Cisco UCS Manager GUI Configuration Guide, Release 2.1

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Preface

This preface includes the following sections:

Audience

This guide is intended primarily for data center administrators with responsibilities and expertise in one or more of the following:

- Server administration
- Storage administration
- Network administration
- Network security

Conventions

Text Type	Indication
GUI elements	GUI elements such as tab titles, area names, and field labels appear in **this font**. Main titles such as window, dialog box, and wizard titles appear in **this font**.
Document titles	Document titles appear in *this font*.
TUI elements	In a Text-based User Interface, text the system displays appears in `this font`.
System output	Terminal sessions and information that the system displays appear in `this font`.

Text Type	Indication
CLI commands	CLI command keywords appear in **this font**. Variables in a CLI command appear in *this font*.
[ ]	Elements in square brackets are optional.
{x | y | z}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Caution Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

⚠

Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Related Cisco UCS Documentation

Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: http://www.cisco.com/go/unifiedcomputing/b-series-doc.

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: http://www.cisco.com/go/unifiedcomputing/c-series-doc.

Other Documentation Resources

An ISO file containing all B and C-Series documents is available at the following URL: http://www.cisco.com/cisco/software/type.html?mdfid=283853163&flowid=25821. From this page, click **Unified Computing System (UCS) Documentation Roadmap Bundle**.

The ISO file is updated after every major documentation release.

Follow Cisco UCS Docs on Twitter to receive document update notifications.

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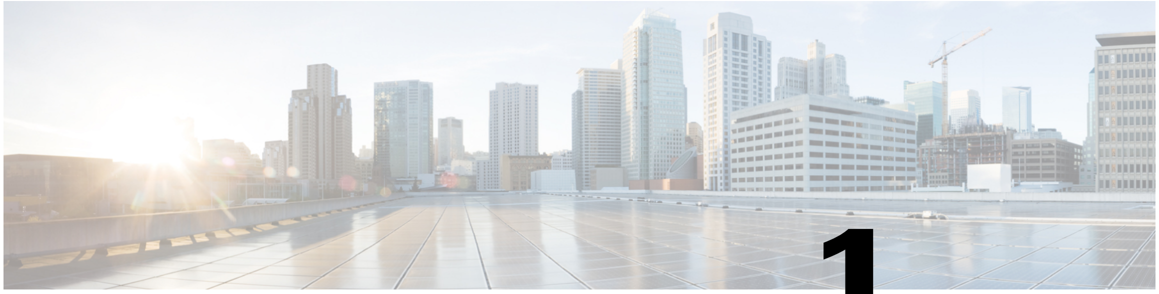
PART I

Introduction



CHAPTER 1

New and Changed Information

This chapter includes the following sections:

New and Changed Information for this Release

The following table provides an overview of the significant changes to this guide for this current release. The table does not provide an exhaustive list of all changes made to the configuration guides or of the new features in this release. For information about new supported hardware in this release, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: http://www.cisco.com/go/unifiedcomputing/b-series-doc.

Table 1: New Features and Changed Behavior in Cisco UCS, Release 2.1(1)

Feature	Description	Where Documented
Cisco UCS Central	Provides a global view of an entire data center through multiple Cisco UCS Manager sessions. You can use Cisco UCS Central to manage Cisco UCS operations for an individual data center or for multiple data centers. Cisco UCS Central facilitates operational management for registered Cisco UCS domains for firmware management, catalog management, global service profiles, statistics management, configuration backup and restore operations, monitor log, core files, and faults.	This feature is documented in the Cisco UCS Central configuration guides and other documentation. The Cisco UCS Central documentation is available at the following URL: http://www.cisco.com/en/US/products/ps12502/products_installation_and_configuration_guides_list.html

Feature	Description	Where Documented
Cisco UCS C-Series Server Integration through Single Wire Management	Enables you to integrate Cisco UCS C-Series rack servers through a single-wire management mode, using Network Controller Sideband Interface (NC-SI). Integration through double-wire management is also available in this release.	This feature is documented in *Cisco UCS C-Series Server Integration with Cisco UCS Manager 2.1*. The C-Series integration guides can be found here: http://www.cisco.com/en/US/partner/products/ps11736/products_installation_and_configuration_guides_list.html
Default vNIC and vHBA Behavior Policies	Enables you to specify how vNICs and vHBAs are created for a service profile. You can choose to create vNICS and vHBAs manually, or you can allow Cisco UCS Manager to create them automatically.	Default vNIC Behavior Policy: Configuring Network-Related Policies, on page 257 Default vHBA Behavior Policy: Configuring Storage-Related Policies, on page 329
Fault Suppression	Enables you to suppress SNMP trap and Call Home notifications during planned maintenance time. You can create a fault suppression task to prevent notifications from being sent whenever a transient fault is raised or cleared.	Fault Suppression, on page 755
FCoE Uplink Ports	Enables you to configure an Ethernet port as an FCoE uplink port to carry Ethernet traffic and/or Fibre Channel traffic.	FCoE Uplink Ports, on page 80
FCoE Port Channels	Enables you to group several physical FCoE ports to create one logical FCoE channel link to provide fault-tolerance and high-speed connectivity.	FCoE Port Channels, on page 95
Fibre Channel Zoning	Enables 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.	Configuring Fibre Channel Zoning, on page 351

Feature	Description	Where Documented
Firmware Auto Install	Enables you to upgrade a Cisco UCS domain to the firmware versions contained in a single package in the following two stages: infrastructure firmware upgrade and server firmware upgrade.	This feature is documented in the following configuration guides: • *Cisco UCS B-Series Firmware GUI Configuration Guide* • *Cisco UCS B-Series Firmware CLI Configuration Guide* The firmware configuration guides can be found here: http://www.cisco.com/en/US/products/ps10281/products_installation_and_configuration_guides_list.html
Firmware Cross-Version Support	Enables you to upgrade the infrastructure firmware in a Cisco UCS domain to Cisco UCS, Release 2.1 and leave the server firmware at Cisco UCS, Release 2.0, allowing you to avoid disruptive server reboots.	This feature is documented in the following configuration guides: • *Cisco UCS B-Series Firmware GUI Configuration Guide* • *Cisco UCS B-Series Firmware CLI Configuration Guide* The firmware configuration guides can be found here: http://www.cisco.com/en/US/products/ps10281/products_installation_and_configuration_guides_list.html
LAN and SAN Connectivity Policies for Service Profile Configuration	Enables you to configure connectivity policies that govern the connections and the network communication resources between the server and the LAN or SAN on the network. These policies enable you to restrict the creation of LAN and SAN connectivity to network and storage administrators, while still allowing employees with the appropriate privileges to create service profiles and service profile templates.	LAN Connectivity Policies: Configuring Network-Related Policies, on page 257 SAN Connectivity Policies: Configuring Storage-Related Policies, on page 329

Feature	Description	Where Documented
Multicast Policy	Enables you to configure Internet Group Management Protocol (IGMP) snooping and IGMP querier to dynamically determine which hosts in a VLAN should be included in particular multicast transmissions.	Multicast Policy, on page 284
Privileges documentation	Provides detailed information about user privileges in Cisco UCS in a separate reference document.	This feature is documented in *Privileges in Cisco UCS* available at the following URL: http://www.cisco.com/en/US/products/ps10281/prod_technical_reference_list.html.
Scheduled backups	Enables you to schedule full state backups and all configuration exports.	Scheduled Backups, on page 659
Service Profile Renaming	Enables you to change the name of an existing service profile.	Configuring Service Profiles
Support for discovery of flash I/O devices	Includes discovery and inventory for PCIe-based flash storage devices in supported Cisco UCS servers.	
Support for Multiple Receive Queue Support (MRQS) on Linux	Includes eNIC support for the Multiple Receive Queue Support (MRQS) feature on Red Hat Enterprise Linux Version 6.x and SUSE Linux Enterprise Server Version 11.x.	Configuring an Ethernet Adapter Policy to Enable eNIC Support for MRQS on Linux Operating Systems, on page 267
Troubleshooting Enhancements for Finite State Machine (FSM) processes	Provides an expansion of the information displayed about FSMs, including expected FSM stage transitions and current and prior stage history.	
Unified Uplink Ports	Enables you to configure an Ethernet port and FCoE port on the same physical port.	Unified Uplink Ports, on page 83
Unified Uplink Port Channels	Enables you to configure an Ethernet port channel and FCoE port channel on the same ID, to create one logical unified uplink port channel link to provide fault-tolerance and high-speed connectivity.	Unified Uplink Port Channel, on page 96

Feature	Description	Where Documented
Unified Storage Ports	Enables you to configure the same physical port as an Ethernet storage interface and FCoE storage interface.	Unified Storage Ports, on page 81
vCon Assignment and Distribution	Changes the algorithm that Cisco UCS uses to implicitly assign vNICs and vHBAs to vCons, and enables you to explicitly assign a vNIC or vHBA to a vCon through vNIC/vHBA Placement Policies.	Configuring Server-Related Policies, on page 381
VLAN Port Count Optimization	Maps the state of multiple VLANs into a single internal state and logically group VLANs based on the port VLAN count. This grouping increases the port VLAN count, compresses the VLAN state, and reduces the CPU load on the fabric interconnect.	VLAN Port Count Optimization, on page 236
VLAN Groups	Groups VLANs on Ethernet ports by function or by VLANs that belong to a specific network.	VLAN Groups, on page 238
VLAN Permissions	Restricts access to VLANs based on specified organizations and restricts the set of VLANs you can assign to service profile vNICs.	VLAN Permissions, on page 240
CIMC Session Management	Cisco UCS Manager, release 2.1(2) provides the ability to view and close KVM, media and SOL sessions. If you are an admin user, you can close sessions of other users.	CIMC Session Management, on page 649
Managing Transportable Flash Module and Supercapacitor	Cisco UCS Manager, release 2.1(2) provides the ability to manage TFM and Supercapacitor.	Managing Transportable Flash Module and Supercapacitor, on page 709
Nested LDAP Group	Cisco UCS Manager, release 2.1(2) provides support for nested LDAP group support.	Nested LDAP Groups, on page 124

Feature	Description	Where Documented
VM-FEX Integration for Hyper-V SRIOV	Cisco Virtual Machine Fabric Extender (VM-FEX) for Hyper-V provides management integration and network communication between Cisco UCS Manager and VMware vCenter.	This feature is documented in the following configuration guides: • *Cisco UCS Manager VM-FEX for Hyper-V GUI Configuration Guide* • *Cisco UCS Manager VM-FEX for Hyper-V CLI Configuration Guide* The VM-FEX configuration guides can be found here: http://www.cisco.com/en/US/products/ps10281/products_installation_and_configuration_guides_list.html
VM-FEX Integration for KVM (Red Hat Linux) SRIOV	Includes enhancements and significant improvements to the functionality of Cisco Virtual Machine Fabric Extender (VM-FEX) for KVM, which provides external switching for virtual machines running on a KVM Linux-based hypervisor in a Cisco UCS domain.	This feature is documented in the following configuration guides: • *Cisco UCS Manager VM-FEX for KVM GUI Configuration Guide* • *Cisco UCS Manager VM-FEX for KVM CLI Configuration Guide* The VM-FEX configuration guides can be found here: http://www.cisco.com/en/US/products/ps10281/products_installation_and_configuration_guides_list.html

CHAPTER 2

Overview of Cisco Unified Computing System

This chapter includes the following sections:

About Cisco Unified Computing System

Cisco Unified Computing System (Cisco UCS) fuses access layer networking and servers. This high-performance, next-generation server system provides a data center with a high degree of workload agility and scalability.

The hardware and software components support Cisco's unified fabric, which runs multiple types of data center traffic over a single converged network adapter.

Architectural Simplification

The simplified architecture of Cisco UCS reduces the number of required devices and centralizes switching resources. By eliminating switching inside a chassis, network access-layer fragmentation is significantly reduced.

Cisco UCS implements Cisco unified fabric within racks and groups of racks, supporting Ethernet and Fibre Channel protocols over 10 Gigabit Cisco Data Center Ethernet and Fibre Channel over Ethernet (FCoE) links.

This radical simplification reduces the number of switches, cables, adapters, and management points by up to two-thirds. All devices in a Cisco UCS domain remain under a single management domain, which remains highly available through the use of redundant components.

High Availability

The management and data plane of Cisco UCS is designed for high availability and redundant access layer fabric interconnects. In addition, Cisco UCS supports existing high availability and disaster recovery solutions for the data center, such as data replication and application-level clustering technologies.

Scalability

A single Cisco UCS domain supports multiple chassis and their servers, all of which are administered through one Cisco UCS Manager. For more detailed information about the scalability, speak to your Cisco representative.

Flexibility

A Cisco UCS domain allows you to quickly align computing resources in the data center with rapidly changing business requirements. This built-in flexibility is determined by whether you choose to fully implement the stateless computing feature.

Pools of servers and other system resources can be applied as necessary to respond to workload fluctuations, support new applications, scale existing software and business services, and accommodate both scheduled and unscheduled downtime. Server identity can be abstracted into a mobile service profile that can be moved from server to server with minimal downtime and no need for additional network configuration.

With this level of flexibility, you can quickly and easily scale server capacity without having to change the server identity or reconfigure the server, LAN, or SAN. During a maintenance window, you can quickly do the following:

- Deploy new servers to meet unexpected workload demand and rebalance resources and traffic.
- Shut down an application, such as a database management system, on one server and then boot it up again on another server with increased I/O capacity and memory resources.

Optimized for Server Virtualization

Cisco UCS has been optimized to implement VM-FEX technology. This technology provides improved support for server virtualization, including better policy-based configuration and security, conformance with a company's operational model, and accommodation for VMware's VMotion.

Unified Fabric

With unified fabric, multiple types of data center traffic can run over a single Data Center Ethernet (DCE) network. Instead of having a series of different host bus adapters (HBAs) and network interface cards (NICs) present in a server, unified fabric uses a single converged network adapter. This type of adapter can carry LAN and SAN traffic on the same cable.

Cisco UCS uses Fibre Channel over Ethernet (FCoE) to carry Fibre Channel and Ethernet traffic on the same physical Ethernet connection between the fabric interconnect and the server. This connection terminates at a converged network adapter on the server, and the unified fabric terminates on the uplink ports of the fabric interconnect. On the core network, the LAN and SAN traffic remains separated. Cisco UCS does not require that you implement unified fabric across the data center.

The converged network adapter presents an Ethernet interface and Fibre Channel interface to the operating system. At the server, the operating system is not aware of the FCoE encapsulation because it sees a standard Fibre Channel HBA.

At the fabric interconnect, the server-facing Ethernet port receives the Ethernet and Fibre Channel traffic. The fabric interconnect (using Ethertype to differentiate the frames) separates the two traffic types. Ethernet frames and Fibre Channel frames are switched to their respective uplink interfaces.

Fibre Channel over Ethernet

Cisco UCS leverages Fibre Channel over Ethernet (FCoE) standard protocol to deliver Fibre Channel. The upper Fibre Channel layers are unchanged, so the Fibre Channel operational model is maintained. FCoE network management and configuration is similar to a native Fibre Channel network.

FCoE encapsulates Fibre Channel traffic over a physical Ethernet link. FCoE is encapsulated over Ethernet with the use of a dedicated Ethertype, 0x8906, so that FCoE traffic and standard Ethernet traffic can be carried on the same link. FCoE has been standardized by the ANSI T11 Standards Committee.

Fibre Channel traffic requires a lossless transport layer. Instead of the buffer-to-buffer credit system used by native Fibre Channel, FCoE depends upon the Ethernet link to implement lossless service.

Ethernet links on the fabric interconnect provide two mechanisms to ensure lossless transport for FCoE traffic:

- Link-level flow control
- Priority flow control

Link-Level Flow Control

IEEE 802.3x link-level flow control allows a congested receiver to signal the endpoint to pause data transmission for a short time. This link-level flow control pauses all traffic on the link.

The transmit and receive directions are separately configurable. By default, link-level flow control is disabled for both directions.

On each Ethernet interface, the fabric interconnect can enable either priority flow control or link-level flow control (but not both).

Priority Flow Control

The priority flow control (PFC) feature applies pause functionality to specific classes of traffic on the Ethernet link. For example, PFC can provide lossless service for the FCoE traffic, and best-effort service for the standard Ethernet traffic. PFC can provide different levels of service to specific classes of Ethernet traffic (using IEEE 802.1p traffic classes).

PFC decides whether to apply pause based on the IEEE 802.1p CoS value. When the fabric interconnect enables PFC, it configures the connected adapter to apply the pause functionality to packets with specific CoS values.

By default, the fabric interconnect negotiates to enable the PFC capability. If the negotiation succeeds, PFC is enabled and link-level flow control remains disabled (regardless of its configuration settings). If the PFC negotiation fails, you can either force PFC to be enabled on the interface or you can enable IEEE 802.x link-level flow control.

Server Architecture and Connectivity

Overview of Service Profiles

Service profiles are the central concept of Cisco UCS. Each service profile serves a specific purpose: ensuring that the associated server hardware has the configuration required to support the applications it will host.

The service profile maintains configuration information about the server hardware, interfaces, fabric connectivity, and server and network identity. This information is stored in a format that you can manage through Cisco UCS Manager. All service profiles are centrally managed and stored in a database on the fabric interconnect.

Every server must be associated with a service profile.

Important At any given time, each server can be associated with only one service profile. Similarly, each service profile can be associated with only one server at a time.

After you associate a service profile with a server, the server is ready to have an operating system and applications installed, and you can use the service profile to review the configuration of the server. If the server associated with a service profile fails, the service profile does not automatically fail over to another server.

When a service profile is disassociated from a server, the identity and connectivity information for the server is reset to factory defaults.

Network Connectivity through Service Profiles

Each service profile specifies the LAN and SAN network connections for the server through the Cisco UCS infrastructure and out to the external network. You do not need to manually configure the network connections for Cisco UCS servers and other components. All network configuration is performed through the service profile.

When you associate a service profile with a server, the Cisco UCS internal fabric is configured with the information in the service profile. If the profile was previously associated with a different server, the network infrastructure reconfigures to support identical network connectivity to the new server.

Configuration through Service Profiles

A service profile can take advantage of resource pools and policies to handle server and connectivity configuration.

Hardware Components Configured by Service Profiles

When a service profile is associated with a server, the following components are configured according to the data in the profile:

- Server, including BIOS and CIMC
- Adapters
- Fabric interconnects

You do not need to configure these hardware components directly.

Server Identity Management through Service Profiles

You can use the network and device identities burned into the server hardware at manufacture or you can use identities that you specify in the associated service profile either directly or through identity pools, such as MAC, WWN, and UUID.

The following are examples of configuration information that you can include in a service profile:

- Profile name and description
- Unique server identity (UUID)
- LAN connectivity attributes, such as the MAC address
- SAN connectivity attributes, such as the WWN

Operational Aspects configured by Service Profiles

You can configure some of the operational functions for a server in a service profile, such as the following:

- Firmware packages and versions
- Operating system boot order and configuration
- IPMI and KVM access

vNIC Configuration by Service Profiles

A vNIC is a virtualized network interface that is configured on a physical network adapter and appears to be a physical NIC to the operating system of the server. The type of adapter in the system determines how many vNICs you can create. For example, a converged network adapter has two NICs, which means you can create a maximum of two vNICs for each adapter.

A vNIC communicates over Ethernet and handles LAN traffic. At a minimum, each vNIC must be configured with a name and with fabric and network connectivity.

vHBA Configuration by Service Profiles

A vHBA is a virtualized host bus adapter that is configured on a physical network adapter and appears to be a physical HBA to the operating system of the server. The type of adapter in the system determines how many vHBAs you can create. For example, a converged network adapter has two HBAs, which means you can create a maximum of two vHBAs for each of those adapters. In contrast, a network interface card does not have any HBAs, which means you cannot create any vHBAs for those adapters.

A vHBA communicates over FCoE and handles SAN traffic. At a minimum, each vHBA must be configured with a name and fabric connectivity.

Service Profiles that Override Server Identity

This type of service profile provides the maximum amount of flexibility and control. This profile allows you to override the identity values that are on the server at the time of association and use the resource pools and policies set up in Cisco UCS Manager to automate some administration tasks.

You can disassociate this service profile from one server and then associate it with another server. This re-association can be done either manually or through an automated server pool policy. The burned-in settings, such as UUID and MAC address, on the new server are overwritten with the configuration in the service profile. As a result, the change in server is transparent to your network. You do not need to reconfigure any component or application on your network to begin using the new server.

This profile allows you to take advantage of and manage system resources through resource pools and policies, such as the following:

- Virtualized identity information, including pools of MAC addresses, WWN addresses, and UUIDs
- Ethernet and Fibre Channel adapter profile policies
- Firmware package policies
- Operating system boot order policies

Unless the service profile contains power management policies, a server pool qualification policy, or another policy that requires a specific hardware configuration, the profile can be used for any type of server in the Cisco UCS domain.

You can associate these service profiles with either a rack-mount server or a blade server. The ability to migrate the service profile depends upon whether you choose to restrict migration of the service profile.

Note If you choose not to restrict migration, Cisco UCS Manager does not perform any compatibility checks on the new server before migrating the existing service profile. If the hardware of both servers are not similar, the association might fail.

Service Profiles that Inherit Server Identity

This hardware-based service profile is the simplest to use and create. This profile uses the default values in the server and mimics the management of a rack-mounted server. It is tied to a specific server and cannot be moved or migrated to another server.

You do not need to create pools or configuration policies to use this service profile.

This service profile inherits and applies the identity and configuration information that is present at the time of association, such as the following:

- MAC addresses for the two NICs
- For a converged network adapter or a virtual interface card, the WWN addresses for the two HBAs
- BIOS versions
- Server UUID

Important The server identity and configuration information inherited through this service profile may not be the values burned into the server hardware at manufacture if those values were changed before this profile is associated with the server.

Service Profile Templates

With a service profile template, you can quickly create several service profiles with the same basic parameters, such as the number of vNICs and vHBAs, and with identity information drawn from the same pools.

Tip If you need only one service profile with similar values to an existing service profile, you can clone a service profile in the Cisco UCS Manager GUI.

For example, if you need several service profiles with similar values to configure servers to host database software, you can create a service profile template, either manually or from an existing service profile. You then use the template to create the service profiles.

Cisco UCS supports the following types of service profile templates:

Initial template

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.

Updating template

Service profiles created from an updating template inherit all the properties of the template and remain connected to the template. Any changes to the template automatically update the service profiles created from the template.

Policies

Policies determine how Cisco UCS components will act in specific circumstances. You can create multiple instances of most policies. For example, you might want different boot policies, so that some servers can PXE boot, some can SAN boot, and others can boot from local storage.

Policies allow separation of functions within the system. A subject matter expert can define policies that are used in a service profile, which is created by someone without that subject matter expertise. For example, a LAN administrator can create adapter policies and quality of service policies for the system. These policies can then be used in a service profile that is created by someone who has limited or no subject matter expertise with LAN administration.

You can create and use two types of policies in Cisco UCS Manager:

- Configuration policies that configure the servers and other components
- Operational policies that control certain management, monitoring, and access control functions

Pools

Pools are collections of identities, or physical or logical resources, that are available in the system. All pools increase the flexibility of service profiles and allow you to centrally manage your system resources.

You can use pools to segment unconfigured servers or available ranges of server identity information into groupings that make sense for the data center. For example, if you create a pool of unconfigured servers with similar characteristics and include that pool in a service profile, you can use a policy to associate that service profile with an available, unconfigured server.

If you pool identifying information, such as MAC addresses, you can preassign ranges for servers that host specific applications. For example, you can configure all database servers within the same range of MAC addresses, UUIDs, and WWNs.

Domain Pools

Domain Pools are defined locally in a Cisco UCS domain, and can only be used in that Cisco UCS domain.

Global Pools

Global Pools are defined in Cisco UCS Central, and can be shared between Cisco UCS domains. If a Cisco UCS domain is registered with Cisco UCS Central, you can assign **Global Pools** in Cisco UCS Manager.

Traffic Management

Oversubscription

Oversubscription occurs when multiple network devices are connected to the same fabric interconnect port. This practice optimizes fabric interconnect use, since ports rarely run at maximum speed for any length of time. As a result, when configured correctly, oversubscription allows you to take advantage of unused bandwidth. However, incorrectly configured oversubscription can result in contention for bandwidth and a lower quality of service to all services that use the oversubscribed port.

For example, oversubscription can occur if four servers share a single uplink port, and all four servers attempt to send data at a cumulative rate higher than available bandwidth of uplink port.

Oversubscription Considerations

The following elements can impact how you configure oversubscription in a Cisco UCS domain:

Ratio of Server-Facing Ports to Uplink Ports

You need to know what how many server-facing ports and uplink ports are in the system, because that ratio can impact performance. For example, if your system has twenty ports that can communicate down to the servers and only two ports that can communicate up to the network, your uplink ports will be oversubscribed. In this situation, the amount of traffic created by the servers can also affect performance.

Number of Uplink Ports from Fabric Interconnect to Network

You can choose to add more uplink ports between the Cisco UCS fabric interconnect and the upper layers of the LAN to increase bandwidth. In Cisco UCS, you must have at least one uplink port per fabric interconnect to ensure that all servers and NICs to have access to the LAN. The number of LAN uplinks should be determined by the aggregate bandwidth needed by all Cisco UCS servers.

For the 6100 series fabric interconnects, Fibre Channel uplink ports are available on the expansion slots only. You must add more expansion slots to increase number of available Fibre Channel uplinks. Ethernet uplink ports can exist on the fixed slot and on expansion slots.

For the 6200 series fabric interconnects running Cisco UCS Manager, version 2.0 and higher, Ethernet uplink ports and Fibre Channel uplink ports are both configurable on the base module, as well as on the expansion module.

For example, if you have two Cisco UCS 5100 series chassis that are fully populated with half width Cisco UCS B200-M1 servers, you have 16 servers. In a cluster configuration, with one LAN uplink per fabric interconnect, these 16 servers share 20GbE of LAN bandwidth. If more capacity is needed, more uplinks from the fabric interconnect should be added. We recommend that you have symmetric configuration of the uplink in cluster configurations. In the same example, if 4 uplinks are used in each fabric interconnect, the 16 servers are sharing 80 GB of bandwidth, so each has approximately 5 GB of capacity. When multiple uplinks are used on a Cisco UCS fabric interconnect the network design team should consider using a port channel to make best use of the capacity.

Number of Uplink Ports from I/O Module to Fabric Interconnect

You can choose to add more bandwidth between I/O module and fabric interconnect by using more uplink ports and increasing the number of cables. In Cisco UCS, you can have one, two, or four cables connecting a I/O module to a Cisco UCS 6100 series fabric interconnect. You can have up to eight cables if you're connecting a 2208 I/O module and a 6248 fabric interconnect. The number of cables determines the number of active uplink ports and the oversubscription ratio.

Number of Active Links from Server to Fabric Interconnect

The amount of non-oversubscribed bandwidth available to each server depends on the number of I/O modules used and the number of cables used to connect those I/O modules to the fabric interconnects. Having a second I/O module in place provides additional bandwidth and redundancy to the servers. This level of flexibility in design ensures that you can provide anywhere from 80 Gbps (two I/O modules with four links each) to 10 Gbps (one I/O module with one link) to the chassis.

With 80 Gbps to the chassis, each half-width server in the Cisco UCS domain can get up to 10 Gbps in a non-oversubscribed configuration, with an ability to use up to 20 Gbps with 2:1 oversubscription.

Guidelines for Estimating Oversubscription

When you estimate the optimal oversubscription ratio for a fabric interconnect port, consider the following guidelines:

Cost/Performance Slider

The prioritization of cost and performance is different for each data center and has a direct impact on the configuration of oversubscription. When you plan hardware usage for oversubscription, you need to know where the data center is located on this slider. For example, oversubscription can be minimized if the data center is more concerned with performance than cost. However, cost is a significant factor in most data centers, and oversubscription requires careful planning.

Bandwidth Usage

The estimated bandwidth that you expect each server to actually use is important when you determine the assignment of each server to a fabric interconnect port and, as a result, the oversubscription ratio of the ports. For oversubscription, you must consider how many GBs of traffic the server will consume on average, the ratio of configured bandwidth to used bandwidth, and the times when high bandwidth use will occur.

Network Type

The network type is only relevant to traffic on uplink ports, because FCoE does not exist outside Cisco UCS. The rest of the data center network only differentiates between LAN and SAN traffic. Therefore, you do not need to take the network type into consideration when you estimate oversubscription of a fabric interconnect port.

Pinning

Pinning in Cisco UCS is only relevant to uplink ports. You can pin Ethernet or FCoE traffic from a given server to a specific uplink Ethernet port or uplink FC port.

When you pin the NIC and HBA of both physical and virtual servers to uplink ports, you give the fabric interconnect greater control over the unified fabric. This control ensures more optimal utilization of uplink port bandwidth.

Cisco UCS uses pin groups to manage which NICs, vNICs, HBAs, and vHBAs are pinned to an uplink port. To configure pinning for a server, you can either assign a pin group directly, or include a pin group in a vNIC policy, and then add that vNIC policy to the service profile assigned to that server. All traffic from the vNIC or vHBA on the server travels through the I/O module to the same uplink port.

Pinning Server Traffic to Server Ports

All server traffic travels through the I/O module to server ports on the fabric interconnect. The number of links for which the chassis is configured determines how this traffic is pinned.

The pinning determines which server traffic goes to which server port on the fabric interconnect. This pinning is fixed. You cannot modify it. As a result, you must consider the server location when you determine the appropriate allocation of bandwidth for a chassis.

Note You must review the allocation of ports to links before you allocate servers to slots. The cabled ports are not necessarily port 1 and port 2 on the I/O module. If you change the number of links between the fabric interconnect and the I/O module, you must reacknowledge the chassis to have the traffic rerouted.

All port numbers refer to the fabric interconnect-side ports on the I/O module.

Chassis with One I/O Module (Not Configured for Fabric Port Channels)

Note If the adapter in a server supports and is configured for adapter port channels, those port channels are pinned to the same link as described in the following table. If the I/O module in the chassis supports and is configured for fabric port channels, the server slots are pinned to a fabric port channel rather than to an individual link.

Links on Chassis	Link 1 / Fabric Port Channel	Link 2	Link 3	Link 4	Link 5	Link 6	Link 7	Link 8
1 link	All server slots	None	None	None	None	None	None	None

Links on Chassis	Link 1 / Fabric Port Channel	Link 2	Link 3	Link 4	Link 5	Link 6	Link 7	Link 8
2 links	Server slots 1, 3, 5, and 7	Server slots 2, 4, 6, and 8	None	None	None	None	None	None
4 links	Server slots 1 and 5	Server slots 2 and 6	Server slots 3 and 7	Server slots 4 and 8	None	None	None	None
8 links	Server slot 1	Server slot 2	Server slot 3	Server slot 4	Server slot 5	Server slot 6	Server slot 7	Server slot 8
Fabric Port Channel	All server slots	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Chassis with Two I/O Modules

If a chassis has two I/O modules, traffic from one I/O module goes to one of the fabric interconnects and traffic from the other I/O module goes to the second fabric interconnect. You cannot connect two I/O modules to a single fabric interconnect.

Fabric Interconnect Configured in vNIC	Server Traffic Path
A	Server traffic goes to fabric interconnect A. If A fails, the server traffic does not fail over to B.
B	All server traffic goes to fabric interconnect B. If B fails, the server traffic does not fail over to A.
A-B	All server traffic goes to fabric interconnect A. If A fails, the server traffic fails over to B.
B-A	All server traffic goes to fabric interconnect B. If B fails, the server traffic fails over to A.

Guidelines for Pinning

When you determine the optimal configuration for pin groups and pinning for an uplink port, consider the estimated bandwidth usage for the servers. If you know that some servers in the system will use a lot of bandwidth, ensure that you pin these servers to different uplink ports.

Quality of Service

Cisco UCS provides the following methods to implement quality of service:

- System classes that specify the global configuration for certain types of traffic across the entire system
- QoS policies that assign system classes for individual vNICs
- Flow control policies that determine how uplink Ethernet ports handle pause frames

System Classes

Cisco UCS uses Data Center Ethernet (DCE) to handle all traffic inside a Cisco UCS domain. This industry standard enhancement to Ethernet divides the bandwidth of the Ethernet pipe into eight virtual lanes. Two virtual lanes are reserved for internal system and management traffic. You can configure quality of service (Qos) for the other six virtual lanes. System classes determine how the DCE bandwidth in these six virtual lanes is allocated across the entire Cisco UCS domain.

Each system class reserves a specific segment of the bandwidth for a specific type of traffic, which provides a level of traffic management, even in an oversubscribed system. For example, you can configure the Fibre Channel Priority system class to determine the percentage of DCE bandwidth allocated to FCoE traffic.

The following table describes the system classes that you can configure.

Table 2: System Classes

System Class	Description
Platinum Gold Silver Bronze	A configurable set of system classes that you can include in the QoS policy for a service profile. Each system class manages one lane of traffic. All properties of these system classes are available for you to assign custom settings and policies.
Best Effort	A system class that sets the quality of service for the lane reserved for basic Ethernet traffic. Some properties of this system class are preset and cannot be modified. For example, this class has a drop policy that allows it to drop data packets if required. You cannot disable this system class.
Fibre Channel	A system class that sets the quality of service for the lane reserved for Fibre Channel over Ethernet traffic. Some properties of this system class are preset and cannot be modified. For example, this class has a no-drop policy that ensures it never drops data packets. You cannot disable this system class. **Note** FCoE traffic has a reserved QoS system class that should not be used by any other type of traffic. If any other type of traffic has a CoS value that is used by FCoE, the value is remarked to 0.

Quality of Service Policy

A 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.

You must include a QoS policy in a vNIC policy or vHBA policy and then include that policy in a service profile to configure the vNIC or vHBA.

Flow Control Policy

Flow control policies determine whether the uplink Ethernet ports in a Cisco UCS domain send and receive IEEE 802.3x pause frames when the receive buffer for a port fills. These pause frames request that the transmitting port stop sending data for a few milliseconds until the buffer clears.

For flow control to work between a LAN port and an uplink Ethernet port, you must enable the corresponding receive and send flow control parameters for both ports. For Cisco UCS, the flow control policies configure these parameters.

When you enable the send function, the uplink Ethernet port sends a pause request to the network port if the incoming packet rate becomes too high. The pause remains in effect for a few milliseconds before traffic is reset to normal levels. If you enable the receive function, the uplink Ethernet port honors all pause requests from the network port. All traffic is halted on that uplink port until the network port cancels the pause request.

Because you assign the flow control policy to the port, changes to the policy have an immediate effect on how the port reacts to a pause frame or a full receive buffer.

Opt-In Features

Each Cisco UCS domain is licensed for all functionality. Depending upon how the system is configured, you can decide to opt in to some features or opt out of them for easier integration into existing environment. If a process change happens, you can change your system configuration and include one or both of the opt-in features.

The opt-in features are as follows:

- Stateless computing, which takes advantage of mobile service profiles with pools and policies where each component, such as a server or an adapter, is stateless.
- Multi-tenancy, which uses organizations and role-based access control to divide the system into smaller logical segments.

Stateless Computing

Stateless computing allows you to use a service profile to apply the personality of one server to a different server in the same Cisco UCS domain. The personality of the server includes the elements that identify that server and make it unique in the Cisco UCS domain. If you change any of these elements, the server could lose its ability to access, use, or even achieve booted status.

The elements that make up a server's personality include the following:

- Firmware versions
- UUID (used for server identification)

- MAC address (used for LAN connectivity)
- World Wide Names (used for SAN connectivity)
- Boot settings

Stateless computing creates a dynamic server environment with highly flexible servers. Every physical server in a Cisco UCS domain remains anonymous until you associate a service profile with it, then the server gets the identity configured in the service profile. If you no longer need a business service on that server, you can shut it down, disassociate the service profile, and then associate another service profile to create a different identity for the same physical server. The "new" server can then host another business service.

To take full advantage of the flexibility of statelessness, the optional local disks on the servers should only be used for swap or temp space and not to store operating system or application data.

You can choose to fully implement stateless computing for all physical servers in a Cisco UCS domain, to not have any stateless servers, or to have a mix of the two types.

If You Opt In to Stateless Computing

Each physical server in the Cisco UCS domain is defined through a service profile. Any server can be used to host one set of applications, then reassigned to another set of applications or business services, if required by the needs of the data center.

You create service profiles that point to policies and pools of resources that are defined in the Cisco UCS domain. The server pools, WWN pools, and MAC pools ensure that all unassigned resources are available on an as-needed basis. For example, if a physical server fails, you can immediately assign the service profile to another server. Because the service profile provides the new server with the same identity as the original server, including WWN and MAC address, the rest of the data center infrastructure sees it as the same server and you do not need to make any configuration changes in the LAN or SAN.

If You Opt Out of Stateless Computing

Each server in the Cisco UCS domain is treated as a traditional rack mount server.

You create service profiles that inherit the identify information burned into the hardware and use these profiles to configure LAN or SAN connectivity for the server. However, if the server hardware fails, you cannot reassign the service profile to a new server.

Multitenancy

Multitenancy allows you to divide the large physical infrastructure of an Cisco UCS domain into logical entities known as organizations. As a result, you can achieve a logical isolation between organizations without providing a dedicated physical infrastructure for each organization.

You can assign unique resources to each tenant through the related organization, in the multitenant environment. These resources can include different policies, pools, and quality of service definitions. You can also implement locales to assign or restrict user privileges and roles by organization, if you do not want all users to have access to all organizations.

If you set up a multitenant environment, all organizations are hierarchical. The top-level organization is always root. The policies and pools that you create in root are system-wide and are available to all organizations in the system. However, any policies and pools created in other organizations are only available to organizations that are above it in the same hierarchy. For example, if a system has organizations named Finance and HR that are not in the same hierarchy, Finance cannot use any policies in the HR organization, and HR cannot access any policies in the Finance organization. However, both Finance and HR can use policies and pools in the root organization.

If you create organizations in a multitenant environment, you can also set up one or more of the following for each organization or for a suborganization in the same hierarchy:

- Resource pools
- Policies
- Service profiles
- Service profile templates

If You Opt In to Multitenancy

Each Cisco UCS domain is divided into several distinct organizations. The types of organizations you create in a multitenancy implementation depends upon the business needs of the company. Examples include organizations that represent the following:

- Enterprise groups or divisions within a company, such as marketing, finance, engineering, or human resources
- Different customers or name service domains, for service providers

You can create locales to ensure that users have access only to those organizations that they are authorized to administer.

If You Opt Out of Multitenancy

The Cisco UCS domain remains a single logical entity with everything in the root organization. All policies and resource pools can be assigned to any server in the Cisco UCS domain.

Virtualization in Cisco UCS

Overview of Virtualization

Virtualization allows you to create multiple Virtual Machines (VMs) to run in isolation, side by side on the same physical machine.

Each virtual machine has its own set of virtual hardware (RAM, CPU, NIC) upon which an operating system and fully configured applications are loaded. The operating system sees a consistent, normalized set of hardware regardless of the actual physical hardware components.

In a virtual machine, both hardware and software are encapsulated in a single file for rapid provisioning and moving between physical servers. You can move a virtual machine, within seconds, from one physical server to another for zero-downtime maintenance and continuous workload consolidation.

The virtual hardware makes it possible for many servers, each running in an independent virtual machine, to run on a single physical server. The advantages of virtualization include better use of computing resources, greater server density, and seamless server migration.

Overview of Cisco Virtual Machine Fabric Extender

A virtualized server implementation consists of one or more VMs that run as guests on a single physical server. The guest VMs are hosted and managed by a software layer called the hypervisor or virtual machine manager (VMM). Typically, the hypervisor presents a virtual network interface to each VM and performs Layer 2 switching of traffic from a VM to other local VMs or to another interface to the external network.

Working with a Cisco virtual interface card (VIC) adapter, the Cisco Virtual Machine Fabric Extender (VM-FEX) bypasses software-based switching of VM traffic by the hypervisor for external hardware-based switching in the fabric interconnect. This method reduces the load on the server CPU, provides faster switching, and enables you to apply a rich set of network management features to local and remote traffic.

VM-FEX extends the IEEE 802.1Qbh port extender architecture to the VMs by providing each VM interface with a virtual Peripheral Component Interconnect Express (PCIe) device and a virtual port on a switch. This solution allows precise rate limiting and quality of service (QoS) guarantees on the VM interface.

Virtualization with Network Interface Cards and Converged Network Adapters

Network interface card (NIC) and converged network adapters support virtualized environments with the standard VMware integration with ESX installed on the server and all virtual machine management performed through the VC.

Portability of Virtual Machines

If you implement service profiles you retain the ability to easily move a server identity from one server to another. After you image the new server, the ESX treats that server as if it were the original.

Communication between Virtual Machines on the Same Server

These adapters implement the standard communications between virtual machines on the same server. If an ESX host includes multiple virtual machines, all communications must go through the virtual switch on the server.

If the system uses the native VMware drivers, the virtual switch is out of the network administrator's domain and is not subject to any network policies. As a result, for example, QoS policies on the network are not applied to any data packets traveling from VM1 to VM2 through the virtual switch.

If the system includes another virtual switch, such as the Nexus 1000, that virtual switch is subject to the network policies configured on that switch by the network administrator.

Virtualization with a Virtual Interface Card Adapter

A Cisco VIC adapter, such as the Cisco UCS M81KR Virtual Interface Card, is a converged network adapter (CNA) that is designed for both single-OS and VM-based deployments. The VIC adapter supports static or dynamic virtualized interfaces, which includes up to 128 virtual network interface cards (vNICs).

VIC adapters support VM-FEX to provide hardware-based switching of traffic to and from virtual machine interfaces.

CHAPTER 3

Overview of Cisco UCS Manager

This chapter includes the following sections:

About Cisco UCS Manager

Cisco UCS Manager is the management system for all components in a Cisco UCS domain. Cisco UCS Manager runs within the fabric interconnect. You can use any of the interfaces available with this management service to access, configure, administer, and monitor the network and server resources for all chassis connected to the fabric interconnect.

Multiple Management Interfaces

Cisco UCS Manager includes the following interfaces you can use to manage a Cisco UCS domain:

- Cisco UCS Manager GUI
- Cisco UCS Manager CLI
- XML API
- KVM
- IPMI

Almost all tasks can be performed in any of the interfaces, and the results of tasks performed in one interface are automatically displayed in another.

However, you cannot do the following:

- Use Cisco UCS Manager GUI to invoke Cisco UCS Manager CLI.
- View the results of a command invoked through Cisco UCS Manager CLI in Cisco UCS Manager GUI.
- Generate CLI output from Cisco UCS Manager GUI.

Centralized Management

Cisco UCS Manager centralizes the management of resources and devices, rather than using multiple management points. This centralized management includes management of the following devices in a Cisco UCS domain:

- Fabric interconnects.
- Software switches for virtual servers.
- Power and environmental management for chassis and servers.
- Configuration and firmware updates for server network interfaces (Ethernet NICs and converged network adapters).
- Firmware and BIOS settings for servers.

Support for Virtual and Physical Servers

Cisco UCS Manager abstracts server state information—including server identity, I/O configuration, MAC addresses and World Wide Names, firmware revision, and network profiles—into a service profile. You can apply the service profile to any server resource in the system, providing the same flexibility and support to physical servers, virtual servers, and virtual machines connected to a virtual device provided by a VIC adapter.

Role-Based Administration and Multi-Tenancy Support

Cisco UCS Manager supports flexibly defined roles so that data centers can use the same best practices with which they manage discrete servers, storage, and networks to operate a Cisco UCS domain. You can create user roles with privileges that reflect user responsibilities in the data center. For example, you can create the following:

- Server administrator roles with control over server-related configurations.
- Storage administrator roles with control over tasks related to the SAN.
- Network administrator roles with control over tasks related to the LAN.

Cisco UCS is multi-tenancy ready, exposing primitives that allow systems management software using the API to get controlled access to Cisco UCS resources. In a multi-tenancy environment, Cisco UCS Manager enables you to create locales for user roles that can limit the scope of a user to a particular organization.

Tasks You Can Perform in Cisco UCS Manager

You can use Cisco UCS Manager to perform management tasks for all physical and virtual devices within a Cisco UCS domain.

Cisco UCS Hardware Management

You can use Cisco UCS Manager to manage all hardware within a Cisco UCS domain, including the following:

- Chassis
- Servers
- Fabric interconnects
- Fans

- Ports
- Interface cards
- I/O modules

Cisco UCS Resource Management

You can use Cisco UCS Manager to create and manage all resources within a Cisco UCS domain, including the following:

- Servers
- WWN addresses
- MAC addresses
- UUIDs
- Bandwidth

Server Administration

A server administrator can use Cisco UCS Manager to perform server management tasks within a Cisco UCS domain, including the following:

- Create server pools and policies related to those pools, such as qualification policies
- Create policies for the servers, such as discovery policies, scrub policies, and IPMI policies
- Create service profiles and, if desired, service profile templates
- Apply service profiles to servers
- Monitor faults, alarms, and the status of equipment

Network Administration

A network administrator can use Cisco UCS Manager to perform tasks required to create LAN configuration for a Cisco UCS domain, including the following:

- Configure uplink ports, port channels, and LAN PIN groups
- Create VLANs
- Configure the quality of service classes and definitions
- Create the pools and policies related to network configuration, such as MAC address pools and Ethernet adapter profiles

Storage Administration

A storage administrator can use Cisco UCS Manager to perform tasks required to create SAN configuration for a Cisco UCS domain, including the following:

- Configure ports, port channels, and SAN PIN groups
- Create VSANs
- Configure the quality of service classes and definitions

- Create the pools and policies related to the network configuration, such as WWN pools and Fibre Channel adapter profiles

Tasks You Cannot Perform in Cisco UCS Manager

You cannot use Cisco UCS Manager to perform certain system management tasks that are not specifically related to device management within a Cisco UCS domain.

No Cross-System Management

You cannot use Cisco UCS Manager to manage systems or devices that are outside the Cisco UCS domain where Cisco UCS Manager is located. For example, you cannot manage heterogeneous environments, such as non-Cisco UCS x86 systems, SPARC systems, or PowerPC systems.

No Operating System or Application Provisioning or Management

Cisco UCS Manager provisions servers and, as a result, exists below the operating system on a server. Therefore, you cannot use it to provision or manage operating systems or applications on servers. For example, you cannot do the following:

- Deploy an OS, such as Windows or Linux
- Deploy patches for software, such as an OS or an application
- Install base software components, such as anti-virus software, monitoring agents, or backup clients
- Install software applications, such as databases, application server software, or web servers
- Perform operator actions, including restarting an Oracle database, restarting printer queues, or handling non-Cisco UCS user accounts
- Configure or manage external storage on the SAN or NAS storage

Cisco UCS Manager in a High Availability Environment

In a high availability environment with two fabric interconnects, you can run a separate instance of Cisco UCS Manager on each fabric interconnect. The Cisco UCS Manager on the primary fabric interconnect acts as the primary management instance, and the Cisco UCS Manager on the other fabric interconnect is the subordinate management instance.

The two instances of Cisco UCS Manager communicate across a private network between the L1 and L2 Ethernet ports on the fabric interconnects. Configuration and status information is communicated across this private network to ensure that all management information is replicated. This ongoing communication ensures that the management information for Cisco UCS persists even if the primary fabric interconnect fails. In addition, the "floating" management IP address that runs on the primary Cisco UCS Manager ensures a smooth transition in the event of a failover to the subordinate fabric interconnect.

CHAPTER 4

Overview of Cisco UCS Manager GUI

This chapter includes the following sections:

Overview of Cisco UCS Manager GUI

Cisco UCS Manager GUI is the Java application that provides a GUI interface to Cisco UCS Manager. You can start and access Cisco UCS Manager GUI from any computer that meets the requirements listed in the System Requirements section of the Cisco UCS Software Release Notes.

Each time you start Cisco UCS Manager GUI, Cisco UCS Manager uses Java Web Start technology to cache the current version of the application on your computer. As a result, you do not have to download the application every time you log in. You only have to download the application the first time that you log in from a computer after the Cisco UCS Manager software has been updated on a system.

Tip The title bar displays the name of the Cisco UCS domain to which you are connected.

Fault Summary Area

The **Fault Summary** area displays in the upper left of Cisco UCS Manager GUI. This area displays a summary of all faults that have occurred in the Cisco UCS domain.

Each type of fault is represented by a different icon. The number below each icon indicates how many faults of that type have occurred in the system. If you click an icon, Cisco UCS Manager GUI opens the **Faults** tab in the **Work** area and displays the details of all faults of that type.

The following table describes the types of faults each icon in the **Fault Summary** area represents:

Fault Type	Description
Critical Alarms	Critical problems exist with one or more components. These issues should be researched and fixed immediately.
Major Alarms	Serious problems exist with one or more components. These issues should be researched and fixed immediately.
Minor Alarms	Problems exist with one or more components that might adversely affect system performance. These issues should be researched and fixed as soon as possible before they become major or critical issues.
Warning Alarms	Potential problems exist with one or more components that might adversely affect system performance if they are allowed to continue. These issues should be researched and fixed as soon as possible before the problem grows worse.
Suppression Status field	The state of fault suppression tasks on the component. Click **Suppression Task Properties** in the **Actions** area to view all fault suppression tasks. **Note** This field is only displayed if the component supports fault suppression.

Tip If you only want to see faults for a specific object, navigate to that object and then review the **Faults** tab for that object.

Navigation Pane

The **Navigation** pane displays on the left side of Cisco UCS Manager GUI below the **Fault Summary** area. This pane provides centralized navigation to all equipment and other components in the Cisco UCS domain. When you select a component in the **Navigation** pane, the object displays in the **Work** area.

The **Navigation** pane has five tabs. Each tab includes the following elements:

- A **Filter** combo box that you can use to filter the navigation tree to view all nodes or only one node.
- An expandable navigation tree that you can use to access all components on that tab. An icon next to an folder indicates that the node or folder has subcomponents.

Equipment Tab

This tab contains a basic inventory of the equipment in the Cisco UCS domain. A system or server administrator can use this tab to access and manage the chassis, fabric interconnects, servers, and other hardware. A red, orange, or yellow rectangle around a device name indicate that the device has a fault.

The major nodes in this tab are the following:

- **Equipment—**An overview of the entire Cisco UCS domain, including active and decommissioned hardware, firmware management, equipment-related policies, power groups, and an aggregated list of faults.
- **Chassis—**The fans, I/O modules, power supply units (PSUs), and Cisco UCS B-Series blade servers for each chassis in the Cisco UCS domain.
- **Rack-Mounts—**The FEXes and Cisco UCS C-Series rack servers integrated with the Cisco UCS domain.
- **Fabric Interconnects—**The fixed and expansion modules, fans, and PSUs associated with the fabric interconnects in the Cisco UCS domain.

Servers Tab

This tab contains the server-related components, such as service profiles, polices, and pools. A server administrator typically accesses and manages the components on this tab.

The major nodes below the **Servers** node in this tab are the following:

- **Servers—**Service profiles and the relationship between the defined organizations and the service profiles.
- **Service Profiles—**The service profiles defined in the system divided by organization.
- **Service Profile Templates—**The service profile templates defined in the system divided by organization.
- **Policies—**Server-related policies for adapters, BIOS, firmware, IPMI access, local disk configuration, maintenance, power, disk scrubbing, Serial over LAN, server pools, iSCSI authentication, vNIC/vHBA placement, and fault thresholds.
- **Pools—**Server pools and UUID suffix pools.
- **Schedules—**Maintenance and fault suppression schedules.

LAN Tab

This tab contains the components related to LAN configuration, such as LAN pin groups, quality of service classes, VLANs, policies, pools, and the internal domain. A network administrator typically accesses and manages the components on this tab.

The major nodes below the **LAN** node in this tab are the following:

- **LAN Cloud—**Quality of service settings, port channels, pin groups, VLANs, VLAN optimization sets, threshold policies.
- **Appliances—**Interfaces, port channels, and VLANs.
- **Internal LAN—**Ports and threshold polices associated with the internal fabric.
- **Policies—**Policies governing flow control, adapters, vNICs, vNIC templates, quality of services, and fault thresholds.
- **Pools—**The IP pools and MAC pools defined in the system.

- **Traffic Monitoring Sessions—**The port traffic monitoring sessions defined in the system.

SAN Tab

This tab contains the components related to SAN configuration, such as pin groups, VSANs, policies, and pools. A storage administrator typically accesses and manages the components on this tab.

The major nodes in this tab are the following:

- **SAN—**SAN uplinks, fibre channel address assignment, SAN-related pools, and VSANs.
- **SAN Cloud—**SAN uplinks, fibre channel address assignment, SAN-related pools, and VSANs.
- **Storage Cloud—**Storage ports and VSANs.
- **Policies—**Fibre Channel adapter policies, default vHBA behavior, SAN connectivity policies, storage connection policies, vHBA templates, and fault thresholds.
- **Pools—**The iSCSI Qualified Name (IQN) pools and World Wide Name pools defined in the system.
- **Traffic Monitoring Sessions—**The port traffic monitoring sessions defined in the system.

VM Tab

This tab contains the components required to configure VM-FEX for servers with a VIC adapter. For example, you use components on this tab to configure the connection between Cisco UCS Manager and VMware vCenter, to configure distributed virtual switches, port profiles, and to view the virtual machines hosted on servers in the Cisco UCS domain.

The major nodes in this tab are the following:

- **All–**Port profiles, virtual machines, virtual switches, certificates, the lifecycle policy, VM-related events and FSM tasks.
- **Clusters—**Clusters, including the associated virtual machines and port profiles.
- **Port Profiles—**VMWare port profiles.
- **VMware—**vCenters, including folders, Datacenters, virtual machines, and virtual switches

Admin Tab

This tab contains system-wide settings, such as user manager and communication services, and troubleshooting components, such as faults and events. The system administrator typically accesses and manages the components on this tab.

The major nodes in this tab are the following:

- **All—**Management interfaces, backup and import configuration, tech support file creation, the full state backup policy, and the all configuration export policy.
- **Faults, Events and Audit Log—**System-wide faults, events, audit logs, syslog entries, core files, tech support files, and global fault policies.
- **User Management—**Authentication methods, remote access methods, local users, locales, and user roles.
- **Key Management—**SSH key and trusted point settings.

- **Communication Management—**Communication service settings for SSH, Telnet, HTTP, HTTPS, SNMP, web session limits, Call Home settings, DNS management, and management interfaces, and Cisco UCS Central settings.
- **Stats Management—**Threshold statistics settings that control when faults are issued by the system.
- **Time Zone Management—**NTP server settings to establish time zone synchronization.
- **Capability Catalog—**The capability catalog, a set of tunable parameters, strings, and rules.
- **Management Extension—**Management extensions, which allow you add support for previously unsupported servers and other hardware to Cisco UCS Manager.
- **License Management—**The feature and port licenses installed on this system.

Toolbar

The toolbar displays on the right side of Cisco UCS Manager GUI above the **Work** pane. You can use the menu buttons in the toolbar to perform common actions, including the following actions:

- Navigate between previously viewed items in the **Work** pane
- Create elements for the Cisco UCS domain
- Set options for Cisco UCS Manager GUI
- Access online help for Cisco UCS Manager GUI

Work Pane

The **Work** pane displays on the right side of Cisco UCS Manager GUI. This pane displays details about the component selected in the **Navigation** pane.

The **Work** pane includes the following elements:

- A navigation bar that displays the path from the main node of the tab in the **Navigation** pane to the selected element. You can click any component in this path to display that component in the **Work** pane.
- A content area that displays tabs with information related to the component selected in the **Navigation** pane. The tabs displayed in the content area depends upon the selected component. You can use these tabs to view information about the component, create components, modify properties of the component, and examine a selected object.

Status Bar

The status bar displays across the bottom of Cisco UCS Manager GUI. The status bar provides information about the state of the application.

On the left, the status bar displays the following information about your current session in Cisco UCS Manager GUI:

- A lock icon that indicates the protocol you used to log in. If the icon is locked, you connected with HTTPS and if the icon is unlocked, you connected with HTTP.
- The username you used to log in.

- The IP address of the server where you logged in.

On the right, the status bar displays the system time.

Table Customization

Cisco UCS Manager GUI enables you to customize the tables on each tab. You can change the type of content that you view and filter the content.

Table Customization Menu Button

This menu button in the upper right of every table enables you to control and customize your view of the table. The drop-down menu for this button includes the following options:

Menu Item	Description
Column Name	The menu contains an entry for each column in the table. Click a column name to display or hide the column.
Horizontal Scroll	If selected, adds a horizontal scroll bar to the table. If not selected, when you widen one of the columns, all columns to the right narrow and do not scroll.
Pack All Columns	Resizes all columns to their default width.
Pack Selected Column	Resizes only the selected column to its default width.

Table Content Filtering

The **Filter** button above each table enables you to filter the content in the table according to the criteria that you set in the **Filter** dialog box. The dialog box includes the following filtering options:

Name	Description
Disable option	No filtering criteria is used on the content of the column. This is the default setting.
Equal option	Displays only that content in the column which exactly matches the value specified.
Not Equal option	Displays only that content in the column which does not exactly match the value specified.
Wildcard option	The criteria you enter can include one of the following wildcards: • _ (underscore) or ? (question mark)—replaces a single character • % (percent sign) or * (asterisk)—replaces any sequence of characters

Name	Description
Less Than option	Displays only that content in the column which is less than the value specified.
Less Than Or Equal option	Displays only that content in the column which is less than or equal to the value specified.
Greater Than option	Displays only that content in the column which is greater than the value specified.
Greater Than Or Equal option	Displays only that content in the column which is greater than or equal to the value specified.

LAN Uplinks Manager

The LAN Uplinks Manager provides a single interface where you can configure the connections between Cisco UCS and the LAN. You can use the LAN Uplinks Manager to create and configure the following:

- Ethernet switching mode
- Uplink Ethernet ports
- Port channels
- LAN pin groups
- Named VLANs
- Server ports
- QoS system classes

Some of the configuration that you can do in the LAN Uplinks Manager can also be done in nodes on other tabs, such as the **Equipment** tab or the **LAN** tab.

Internal Fabric Manager

The Internal Fabric Manager provides a single interface where you can configure server ports for a fabric interconnect in a Cisco UCS domain. The Internal Fabric Manager is accessible from the **General** tab for that fabric interconnect.

Some of the configuration that you can do in the Internal Fabric Manager can also be done in nodes on the **Equipment** tab, on the **LAN** tab, or in the LAN Uplinks Manager.

Hybrid Display

For each chassis in a Cisco UCS domain, Cisco UCS Manager GUI provides a hybrid display that includes both physical components and connections between the chassis and the fabric interconnects.

This tab displays detailed information about the connections between the selected chassis and the fabric interconnects. It has an icon for the following:

- Each fabric interconnect in the system
- The I/O module (IOM) in the selected component, which is shown as an independent unit to make the connection paths easier to see
- The selected chassis showing the servers and PSUs

The lines between the icons represent the connections between the following:

- DCE interface on each server and the associated server port on the IOM. These connections are created by Cisco and cannot be changed.
- Server port on the IOM and the associated port on the fabric interconnect. You can change these connections if desired.

You can mouse over the icons and lines to view tooltips identifying each component or connection, and you can double-click any component to view properties for that component.

If there is a fault associated with the component or any of its subcomponents, Cisco UCS Manager GUI displays a fault icon on top of the appropriate component. If there are multiple fault messages, Cisco UCS Manager GUI displays the icon associated with the most serious fault message in the system.

Logging in to the Cisco UCS Manager GUI through HTTPS

The default HTTPS web link for the Cisco UCS Manager GUI is `https://UCSManager_IP`, where *UCSManager_IP* represents the IP address assigned to Cisco UCS Manager. This IP address can be one of the following:

- Cluster configuration: `UCSManager_IP` represents the virtual or cluster IP address assigned to Cisco UCS Manager. Do not use the IP addresses assigned to the management port on the fabric interconnects.
- Standalone configuration: `UCSManager_IP` represents the IP address for the management port on the fabric interconnect.

Procedure

Step 1 In your web browser, type the Cisco UCS Manager GUI web link or select the bookmark in your browser.

Step 2 If a **Security Alert** dialog box appears, click **Yes** to accept the security certificate and continue.

Step 3 In the Cisco UCS Manager launch page, click **Launch UCS Manager**.
Depending upon the web browser you use to log in, you may be prompted to download or save the .JNLP file.

Step 4 If Cisco UCS Manager displays a pre-login banner, review the message and click **OK** to close the dialog box.

Step 5 If a **Security** dialog box displays, do the following:

a) (Optional) Check the check box to accept all content from Cisco.
b) Click **Yes** to accept the certificate and continue.

Step 6 In the **Login** dialog box, do the following:

a) Enter your username and password.
b) If your Cisco UCS implementation includes multiple domains, select the appropriate domain from the **Domain** drop-down list.

c) Click **Login**.

Logging in to the Cisco UCS Manager GUI through HTTP

The default HTTP web link for the Cisco UCS Manager GUI is `http://`*`UCSManager_IP`* , where *UCSManager_IP* represents the IP address assigned to Cisco UCS Manager. This IP address can be one of the following:

- Cluster configuration: *`UCSManager_IP`* represents the virtual or cluster IP address assigned to Cisco UCS Manager. Do not use the IP addresses assigned to the management port on the fabric interconnects.
- Standalone configuration: *`UCSManager_IP`* represents the IP address for the management port on the fabric interconnect

Procedure

Step 1 In your web browser, type the Cisco UCS Manager GUI web link or select the bookmark in your browser.

Step 2 If Cisco UCS Manager displays a pre-login banner, review the message and click **OK** to close the dialog box.

Step 3 In the Cisco UCS Manager launch page, click **Launch UCS Manager**.
Depending upon the web browser you use to log in, you may be prompted to download or save the .JNLP file.

Step 4 In the **Login** dialog box, do the following:

a) Enter your username and password.
b) If your Cisco UCS implementation includes multiple domains, select the appropriate domain from the **Domain** drop-down list.
c) Click **Login**.

Logging Out of the Cisco UCS Manager GUI

Procedure

Step 1 In the Cisco UCS Manager GUI, click **Exit** in the upper right.
The Cisco UCS Manager GUI blurs on your screen to indicate that you cannot use it and displays the **Exit** dialog box.

Step 2 From the drop-down list, select one of the following:

- **Exit** to log out and shut down the Cisco UCS Manager GUI.

- **Log Off** to log out of the Cisco UCS Manager GUI and log in a different user.

Step 3 Click **OK**.

Web Session Limits

Web session limits are used by Cisco UCS Manager to restrict the number of web sessions (both GUI and XML) permitted access to the system at any one time.

By default, the number of concurrent web sessions allowed by Cisco UCS Manager is set to the maximum value: 256.

Setting the Web Session Limit for Cisco UCS Manager

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 In the **Work** pane, click the **Communication Services** tab.

Step 4 In the **Web Session Limits** area, complete the following fields:

Name	Description
Maximum Sessions Per User field	The maximum number of concurrent HTTP and HTTPS sessions allowed for each user. Enter an integer between 1 and 256.
Maximum Sessions field	The maximum number of concurrent HTTP and HTTPS sessions allowed for all users within the system. Enter an integer between 1 and 256.

Step 5 Click **Save Changes**.

Pre-Login Banner

With a pre-login banner, when a user logs into Cisco UCS Manager GUI, Cisco UCS Manager displays the banner text in the **Create Pre-Login Banner** dialog box and waits until the user dismisses that dialog box before it prompts for the username and password. When a user logs into Cisco UCS Manager CLI, Cisco UCS Manager displays the banner text in a dialog box and waits for the user to dismiss that dialog box before it prompts for the password. It then repeats the banner text above the copyright block that it displays to the user.

Creating the Pre-Login Banner

If the **Pre-Login Banner** area does not appear on the **Banners** tab, Cisco UCS Manager does not display a pre-login banner when users log in. If the **Pre-Login Banner** area does appear, you cannot create a second pre-login banner. You can only delete or modify the existing banner.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management**.

Step 3 Click the **User Services** node.

Step 4 In the **Work** pane, click the **Banners** tab.

Step 5 In the **Actions** area, click **Create Pre-Login Banner**.

Step 6 In the **Create Pre-Login Banner** dialog box, click in the text field and enter the message that you want users to see when they log in to Cisco UCS Manager.
You can enter any standard ASCII character in this field.

Step 7 Click **OK**.

Modifying the Pre-Login Banner

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management**.

Step 3 Click the **User Services** node.

Step 4 In the **Work** pane, click the **Banners** tab.

Step 5 Click in the text field in the **Pre-Login Banner** area and make the necessary changes to the text.
You can enter any standard ASCII character in this field.

Step 6 Click **Save Changes**.

Deleting the Pre-Login Banner

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management**.

Step 3 Click the **User Services** node.

Step 4 In the **Work** pane, click the **Banners** tab.

Step 5 In the **Actions** area, click **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Cisco UCS Manager GUI Properties

Configuring the Cisco UCS Manager GUI Session and Log Properties

These properties determine how Cisco UCS Manager GUI reacts to session interruptions and inactivity, and configures the Cisco UCS Manager GUI Java message logging.

Procedure

Step 1 In the toolbar, click **Options** to open the **Properties** dialog box.

Step 2 In the right pane, click **Session**.

Step 3 In the **Session** tab, update one or more of the following fields:

Name	Description
Automatically Reconnect check box	If checked, the system tries to reconnect if communication between the GUI and the fabric interconnect is interrupted.
GUI Inactivity Time Out drop-down list	The number of minutes the system should wait before ending an inactive session. To specify that the session should not time out regardless of the length of inactivity, choose **NEVER**.

Name	Description
Log Level drop-down list	The amount of Java message logging done for Cisco UCS Manager GUI on the user's local machine. This can be one of the following: • **All—**All relevant Java information for the GUI is logged. There can be a maximum of 10 log files, each of which can be a maximum of 10 MB in size. Once the final file has been filled, Cisco UCS Manager deletes the oldest log file and starts a new one. • **Off—**Cisco UCS Manager does not create any Java log files for the GUI. **Note** The log file location is determined by the Java runtime settings on the user's local machine. For more information, see the documentation for the version of Java that you are using.
Max Log Size drop-down list	The maximum size, in megabytes, that Cisco UCS Manager allocates to any of the logs it saves for this Cisco UCS domain.
Reconnection Interval field	If the **Automatically Reconnect** check box is checked, this is the number of seconds the system waits before trying to reconnect.

Step 4 Click **OK**.

Configuring Properties for Confirmation Messages

These properties determine whether or not Cisco UCS Manager GUI displays a confirmation message after configuration changes and other operations.

Procedure

Step 1 In the toolbar, click **Options** to open the **Properties** dialog box.

Step 2 In the right pane, click **Confirmation Messages**.

Step 3 In the **Confirmation Messages** tab, complete the following fields:

Name	Description
Confirm Deletion check box	If checked, Cisco UCS Manager GUI requires that you confirm all delete operations.
Confirm Discard Changes check box	If checked, Cisco UCS Manager GUI requires that you confirm before the system discards any changes.
Confirm Modification/Creation check box	If checked, Cisco UCS Manager GUI requires that you confirm before the system modifies or creates objects.

Name	Description
Confirm Successful Operations check box	If checked, Cisco UCS Manager GUI displays a confirmation when operations are successful.

Step 4 Click **OK**.

Configuring Properties for External Applications

Cisco UCS Manager GUI uses these properties to connect with external applications, such as SSH.

Procedure

Step 1 In the toolbar, click **Options** to open the **Properties** dialog box.

Step 2 In the right pane, click **External Applications**.

Step 3 In the **External Applications** tab, complete the following fields:

Name	Description
SSH field	The application to use for SSH processing.
SSH Parameters field	Any parameters to include in all SSH commands.

Step 4 Click **OK**.

Customizing the Appearance of Cisco UCS Manager GUI

These properties allow you to customize the some of the visual properties of Cisco UCS Manager GUI.

Procedure

Step 1 In the toolbar, click **Options** to open the **Properties** dialog box.

Step 2 In the right pane, click **Visual Enhancements**.

Step 3 In the **Visual Enhancements** tab, update one or more of the following fields:

Name	Description
Automatically Pack Table Columns check box	If checked, Cisco UCS Manager GUI automatically resizes all table columns based on their contents.

Name	Description
Max History Size field	The number of tabs the system should store in memory for use with the Forward and Back toolbar buttons.
Right Aligned Labels check box	If checked, all labels are right-aligned with respect to one another. Otherwise all labels are left-aligned.
Show Image while Dragging check box	If checked, when you drag an object from one place to another, the GUI displays a transparent version of that object until you drop the object in its new location.
Wizard Transition Effects check box	If checked, when you go to a new page in a wizard the first page fades out and the new page fades in. Otherwise the page changes without a visible transition.

Step 4 Click **OK**.

Determining the Acceptable Range of Values for a Field

Some properties have a restricted range of values that you can enter. You can use this procedure to determine that acceptable range for fields in a dialog box, window, or tab. You cannot use this procedure to determine the acceptable range of values for properties listed in a table or tree.

Procedure

Step 1 Place your cursor in the field for which you want to check the range to give focus to that field.

Step 2 Press Alt + Shift + **R**.
Cisco UCS Manager GUI displays the acceptable range of values for a few seconds. The range disappears if you click anywhere on the screen.

Determining Where a Policy Is Used

You can use this procedure to determine which service profiles and service profile templates are associated with the selected policy.

Procedure

Step 1 In the **Navigation** pane, click the policy whose usage you want to view.

Step 2 In the **Work** pane, click the **General** tab.

Step 3 In the **Actions** area, click **Show Policy Usage**.
Cisco UCS Manager GUI displays the **Service Profiles/Templates** dialog box that shows the associated service profiles and service profile templates.

Determining Where a Pool Is Used

You can use this procedure to determine which service profiles and service profile templates are associated with the selected pool.

Procedure

Step 1 In the **Navigation** pane, click the pool whose usage you want to view.

Step 2 In the **Work** pane, click the **General** tab.

Step 3 In the **Actions** area, click **Show Pool Usage**.
Cisco UCS Manager GUI displays the **Service Profiles/Templates** dialog box that shows the associated service profiles and service profile templates.

Copying the XML

To assist you in developing scripts or creating applications with the XML API for Cisco UCS, Cisco UCS Manager GUI includes an option to copy the XML used to create an object in Cisco UCS Manager. This option is available on the right-click menu for most object nodes in the **Navigation** pane, such as the **Port Profiles** node or the node for a specific service profile.

Procedure

Step 1 In the **Navigation** pane, navigate to the object for which you want to copy the XML.

Step 2 Right-click on that object and choose **Copy XML**.

Step 3 Paste the XML into an XML editor, Notepad, or another application.

PART II

System Configuration

CHAPTER 5

Configuring the Fabric Interconnects

This chapter includes the following sections:

Initial System Setup

The first time that you access a fabric interconnect in a Cisco UCS domain, a setup wizard prompts you for the following information required to configure the system:

- Installation method (GUI or CLI)
- Setup mode (restore from full system backup or initial setup)
- System configuration type (standalone or cluster configuration)
- System name
- Admin password
- Management port IP address and subnet mask
- Default gateway IP address
- DNS Server IP address

- Default domain name

Setup Mode

You can choose to either restore the system configuration from an existing backup file, or manually set up the system by going through the Setup wizard. If you choose to restore the system, the backup file must be reachable from the management network.

System Configuration Type

You can configure a Cisco UCS domain to use a single fabric interconnect in a standalone configuration or to use a redundant pair of fabric interconnects in a cluster configuration.

A cluster configuration provides high availability. If one fabric interconnect becomes unavailable, the other takes over. Only one management port (Mgmt0) connection is required to support a cluster configuration; however, both Mgmt0 ports should be connected to provide link-level redundancy.

In addition, a cluster configuration actively enhances failover recovery time for redundant virtual interface (VIF) connections. When an adapter has an active VIF connection to one fabric interconnect and a standby VIF connection to the second, the learned MAC addresses of the active VIF are replicated but not installed on the second fabric interconnect. If the active VIF fails, the second fabric interconnect installs the replicated MAC addresses and broadcasts them to the network through gratuitous ARP messages, shortening the switchover time.

Note The cluster configuration provides redundancy only for the management plane. Data redundancy is dependent on the user configuration and might require a third-party tool to support data redundancy.

To use the cluster configuration, you must directly connect the two fabric interconnects together using Ethernet cables between the L1 (L1-to-L1) and L2 (L2-to-L2) high-availability ports, with no other fabric interconnects in between. Also you can connect the fabric interconnects directly through a patch panel to allow the two fabric interconnects to continuously monitor the status of each other and quickly know when one has failed.

Both fabric interconnects in a cluster configuration must go through the initial setup process. You must enable the first fabric interconnect that you set up for a cluster configuration. When you set up the second fabric interconnect, it detects the first fabric interconnect as a peer fabric interconnect in the cluster.

For more information, see to the *Cisco UCS 6100 Series Fabric Interconnect Hardware Installation Guide*.

Management Port IP Address

In a standalone configuration, you must specify only one IP address and the subnet mask for the single management port on the fabric interconnect.

In a cluster configuration, you must specify the following three IP addresses in the same subnet:

- Management port IP address for fabric interconnect A
- Management port IP address for fabric interconnect B
- Cluster IP address

Performing an Initial System Setup for a Standalone Configuration

Before You Begin

1 Verify the following physical connections on the fabric interconnect:

- The console port is physically connected to a computer terminal or console server
- The management Ethernet port (mgmt0) is connected to an external hub, switch, or router

For more information, refer to the *Cisco UCS Hardware Installation Guide* for your fabric interconnect.

2 Verify that the console port parameters on the computer terminal (or console server) attached to the console port are as follows:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

3 Collect the following information that you will need to supply during the initial setup:

- System name.
- Password for the admin account. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
- Management port IP address and subnet mask.
- Default gateway IP address.
- DNS server IP address (optional).
- Domain name for the system (optional).

Procedure

Step 1 Connect to the console port.

Step 2 Power on the fabric interconnect.
You will see the power on self-test messages as the fabric interconnect boots.

Step 3 At the installation method prompt, enter gui.

Step 4 If the system cannot access a DHCP server, you are prompted to enter the following information:

- IP address for the management port on the fabric interconnect
- Subnet mask for the management port on the fabric interconnect
- IP address for the default gateway assigned to the fabric interconnect

Step 5 Copy the web link from the prompt into a supported web browser and go to the Cisco UCS Manager GUI launch page.

Step 6 On the Cisco UCS Manager GUI launch page, select **Express Setup**.

Step 7 On the **Express Setup** page, select **Initial Setup** and click **Submit**.

Step 8 In the **Cluster and Fabric Setup** Area, select the **Standalone Mode** option.

Step 9 In the **System Setup** Area, complete the following fields:

Field	Description
System Name field	The name assigned to the Cisco UCS domain. In a standalone configuration, the system adds "-A" to the system name. In a cluster configuration, the system adds "-A" to the fabric interconnect assigned to fabric A, and "-B" to the fabric interconnect assigned to fabric B.
Admin Password field	The password used for the Admin account on the fabric interconnect. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
Confirm Admin Password field	The password used for the Admin account on the fabric interconnect.
Mgmt IP Address field	The static IP address for the management port on the fabric interconnect.
Mgmt IP Netmask field	The subnet mask for the management port on the fabric interconnect.
Default Gateway field	The IP address for the default gateway assigned to the management port on the fabric interconnect.
DNS Server IP field	The IP address for the DNS server assigned to the fabric interconnect.
Domain Name field	The name of the domain in which the fabric interconnect resides.

Step 10 Click **Submit.**
A page displays the results of your setup operation.

Initial System Setup for a Cluster Configuration

Performing an Initial System Setup on the First Fabric Interconnect

Before You Begin

1 Verify the following physical connections on the fabric interconnect:

- A console port on the first fabric interconnect is physically connected to a computer terminal or console server
- The management Ethernet port (mgmt0) is connected to an external hub, switch, or router
- The L1 ports on both fabric interconnects are directly connected to each other
- The L2 ports on both fabric interconnects are directly connected to each other

For more information, refer to the *Cisco UCS Hardware Installation Guide* for your fabric interconnect.

2 Verify that the console port parameters on the computer terminal (or console server) attached to the console port are as follows:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

3 Collect the following information that you will need to supply during the initial setup:

- System name.
- Password for the admin account. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
- Three static IP addresses: two for the management port on both fabric interconnects (one per fabric interconnect) and one for the cluster IP address used by Cisco UCS Manager.
- Subnet mask for the three static IP addresses.
- Default gateway IP address.
- DNS server IP address (optional).
- Domain name for the system (optional).

Procedure

Step 1 Connect to the console port.

Step 2 Power on the fabric interconnect.

You will see the power on self-test messages as the fabric interconnect boots.

Step 3 At the installation method prompt, enter gui.

Step 4 If the system cannot access a DHCP server, you are prompted to enter the following information:

- IP address for the management port on the fabric interconnect
- Subnet mask for the management port on the fabric interconnect
- IP address for the default gateway assigned to the fabric interconnect

Step 5 Copy the web link from the prompt into a web browser and go to the Cisco UCS Manager GUI launch page.

Step 6 On the Cisco UCS Manager GUI launch page, select **Express Setup**.

Step 7 On the **Express Setup** page, select **Initial Setup** and click **Submit**.

Step 8 In the **Cluster and Fabric Setup** Area:

a) Click the **Enable Clustering** option.
b) For the **Fabric Setup** option, select **Fabric A**.
c) In the **Cluster IP Address** field, enter the IP address that Cisco UCS Manager will use.

Step 9 In the **System Setup** Area, complete the following fields:

Field	Description
System Name field	The name assigned to the Cisco UCS domain. In a standalone configuration, the system adds "-A" to the system name. In a cluster configuration, the system adds "-A" to the fabric interconnect assigned to fabric A, and "-B" to the fabric interconnect assigned to fabric B.
Admin Password field	The password used for the Admin account on the fabric interconnect. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
Confirm Admin Password field	The password used for the Admin account on the fabric interconnect.
Mgmt IP Address field	The static IP address for the management port on the fabric interconnect.
Mgmt IP Netmask field	The subnet mask for the management port on the fabric interconnect.
Default Gateway field	The IP address for the default gateway assigned to the management port on the fabric interconnect.
DNS Server IP field	The IP address for the DNS server assigned to the fabric interconnect.

Field	Description
Domain Name field	The name of the domain in which the fabric interconnect resides.

Step 10 Click **Submit**.
A page displays the results of your setup operation.

Performing an Initial System Setup on the Second Fabric Interconnect

Before You Begin

You must ensure the following:

- A console port on the second fabric interconnect is physically connected to a computer terminal or console server
- You know the password for the admin account on the first fabric interconnect that you configured.

Procedure

Step 1 Connect to the console port.

Step 2 Power on the fabric interconnect.
You will see the power on self-test messages as the fabric interconnect boots.

Step 3 At the installation method prompt, enter gui.

Step 4 If the system cannot access a DHCP server, you are prompted to enter the following information:

- IP address for the management port on the fabric interconnect
- Subnet mask for the management port on the fabric interconnect
- IP address for the default gateway assigned to the fabric interconnect

Step 5 Copy the web link from the prompt into a web browser and go to the Cisco UCS Manager GUI launch page.

Step 6 On the Cisco UCS Manager GUI launch page, select **Express Setup**.

Step 7 On the **Express Setup** page, select **Initial Setup** and click **Submit**.
The fabric interconnect should detect the configuration information for the first fabric interconnect.

Step 8 In the **Cluster and Fabric Setup** Area:

a) Select the **Enable Clustering** option.
b) For the **Fabric Setup** option, make sure **Fabric B** is selected.

Step 9 In the **System Setup** Area, enter the password for the Admin account into the **Admin Password of Master** field.

Step 10 Click **Submit**.

A page displays the results of your setup operation.

Enabling a Standalone Fabric Interconnect for Cluster Configuration

You can add a second fabric interconnect to an existing Cisco UCS domain that uses a single standalone fabric interconnect. To do this, you must enable the standalone fabric interconnect for cluster operation by configuring it with the virtual IP address of the cluster, and then add the second fabric interconnect to the cluster.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **connect local-mgmt**	Enters local management mode.
Step 2	UCS-A(local-mgmt) # **enable cluster** *virtual-ip-addr*	Enables cluster operation on the standalone fabric interconnect with the specified IP address. When you enter this command, you are prompted to confirm that you want to enable cluster operation. Type **yes** to confirm. The IP address must be the virtual IP address for the cluster configuration, not the IP address assigned to the fabric interconnect that you are adding to the cluster.

The following example enables a standalone fabric interconnect with a virtual IP address of 192.168.1.101 for cluster operation:

```
UCS-A# connect local-mgmt
UCS-A(local-mgmt)# enable cluster 192.168.1.101
This command will enable cluster mode on this setup. You cannot change it
back to stand-alone. Are you sure you want to continue? (yes/no): yes
UCS-A(local-mgmt)#
```

What to Do Next

Add the second fabric interconnect to the cluster.

Ethernet Switching Mode

The Ethernet switching mode determines how the fabric interconnect behaves as a switching device between the servers and the network. The fabric interconnect operates in either of the following Ethernet switching modes:

End-Host Mode

End-host mode allows the fabric interconnect to act as an end host to the network, representing all server (hosts) connected to it through vNICs. This behavior is achieved by pinning (either dynamically pinned or hard pinned) vNICs to uplink ports, which provides redundancy to the network, and makes the uplink ports appear as server ports to the rest of the fabric. In end-host mode, the fabric interconnect does not run the Spanning Tree Protocol (STP) but it avoids loops by denying uplink ports from forwarding traffic to each other and by denying egress server traffic on more than one uplink port at a time. End-host mode is the default Ethernet switching mode and should be used if either of the following are used upstream:

- Layer 2 switching for Layer 2 aggregation
- Virtual Switching System (VSS) aggregation layer

Note When you enable end-host mode, if a vNIC is hard pinned to an uplink port and this uplink port goes down, the system cannot repin the vNIC, and the vNIC remains down.

Switch Mode

Switch mode is the traditional Ethernet switching mode. The fabric interconnect runs STP to avoid loops, and broadcast and multicast packets are handled in the traditional way. Switch mode is not the default Ethernet switching mode, and should be used only if the fabric interconnect is directly connected to a router, or if either of the following are used upstream:

- Layer 3 aggregation
- VLAN in a box

Note For both Ethernet switching modes, even when vNICs are hard pinned to uplink ports, all server-to-server unicast traffic in the server array is sent only through the fabric interconnect and is never sent through uplink ports. Server-to-server multicast and broadcast traffic is sent through all uplink ports in the same VLAN.

Configuring Ethernet Switching Mode

Important When you change the Ethernet switching mode, Cisco UCS Manager logs you out and restarts the fabric interconnect. For a cluster configuration, Cisco UCS Manager restarts both fabric interconnects. The second fabric interconnect can take several minutes to complete the change in Ethernet switching mode and become system ready. The configuration is retained.

While the fabric interconnects are rebooting, all blade servers will lose all LAN and SAN connectivity, causing a complete outage of all services on the blades. This may cause the operating system to crash.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area of the **General** tab, click one of the following links:

- **Set Ethernet Switching Mode**

- **Set Ethernet End-Host Mode**

The link for the current mode is dimmed.

Step 5 In the dialog box, click **Yes**.
Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager GUI.

Fibre Channel Switching Mode

The Fibre Channel switching mode determines how the fabric interconnect behaves as a switching device between the servers and storage devices. The fabric interconnect operates in either of the following Fibre Channel switching modes:

End-Host Mode

End-host mode allows the fabric interconnect to act as an end host to the connected fibre channel networks, representing all server (hosts) connected to it through virtual host bus adapters (vHBAs). This behavior is achieved by pinning (either dynamically pinned or hard pinned) vHBAs to Fibre Channel uplink ports, which makes the Fibre Channel ports appear as server ports (N-ports) to the rest of the fabric. When in end-host mode, the fabric interconnect avoids loops by denying uplink ports from receiving traffic from one another.

End-host mode is synonymous with NPV mode. This mode is the default Fibre Channel Switching mode.

Note When you enable end-host mode, if a vHBA is hard pinned to a uplink Fibre Channel port and this uplink port goes down, the system cannot repin the vHBA, and the vHBA remains down.

Switch Mode

Switch mode is the traditional Fibre Channel switching mode. Switch mode allows the fabric interconnect to connect directly to a storage device. Enabling Fibre Channel switch mode is useful in Pod models where there is no SAN (for example, a single Cisco UCS domain that is connected directly to storage), or where a SAN exists (with an upstream MDS).

Switch mode is not the default Fibre Channel switching mode.

Note In Fibre Channel switch mode, SAN pin groups are irrelevant. Any existing SAN pin groups are ignored.

Configuring Fibre Channel Switching Mode

Important When you change the Fibre Channel switching mode, Cisco UCS Manager logs you out and restarts the fabric interconnect. For a cluster configuration, Cisco UCS Manager restarts both fabric interconnects sequentially. The second fabric interconnect can take several minutes to complete the change in Fibre Channel switching mode and become system ready.

Note When the Fibre Channel switching mode is changed, both UCS fabric interconnects will reload simultaneously. Reloading of fabric interconnects will cause a system-wide downtime for approximately 10-15 minutes.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area of the **General** tab, click one of the following links:

- **Set Fibre Channel Switching Mode**
- **Set Fibre Channel End-Host Mode**

The link for the current mode is dimmed.

Step 5 In the dialog box, click **Yes**.
Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager GUI.

Changing the Properties of the Fabric Interconnects

Note To change the subnet for a Cisco UCS domain, you must simultaneously change all subnets, the virtual IP address used to access Cisco UCS Manager, and the IP addresses for all fabric interconnects.

Procedure

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

Step 2 On the **Admin** tab, click **All**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Management Interfaces** to open the **Management Interfaces** dialog box.

Step 5 In the **Management Interfaces** dialog box, modify the values in one or more of the following fields:

Name	Description
IP Address field	The IP address assigned to the Cisco UCS Manager GUI.
Domain Name field	The domain name assigned to this Cisco UCS domain. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Name field	The name assigned to this Cisco UCS domain. Enter an alphabetic character followed by up to 29 alphanumeric characters or hyphens (-).
System Owner field	The owner of the Cisco UCS domain. Enter up to 32 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
System Site field	The site associated with the Cisco UCS domain. Enter up to 32 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
System Description field	The description of the Cisco UCS domain. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Mode field	How this system is configured for high availability. This can be one of the following: • **Cluster** • **Stand Alone**

Step 6 To change only the virtual IP address that you use to access Cisco UCS Manager, enter the desired IP address in the **IP Address** field in the **Virtual IP** area.

Step 7 To change only the name assigned to the Cisco UCS domain, enter the desired name in the **Name** field in the **Virtual IP** area.

Step 8 To change the subnet, IP address, and default gateway assigned to the fabric interconnects, update the following fields:

a) In the **Virtual IP** area, change the IP address used to access Cisco UCS Manager in the **IP Address** field.

b) In the **Fabric Interconnect** area for each fabric interconnect, update the following fields:

Name	Description
IP Address field	The IP address to use when communicating with the fabric interconnect.
Subnet Mask field	The associated subnet mask.
Default Gateway field	The associated gateway.

Step 9 Click **OK**.

Step 10 Log out of Cisco UCS Manager GUI and log back in again to see your changes.

Determining the Leadership Role of a Fabric Interconnect

Procedure

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

Step 2 In the **Equipment** tab, expand **Equipment** > **Fabric Interconnects**.

Step 3 Click the fabric interconnect for which you want to identify the role.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **General** tab, click the down arrows on the **High Availability Details** bar to expand that area.

Step 6 View the **Leadership** field to determine whether the fabric interconnect is the primary or subordinate.

CHAPTER 6

Configuring Ports and Port Channels

This chapter includes the following sections:

Server and Uplink Ports on the 6100 Series Fabric Interconnect

Each Cisco UCS 6200 Series Fabric Interconnect has a set of ports in a fixed port module that you can configure as either server ports or uplink Ethernet ports. These ports are not reserved. They cannot be used by a Cisco UCS domain until you configure them. You can add expansion modules to increase the number of uplink ports on the fabric interconnect or to add uplink Fibre Channel ports to the fabric interconnect.

Note When you configure a port on a fabric interconnect, the administrative state is automatically set to enabled. If the port is connected to another device, this may cause traffic disruption. You can disable the port after it has been configured.

You need to create LAN pin groups and SAN pin groups to pin traffic from servers to an uplink port.

Note Ports on the Cisco UCS 6200 Series Fabric Interconnect are not unified. For more information on Unified Ports, see Unified Ports on the 6200 Series Fabric Interconnect.

Each fabric interconnect can include the following port types:

Server Ports

Server ports handle data traffic between the fabric interconnect and the adapter cards on the servers.

You can only configure server ports on the fixed port module. Expansion modules do not include server ports.

Uplink Ethernet Ports

Uplink Ethernet ports handle Ethernet traffic between the fabric interconnect and the next layer of the network. All network-bound Ethernet traffic is pinned to one of these ports.

By default, Ethernet ports are unconfigured. However, you can configure them to function in the following ways:

- Uplink
- FCoE
- Appliance

You can configure uplink Ethernet ports on either the fixed module or an expansion module.

Uplink Fibre Channel Ports

Uplink Fibre Channel ports handle FCoE traffic between the fabric interconnect and the next layer of the storage area network. All network-bound FCoE traffic is pinned to one of these ports.

By default, Fibre Channel ports are uplink. However, you can configure them to function as Fibre Channel storage ports. This is useful in cases where Cisco UCS requires a connection to a Direct-Attached Storage (DAS) device.

You can only configure uplink Fibre Channel ports on an expansion module. The fixed module does not include uplink Fibre Channel ports.

Unified Ports on the 6200 Series Fabric Interconnect

Unified ports are ports on the Cisco UCS 6200 Series Fabric Interconnect that can be configured to carry either Ethernet or Fibre Channel traffic. These ports are not reserved. They cannot be used by a Cisco UCS domain until you configure them.

Note When you configure a port on a fabric interconnect, the administrative state is automatically set to enabled. If the port is connected to another device, this may cause traffic disruption. You can disable the port after it has been configured.

Configurable beacon LEDs indicate which unified ports are configured for the selected port mode.

Port Modes

The port mode determines whether a unified port on the fabric interconnect is configured to carry Ethernet or Fibre Channel traffic. The port mode is not automatically discovered by the fabric interconnect; it is configured in Cisco UCS Manager.

Changing the port mode results in the existing port configuration being deleted and replaced by a new logical port. Any objects associated with that port configuration, such as VLANs and VSANS, are removed. There is no restriction on the number of times the port mode can be changed for a unified port.

Port Types

The port type defines the type of traffic carried over a unified port connection.

All of the port types listed are configurable on both the fixed and expansion module, including server ports, which are not configurable on the 6100 series fabric interconnect expansion module, but are configurable on the 6200 series fabric interconnect expansion module.

By default, unified ports changed to Ethernet port mode are set to uplink Ethernet port type. unified ports changed to Fibre Channel port mode are set to the Fibre Channel uplink port type. Fibre Channel ports cannot be unconfigured.

Changing the port type does not require a reboot.

When the port mode is set to Ethernet, you can configure the following port types:

- Server ports
- Ethernet uplink ports
- Ethernet port channel members
- FCoE ports
- Appliance ports
- Appliance port channel members
- SPAN destination ports
- SPAN source ports

Note For SPAN source ports, configure one of the port types and then configure the port as SPAN source.

When the port mode is set to Fibre Channel, you can configure the following port types:

- Fibre Channel uplink ports
- Fibre Channel port channel members
- Fibre Channel storage ports
- FCoE Uplink ports
- SPAN destination ports
- SPAN source ports

Note For SPAN source ports, configure one of the port types and then configure the port as SPAN source.

Beacon LEDs for Unified Ports

Each port on the 6200 series fabric interconnect has a corresponding beacon LED. When the Beacon LED property is configured, the beacon LEDs illuminate, showing you which ports are configured in a given port mode.

The Beacon LED property can be configured to show you which ports are grouped in one port mode: either Ethernet or Fibre Channel. By default, the Beacon LED property is set to Off.

Note For unified ports on the expansion module, the Beacon LED property may be reset to the default value of Off during expansion module reboot.

Guidelines for Configuring Unified Ports

Consider the following guidelines and restrictions when configuring unified ports:

Hardware and Software Requirements

Unified ports are supported on the 6200 series fabric interconnect with Cisco UCS Manager, version 2.0.

Unified ports are not supported on 6100 series fabric interconnects, even if they are running Cisco UCS Manager, version 2.0.

Port Mode Placement

Because the Cisco UCS Manager GUI interface uses a slider to configure the port mode for unified ports on a fixed or expansion module, it automatically enforces the following restrictions which limits how port modes can be assigned to unified ports. When using the Cisco UCS Manager CLI interface, these restrictions are enforced when you commit the transaction to the system configuration. If the port mode configuration violates any of the following restrictions, the Cisco UCS Manager CLI displays an error:

- Ethernet ports must be grouped together in a block. For each module (fixed or expansion), the Ethernet port block must start with the first port and end with an even numbered port.
- Fibre Channel ports must be grouped together in a block. For each module (fixed or expansion), the first port in the Fibre Channel port block must follow the last Ethernet port and extend to include the rest of the ports in the module. For configurations that include only Fibre Channel ports, the Fibre Channel block must start with the first port on the fixed or expansion module.
- Alternating Ethernet and Fibre Channel ports is not supported on a single module.

Example of a valid configuration— Might include unified ports 1–16 on the fixed module configured in Ethernet port mode and ports 17–32 in Fibre Channel port mode. On the expansion module you could configure ports 1–4 in Ethernet port mode and then configure ports 5–16 in Fibre Channel mode. The rule about alternating Ethernet and Fibre Channel port types is not violated because this port arrangement complies with the rules on each individual module.

Example of an invalid configuration— Might include a block of Fibre Channel ports starting with port 16. Because each block of ports has to start with an odd-numbered port, you would have to start the block with port 17.

Note The total number of uplink Ethernet ports and uplink Ethernet port channel members that can be configured on each fabric interconnect is limited to 31. This limitation includes uplink Ethernet ports and uplink Ethernet port channel members configured on the expansion module.

Cautions and Guidelines for Configuring Unified Uplink Ports and Unified Storage Ports

The following are cautions and guidelines to follow while working with unified uplink ports and unified storage ports:

- In an unified uplink port, if you enable one component as a SPAN source, the other component will automatically become a SPAN source.

  Note If you create or delete a SPAN source under the Ethernet uplink port, Cisco UCS Manager automatically creates pr deletes a SPAN source under the FCoE uplink port. The same happens with you create a SPAN source on the FCOE uplink port.

- You must configure a non default native vlan on FcoE and unified uplink ports. This VLAN is not used for any traffic. Cisco UCS Manager will reuse an existing fcoe-storage-native-vlan for this purpose. This fcoe-storage-native-vlan will be used as native VLAN on FCoE and unified uplinks.
- In an unified uplink port, if you do not specify a non default VLAN for the Ethernet uplink port the fcoe-storage-native-vlan will be assigned as the native VLAN on the unified uplink port. If the Ethernet port has a non default native VLAN specified as native VLAN, this will be assigned as the native VLAN for unified uplink port.

- When you create or delete a member port under an Ethernet port channel, Cisco UCS Manager automatically creates or deletes the member port under FCoE port channel. The same happens when you create or delete a member port in FCoE port channel.
- When you configure an Ethernet port as a standalone port, such as server port, Ethernet uplink, FCoE uplink or FCoE storage and make it as a member port for an Ethernet or FCOE port channel, Cisco UCS Manager automatically makes this port as a member of both Ethernet and FCoE port channels.
- When you remove the membership for a member port from being a member of server uplink, Ethernet uplink, FCoE uplink or FCoE storage, Cisco UCS Manager deletes the corresponding members ports from Ethernet port channel and FCoE port channel and creates a new standalone port.
- If you downgrade Cisco UCS Manager from release 2.1 to any of the prior releases, all unified uplink ports and port channels will be converted to Ethernet ports and Ethernet port channels when the downgrade is complete. Similarly, all the unified storage ports will be converted to appliance ports.
- For unified uplink ports and unified storage ports, when you create two interfaces, only once license is checked out. As long as either interface is enabled, the license remains checked out. The license will be released only if both the interfaces are disabled for a unified uplink port or a unified storage port.
- Cisco UCS 6100 series fabric interconnect switch can only support 1VF or 1VF-PO facing same downstream NPV switch.

Effect of Port Mode Changes on Data Traffic

Port mode changes can cause an interruption to the data traffic for the Cisco UCS domain. The length of the interruption and the traffic that is affected depend upon the configuration of the Cisco UCS domain and the module on which you made the port mode changes.

Tip To minimize the traffic disruption during system changes, form a Fibre Channel uplink port-channel across the fixed and expansion modules.

Impact of Port Mode Changes on an Expansion Module

After you make port mode changes on an expansion module, the module reboots. All traffic through ports on the expansion module is interrupted for approximately one minute while the module reboots.

Impact of Port Mode Changes on the Fixed Module in a Cluster Configuration

A cluster configuration has two fabric interconnects. After you make port changes to the fixed module, the fabric interconnect reboots. The impact on the data traffic depends upon whether or not you have configured the server vNICs to failover to the other fabric interconnect when one fails.

If you change the port modes on the expansion module of one fabric interconnect and then wait for that to reboot before changing the port modes on the second fabric interconnect, the following occurs:

- With server vNIC failover, traffic fails over to the other fabric interconnect and no interruption occurs.
- Without server vNIC failover, all data traffic through the fabric interconnect on which you changed the port modes is interrupted for approximately eight minutes while the fabric interconnect reboots.

However, if you change the port modes on the fixed modules of both fabric interconnects simultaneously, all data traffic through the fabric interconnects are interrupted for approximately eight minutes while the fabric interconnects reboot.

Impact of Port Mode Changes on the Fixed Module in a Standalone Configuration

A standalone configuration has only one fabric interconnect. After you make port changes to the fixed module, the fabric interconnect reboots. All data traffic through the fabric interconnect is interrupted for approximately eight minutes while the fabric interconnect reboots.

Configuring Port Modes for a 6248 Fabric Interconnect

Caution Changing the port mode on either module can cause an interruption in data traffic because changes to the fixed module require a reboot of the fabric interconnect and changes on an expansion module require a reboot of that module.

If the Cisco UCS domain has a cluster configuration that is set up for high availability and servers with service profiles that are configured for failover, traffic fails over to the other fabric interconnect and data traffic is not interrupted when the port mode is changed on the fixed module.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area of the **General** tab, click **Configure Unified Ports**.

Step 5 Review the confirmation message and click one of the following:

- **Yes—**To continue with configuring the port mode.
- **No—**To exit without configuring the port mode and wait for an appropriate maintenance window.

Step 6 Click one of the following buttons to choose the module for which you want to configure the port modes:

- **Configure Fixed Module**
- **Configure Expansion Module**

Step 7 Use your mouse to drag the slider along the bar until the displays shows the port mode configuration that you want for the module.
If you change the port mode for a previously configured port, the port returns to an unconfigured state.

Step 8 If you need to configure port modes for the other module, repeat Steps 6 and 7.

Step 9 Click **Finish** to save your port mode configuration.
Depending upon the module for which you configured the port modes, data traffic for the Cisco UCS domain is interrupted as follows:

- Fixed module—The fabric interconnect reboots. All data traffic through that fabric interconnect is interrupted. In a cluster configuration that provides high availability and includes servers with vNICs that are configured for failover, traffic fails over to the other fabric interconnect and no interruption occurs.

It takes about 8 minutes for the fixed module to reboot.

- Expansion module—The module reboots. All data traffic through ports in that module is interrupted.

  It takes about 1 minute for the expansion module to reboot.

What to Do Next

Configure the port types for the ports. You can right-click on any port in the module display above the slider and configure that port for an available port type.

Configuring Port Modes for a 6296 Fabric Interconnect

Caution Changing the port mode on either module can cause an interruption in data traffic because changes to the fixed module require a reboot of the fabric interconnect and changes on an expansion module require a reboot of that module.

If the Cisco UCS domain has a cluster configuration that is set up for high availability and servers with service profiles that are configured for failover, traffic fails over to the other fabric interconnect and data traffic is not interrupted when the port mode is changed on the fixed module.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area of the **General** tab, click **Configure Unified Ports**.

Step 5 Review the confirmation message and click one of the following:

- **Yes**—To open the **Configure Unified Ports** wizard and continue with configuring the port mode.
- **No**—To exit without configuring the port mode and wait for an appropriate maintenance window.

Step 6 On the **Configure Fixed Module Ports** page, do the following:

a) Use your mouse to drag the slider along the bar until the displays shows the port mode configuration that you want for the fixed module.

b) If you want to configure the port type for a port, right-click on any port in the module display above the slider and configure that port for an available port type.

c) Do one of the following:

- Click **Next** to configure the port mode for ports in expansion module 1.
- If you do not wish to configure the port mode for ports on the expansion modules, continue with Step 9.

If you change the port mode for a previously configured port, the port returns to an unconfigured state.

Step 7 On the **Configure Expansion Module 1 Ports** page, do the following:

a) Use your mouse to drag the slider along the bar until the displays shows the port mode configuration that you want for the expansion module.

b) If you want to configure the port type for a port, right-click on any port in the module display above the slider and configure that port for an available port type.

c) Do one of the following:

- Click **Next** to configure the port mode for ports in expansion module 2.
- If you do not wish to configure the port mode for ports on the remaining expansion modules, continue with Step 9.

If you change the port mode for a previously configured port, the port returns to an unconfigured state.

Step 8 If you need to configure port modes for expansion module 3, repeat Step 7.

Step 9 Click **Finish** to save your port mode configuration.
Depending upon the module for which you configured the port modes, data traffic for the Cisco UCS domain is interrupted as follows:

- Fixed module**—**The fabric interconnect reboots. All data traffic through that fabric interconnect is interrupted. In a cluster configuration that provides high availability and includes servers with vNICs that are configured for failover, traffic fails over to the other fabric interconnect and no interruption occurs.

  It takes about 8 minutes for the fixed module to reboot.

- Expansion module**—**The module reboots. All data traffic through ports in that module is interrupted.

  It takes about 1 minute for the expansion module to reboot.

Configuring the Beacon LEDs for Unified Ports

Complete the following task for each module for which you want to configure beacon LEDs.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the unified ports for which you want to configure the beacon LEDs, click on one of the following:

- **Fixed Module**

- **Expansion Module**

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Properties** area, click one of the following radio buttons in the **Beacon LED** field:

- **Off**—All physical LEDs are off.
- **Eth**—The physical LEDs next to all Ethernet ports are on.
- **Fc**—The physical LEDs next to all Fibre Channel ports are on.

Step 6 Click **Save Changes**.

Server Ports

Configuring Server Ports

All of the port types listed are configurable on both the fixed and expansion module, including server ports, which are not configurable on the 6100 series fabric interconnect expansion module, but are configurable on the 6200 series fabric interconnect expansion module.

This task describes only one method of configuring ports. You can also configure ports from a right-click menu or in the LAN Uplinks Manager.

Procedure

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

Step 2 In the **Equipment** tab, expand **Fabric Interconnects** > ***Fabric_Interconnect_Name*** > **Fixed Module** > **Ethernet Ports**.

Step 3 Click on a port under the **Ethernet Ports** node.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Reconfigure**.

Step 6 From the drop-down list choose **Configure as Server Port**.

Uplink Ethernet Ports

Configuring Uplink Ethernet Ports

You can configure uplink Ethernet ports on either the fixed module or an expansion module.

This task describes only one method of configuring uplink Ethernet ports. You can also configure uplink Ethernet ports from a right-click menu.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Click on one of the ports under the **Ethernet Ports** node.
If you want to reconfigure a server port, appliance port, or FCoE storage port, expand the appropriate node.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Reconfigure**.

Step 7 From the drop-down list choose **Configure as Uplink Port**.

What to Do Next

If desired, change the properties for the default flow control policy and admin speed of the uplink Ethernet port.

Changing the Properties of an Uplink Ethernet Port

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 In the **Ethernet Ports** node, click the uplink Ethernet port that you want to change.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Show Interface**.

Step 7 In the **Properties** dialog box, complete the following fields:

a) (Optional) In the **User Label** field, enter a label to identify the port.
b) From the **Flow Control Policy** drop-down list, select a flow control policy to determine how the port sends and receives IEEE 802.3x pause frames when the receive buffer fills.
c) In the **Admin Speed** field, click one of the following radio buttons:

- 1Gbps
- 10Gbps

Step 8 Click **OK**.

Reconfiguring a Port on a Fabric Interconnect

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to reconfigure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Click the port or ports you want to reconfigure.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Reconfigure**.

Step 7 From the drop-down list choose which way you want the port reconfigured.

Example: Reconfiguring an Uplink Ethernet Port as a Server Port

1. Expand the **Ethernet Ports** node and select the port you want to reconfigure.
2. Follow steps 5 and 6 above.
3. From the drop-down list choose **Configure as Server Port**.

Enabling a Port on Fabric Interconnect

After you enable or disable a port on a fabric interconnect, wait for at least 1 minute before you reacknowledge the chassis. If you reacknowledge the chassis too soon, the pinning of server traffic from the chassis may not be updated with the changes to the port that you enabled or disabled.

You can enable or disable a port only when it is configured. If the port is unconfigured, the enable disable option is not active.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to enable, expand one of the following:

- **Fixed Module**

- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select a port.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Enable Port**.

Step 7 The Cisco UCS Manager GUI displays a question. Click **OK.**

Step 8 The Cisco UCS Manager GUI displays a confirmation message.

Disabling a Port on Fabric Interconnect

After you enable or disable a port on a fabric interconnect, wait for at least 1 minute before you reacknowledge the chassis. If you reacknowledge the chassis too soon, the pinning of server traffic from the chassis may not be updated with the changes to the port that you enabled or disabled.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to enable, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select a port.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Disable Port**.

Step 7 The Cisco UCS Manager GUI displays a question. Click **OK.**

Step 8 The Cisco UCS Manager GUI displays a confirmation message.

Unconfiguring a Port on a Fabric Interconnect

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to unconfigure, expand one of the following:

- **Fixed Module**

- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select a port.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Unconfigure**.

Step 7 The Cisco UCS Manager GUI displays a question. Click **Yes**.

Step 8 The Cisco UCS Manager GUI displays a confirmation message.

Appliance Ports

Appliance ports are only used to connect fabric interconnects to directly attached NFS storage.

Note When you create a new appliance VLAN, its IEEE VLAN ID is not added to the LAN Cloud. Therefore, appliance ports that are configured with the new VLAN remains down, by default, due to a pinning failure. To bring up these appliance ports, you have to configure a VLAN in LAN Cloud with the same IEEE VLAN ID.

Configuring an Appliance Port

You can configure Appliance ports on either the fixed module or an expansion module.

This task describes only one method of configuring appl ports. You can also configure appliance ports from the **General** tab for the port.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select a port.
If you want to reconfigure a server port, uplink Ethernet port, or FCoE storage port, expand the appropriate node.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Reconfigure**.

Step 7 From the drop-down list, click **Configure as Appliance Port**.

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

Step 9 In the **Configure as Appliance Port** dialog box, complete the following fields:

Name	Description
Priority drop-down list	The quality of service setting associated with this interface. This can be one of the following: • **Fc—**Use this priority for vHBA traffic only. • **Platinum—**Use this priority for vNIC traffic only. • **Gold—**Use this priority for vNIC traffic only. • **Silver—**Use this priority for vNIC traffic only. • **Bronze—**Use this priority for vNIC traffic only. • **Best Effort—**Do not use this priority. It is reserved for the Basic Ethernet traffic lane.
Pin Group drop-down list	The LAN pin group that you want to use as the appliance pin target to the specified fabric and port, or fabric and port channel.
Create LAN Pin Group link	Click this link if you want to create a LAN pin group.
Network Control Policy drop-down list	The network control policy associated with this port.
Create Network Control Policy link	Click this link if you want to create a network control policy.
Flow Control Policy drop-down list	The flow control policy associated with this port.
Create Flow Control Policy link	Click this link if you want to create a flow control policy.
Admin Speed field	The data transfer rate for the port, which should match the destination to which the port is linked. This can be one of the following: • **1 Gbps** • **10 Gbps** • **20 Gbps** • **40 Gbps** **Note** The admin speed can be changed only for certain ports, and not all speeds are available on all systems. For more information, see the *Hardware Installation Guide* for your fabric interconnect.

Step 10 In the **VLANs** area, do the following:

a) In the **Port Mode** field, click one of the following radio buttons to select the mode you want to use for the port channel:

- **Trunk—**Cisco UCS Manager GUI displays the VLANs Table that lets you choose the VLANs you want to use.
- **Access—**Cisco UCS Manager GUI displays the **Select VLAN** drop-down list that allows you to choose a VLAN to associate with this port or port channel.

With either mode, you can click the **Create VLAN** link to create a new VLAN.

Note If traffic for the appliance port needs to traverse the uplink ports, you must also define each VLAN used by this port in the LAN cloud. For example, you need the traffic to traverse the uplink ports if the storage is also used by other servers, or if you want to ensure that traffic fails over to the secondary fabric interconnect if the storage controller for the primary fabric interconnect fails.

b) If you clicked the **Trunk** radio button, complete the following fields in the VLANs table:

Name	Description
Select column	Check the check box in this column for each VLAN you want to use.
Name column	The name of the VLAN.
Native VLAN column	To designate one of the VLANs as the native VLAN, click the radio button in this column.

c) If you clicked the **access** radio button, choose a VLAN from the **Select VLAN** drop-down list.

Step 11 (Optional) If you want to add an endpoint, check the **Ethernet Target Endpoint** check box and complete the following fields:

Name	Description
Name field	The name of the endpoint. 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.
MAC Address field	The MAC address for the endpoint.

Step 12 Click **OK**.

Modifying the Properties of an Appliance Port

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the appliance port you want to modify, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Expand **Ethernet Ports**.

Step 5 Click the appliance port for which you want to modify the properties.

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

Step 7 In the **Actions** area, click **Show Interface**.
You may need to expand or use the scroll bars in the **Properties** dialog box to see all the fields.

Step 8 In the **Properties** dialog box, modify the values in one or more of the following fields:

Name	Description
User Label field	A user-defined name that can be used for internal tracking or customized identification. Enter up to 32 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Admin Speed field	The data transfer rate for the port, which should match the destination to which the port is linked. This can be one of the following: • **1 Gbps** • **10 Gbps** • **20 Gbps** • **40 Gbps** **Note** The admin speed can be changed only for certain ports, and not all speeds are available on all systems. For more information, see the *Hardware Installation Guide* for your fabric interconnect.

Name	Description
Priority drop-down list	The quality of service setting associated with this interface. This can be one of the following: • **Fc—**Use this priority for vHBA traffic only. • **Platinum—**Use this priority for vNIC traffic only. • **Gold—**Use this priority for vNIC traffic only. • **Silver—**Use this priority for vNIC traffic only. • **Bronze—**Use this priority for vNIC traffic only. • **Best Effort—**Do not use this priority. It is reserved for the Basic Ethernet traffic lane.
Pin Group drop-down list	The LAN pin group that you want to use as the appliance pin target to the specified fabric and port, or fabric and port channel.
Network Control Policy drop-down list	The network control policy associated with this port.
MAC Address field	The MAC address for the endpoint. If you do not see this field, the port does not have an Ethernet target endpoint set. Click **Add Ethernet Target Endpoint** in the **Actions** area to add an endpoint.
Port Mode field	The fields displayed in this area depend on the setting of the **Port Mode** field. If you choose: • **Trunk—**Cisco UCS Manager GUI displays the VLANs Table that lets you choose the VLANs you want to use. • **Access—**Cisco UCS Manager GUI displays the **Select VLAN** drop-down list that allows you to choose a VLAN to associate with this port or port channel.

Step 9 Click **OK**.

FCoE and Fibre Channel Storage Ports

Configuring an FCoE Storage Port

You can configure FCoE storage ports on either the fixed module or an expansion module.

This task describes only one method of configuring FCoE storage ports. You can also configure FCoE storage ports from the **General** tab for the port.

Before You Begin

The Fibre Channel switching mode must be set to Switching for these ports to be valid. The storage ports cannot function in end-host mode.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Click one or more of the ports under the **Ethernet Ports** node.
If you want to reconfigure an uplink Ethernet port, server port, or appliance port, expand the appropriate node.

Step 5 Right-click the selected port or ports and choose **Configure as FCoE Storage Port**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **OK**.

Configuring a Fibre Channel Storage Port

This task describes only one method of configuring FC storage ports. You can also configure FC storage ports from the **General** tab for the port.

Before You Begin

The Fibre Channel switching mode must be set to Switching for these ports to be valid. The storage ports cannot function in end-host mode.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Expand the **Expansion Module** node.

Step 4 Click one or more of the ports under the **FC Ports** node.

Step 5 Right-click the selected port or ports and choose **Configure as FC Storage Port**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **OK**.

Restoring an Uplink Fibre Channel Port

This task describes only one method of restoring an FC storage port to function as an uplink FC port. You can also reconfigure FC storage ports from the **General** tab for the port.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Expand the **Expansion Module** node.

Step 4 Click one or more of the ports under the **FC Ports** node.

Step 5 Right-click the selected port or ports and choose **Configure as Uplink Port**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **OK**.

FCoE Uplink Ports

FCoE uplink ports are physical Ethernet interfaces between the fabric interconnects and the upstream Ethernet switch, used for carrying FCoE traffic. With this support the same physical Ethernet port can carry both Ethernet traffic and Fibre Channel traffic.

FCoE uplink ports connect to upstream Ethernet switches using the FCoE protocol for Fibre Channel traffic. This allows both the Fibre Channel and Ethernet traffic to flow on the same physical Ethernet link.

Note FCoE uplinks and unified uplinks enable the multi-hop FCoE feature, by extending the unified fabric up to the distribution layer switch.

You can configure the same Ethernet port as any of the following:

- **FCoE uplink port—**As an FCoE uplink port for only Fibre Channel traffic.
- **Uplink port—**As an Ethernet port for only Ethernet traffic.
- **Unified uplink port—**As a unified uplink port to carry both Ethernet and Fibre Channel traffic.

Configuring FCoE Uplink Ports

You can configure FCoE Uplink port on either a fixed module or an expansion module. This task describes only one method of configuring FCoE Uplink ports. You can also configure FCoE uplink ports from a right-click menu or from the General tab for the port.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select any **Unconfigured** port.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Reconfigure**.

Step 7 From the drop down options, select **Configure as FCoE Uplink Port**.

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

Step 9 The Cisco UCS Manager GUI displays a success message.
In the **Properties** area, the **Role** changes to **Fcoe Uplink**.

Step 10 (Optional) In the **Properties** area, specify the **VSAN** in the **VSAN** field.

Unified Storage Ports

Unified storage is configuring the same physical port as an Ethernet storage interface and FCoE storage interface. You can configure any appliance port or FCoE storage port as a unified storage port on either a fixed module or an expansion module. To configure a unified storage port, the fabric interconnect must be in Fibre Channel switching mode.

In a unified storage port, you can enable/disable individual FCoE storage or appliance interfaces.

- In an unified storage port, if you do not specify a non default VLAN for the appliance port the fcoe-storage-native-vlan will be assigned as the native VLAN on the unified storage port. If the appliance port has a non default native VLAN specified as native VLAN, this will be assigned as the native VLAN for unified storage port.
- When you enable or disable the appliance interface, the corresponding physical port is enabled/disabled. So when you disable the appliance interface in a unified storage, even if the FCoE storage is enabled, it goes down with the physical port.
- When you enable or disable FCoE storage interface, the corresponding VFC is enabled or disabled. So when the FCoE storage interface is disabled in a unified storage port, the appliance interface will continue to function normally.

Configuring an Appliance Port as a Unified Storage Port

You can configure a unified storage port either from an appliance port or an FCoE storage port. You can also configure the unified storage port from an unconfigured port. If you start from an unconfigured port, you will assign either appliance or FCoE storage configuration to the port and then add another configuration to enable it as a unified storage port.

Important Make sure the FI is in FC switching mode.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select any the port that is already configured as an appliance port. In the **Work** pane, under **General** tab, in **Properties** area, the **Role** will show as **Appliance Storage**.

Step 5 In the **Actions** area, click **Reconfigure**.

Step 6 From the pop-up menu, select **Configure as FCoE Storage** Port.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 The Cisco UCS Manager GUI displays a success message. In the **Properties** area, the **Role** changes to **Unified Storage**.

Unconfiguring a Unified Storage Port

You can unconfigure and remove both configurations from the unified connect port. Or you can unconfigure either one of them and retain the other one on the port.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to unconfigure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select the port you want to unconfigure.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Unconfigure**. You will see the following options:

- **Unconfigure FCoE Storage Port**

- **Unconfigure Appliance Port**
- **Unconfigure both**

Step 7 Select one of the unconfigure options.

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

Step 9 The Cisco UCS Manager GUIdisplays a success message. In the **Properties** area, the **Role** changes to based on your unconfigure selection.

Unified Uplink Ports

When you configure an Ethernet uplink and an FCoE uplink on the same physical Ethernet port, it is called the unified uplink port. You can individually enable or disable either FCoE or Ethernet interfaces independently.

- Enabling or disabling the FCoE uplink results in corresponding VFC being enabled or disabled.
- Enabling or disabling an Ethernet uplink results in corresponding physical port being enabled or disabled.

If you disable an Ethernet uplink, it disables the underlying physical port in an unified uplink. So, even if the FCoE uplink is enabled, the FCoE uplink also goes down. But if you disable an FCoE uplink, only the VFC goes down. If the Ethernet uplink is enabled, it can still function properly in the unified uplink port.

Configuring Unified Uplink Ports

You can configure the unified uplink port from either one of the following:

- From existing FCoE uplink or Ethernet Uplink port
- From an unconfigured uplink port

This process describes one method to configure an unified uplink port from an existing FCoE uplink port. You can configure the unified uplink port on either a fixed module or an expansion module.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to configure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select a port.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Properties** area, make sure the **Role** shows as **Fcoe Uplink**.

Step 7 In the **Actions** area, click **Reconfigure**.

Step 8 From the drop down options, select **Configure as Uplink Port**.

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

Step 10 The Cisco UCS Manager GUI displays a success message.
In the **Properties** area, the **Role** changes to **Unified Uplink**.

Step 11 (Optional) In the **Properties** area, specify the **VSAN** in the **VSAN** field.

Unconfiguring Unified Uplink Port

You can unconfigure and remove both configurations from the unified uplink port. Or you can unconfigure either one of the FCoE or Ethernet port configuration and retain the other one on the port.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Depending upon the location of the ports you want to unconfigure, expand one of the following:

- **Fixed Module**
- **Expansion Module**

Step 4 Under the **Ethernet Ports** node, select the port you want to unconfigure.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Unconfigure**. Select one of the following options:

- **Unconfigure FCoE Uplink Port**
- **Unconfigure Uplink Port**
- **Unconfigure both**

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 The Cisco UCS Manager GUI displays a success message. In the **Properties** area, the **Role** changes based on your unconfigure selection.

Step 9 Click **Save Changes**.

Uplink Ethernet Port Channels

An uplink Ethernet port channel allows you to group several physical uplink Ethernet ports (link aggregation) to create one logical Ethernet link to provide fault-tolerance and high-speed connectivity. In Cisco UCS Manager, you create a port channel first and then add uplink Ethernet ports to the port channel. You can add up to eight uplink Ethernet ports to a port channel.

Note Cisco UCS uses Link Aggregation Control Protocol (LACP), not Port Aggregation Protocol (PAgP), to group the uplink Ethernet ports into a port channel. If the ports on the upstream switch are not configured for LACP, the fabric interconnects treat all ports in an uplink Ethernet port channel as individual ports and therefore forward packets.

Creating an Uplink Ethernet Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Expand the node for the fabric interconnect where you want to add the port channel.

Step 4 Right-click the **Port Channels** node and choose **Create Port Channel**.

Step 5 In the **Set Port Channel Name** page of the **Create Port Channel** wizard, do the following:

a) Complete the following fields:

Name	Description
ID field	The identifier for the port channel. Enter an integer between 1 and 256. This ID cannot be changed after the port channel has been saved.
Name field	A user-defined name for the port channel. 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).

b) Click **Next**.

Step 6 In the **Add Ports** page of the **Create Port Channel** wizard, do the following:

a) In the **Ports** table, choose one or more ports to include in the port channel.

b) Click the >> button to add the ports to the **Ports in the port channel** table.
You can use the << button to remove ports from the port channel.

Note Cisco UCS Manager warns you if you select a port that has been configured as a server port. You can click **Yes** in the dialog box to reconfigure that port as an uplink Ethernet port and include it in the port channel.

Step 7 Click **Finish**.

Enabling an Uplink Ethernet Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Expand the node for the fabric interconnect that includes the port channel you want to enable.

Step 4 Expand the **Port Channels** node.

Step 5 Right-click the port channel you want to enable and choose **Enable Port Channel**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Disabling an Uplink Ethernet Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Expand the node for the fabric interconnect that includes the port channel you want to disable.

Step 4 Expand the **Port Channels** node.

Step 5 Right-click the port channel you want to disable and choose **Enable Port Channel**.

Adding Ports to and Removing Ports from an Uplink Ethernet Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud** > *Fabric* > **Port Channels**.

Step 3 Click the port channel to which you want to add or remove ports.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Add Ports**.

Step 6 In the **Add Ports** dialog box, do one of the following:

- To add ports, choose one or more ports in the **Ports** table, and then click the **>>** button to add the ports to the **Ports in the port channel** table.
- To remove ports, choose one or more ports in the **Ports in the port channel** table, and then click the **<<** button to remove the ports from the port channel and add them to the **Ports** table.

Step 7 Click **OK**.

Deleting an Uplink Ethernet Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Expand the node for the fabric interconnect where you want to delete the port channel.

Step 4 Click the **Port Channels** node.

Step 5 In the **General** tab for the **Port Channels** node, choose the port channel you want to delete.

Step 6 Right-click the port channel and choose **Delete**.

Appliance Port Channels

An appliance port channel allows you to group several physical appliance ports to create one logical Ethernet storage link for the purpose of providing fault-tolerance and high-speed connectivity. In Cisco UCS Manager, you create a port channel first and then add appliance ports to the port channel. You can add up to eight appliance ports to a port channel.

Creating an Appliance Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Appliances**.

Step 3 Expand the node for the fabric interconnect where you want to add the port channel.

Step 4 Right-click the **Port Channels** node and choose **Create Port Channel**.

Step 5 In the **Set Port Channel Name** page of the **Create Port Channel** wizard, complete the following fields to specify the identity and other properties of the port channel:

Name	Description
ID field	The unique identifier of the port channel. Enter an integer between 1 and 256. This ID cannot be changed after the port channel has been saved.
Name field	A user-defined name for the port channel. 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.
Priority drop-down list	The quality of service setting associated with this interface. This can be one of the following: • **Fc—**Use this priority for vHBA traffic only. • **Platinum—**Use this priority for vNIC traffic only. • **Gold—**Use this priority for vNIC traffic only. • **Silver—**Use this priority for vNIC traffic only. • **Bronze—**Use this priority for vNIC traffic only. • **Best Effort—**Do not use this priority. It is reserved for the Basic Ethernet traffic lane.
Protocol field	The protocol for the port channel. This can be one of the following: • **Static** • **Lacp**
Pin Group drop-down	The LAN pin group associated with this port channel.
Create LAN Pin Group link	Click this link to create a LAN pin group.
Network Control Policy drop-down list	The network control policy associated with this port channel.
Create Network Control Policy link	Click this link to create a global network control policy that will be available to all port channels.
Flow Control Policy drop-down list	The flow control policy associated with this port channel.
Create Flow Control Policy link	Click this link to create a global flow control policy that will be available to all port channels.

Step 6 In the **VLANs** area, do the following:

a) In the **Port Mode** field, click one of the following radio buttons to select the mode you want to use for the port channel:

- **Trunk—**Cisco UCS Manager GUI displays the VLANs Table that lets you choose the VLANs you want to use.
- **Access—**Cisco UCS Manager GUI displays the **Select VLAN** drop-down list that allows you to choose a VLAN to associate with this port or port channel.

With either mode, you can click the **Create VLAN** link to create a new VLAN.

b) If you clicked the **Trunk** radio button, complete the following fields in the VLANs table:

Name	Description
Select column	Check the check box in this column for each VLAN you want to use.
Name column	The name of the VLAN.
Native VLAN column	To designate one of the VLANs as the native VLAN, click the radio button in this column.

c) If you clicked the **access** radio button, choose a VLAN from the **Select VLAN** drop-down list.

Step 7 (Optional) If you want to add an endpoint, check the **Ethernet Target Endpoint** check box and complete the following fields:

Name	Description
Name field	The name of the endpoint. 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.
MAC Address field	The MAC address for the endpoint.

Step 8 Click **Next**.

Step 9 In the **Add Ports** page of the **Create Port Channel** wizard, do the following:

a) In the **Ports** table, choose one or more ports to include in the port channel.

b) Click the >> button to add the ports to the **Ports in the port channel** table.
You can use the << button to remove ports from the port channel.

Note Cisco UCS Manager warns you if your configuration could cause issues with service profiles or port configurations. You can click **Yes** in the dialog box if you want to create the port channel despite those potential issues.

Step 10 Click **Finish**.

Enabling an Appliance Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Appliances**.

Step 3 Expand the node for the fabric interconnect that includes the port channel you want to enable.

Step 4 Expand the **Port Channels** node.

Step 5 Right-click the port channel you want to enable and choose **Enable Port Channel**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Disabling an Appliance Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Appliances**.

Step 3 Expand the node for the fabric interconnect that includes the port channel you want to disable.

Step 4 Expand the **Port Channels** node.

Step 5 Right-click the port channel you want to disable and choose **Disable Port Channel**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Adding Ports to and Removing Ports from an Appliance Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Appliances** > ***Fabric*** > **Port Channels**.

Step 3 Click the port channel to which you want to add or remove ports.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Add Ports**.

Step 6 In the **Add Ports** dialog box, do one of the following:

- To add ports, choose one or more ports in the **Ports** table, and then click the **>>** button to add the ports to the **Ports in the port channel** table.

- To remove ports, choose one or more ports in the **Ports in the port channel** table, and then click the **<<** button to remove the ports from the port channel and add them to the **Ports** table.

Step 7 Click **OK**.

Deleting an Appliance Port Channel

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Appliances**.

Step 3 Expand the node for the fabric interconnect that includes the port channel you want to delete.

Step 4 Expand the **Port Channels** node.

Step 5 Right-click the port channel you want to enable and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Fibre Channel Port Channels

A Fibre Channel port channel allows you to group several physical Fibre Channel ports (link aggregation) to create one logical Fibre Channel link to provide fault-tolerance and high-speed connectivity. In Cisco UCS Manager, you create a port channel first and then add Fibre Channel ports to the port channel.

You can create up to four Fibre Channel port channels in each Cisco UCS domain. Each Fibre Channel port channel can include a maximum of 16 uplink Fibre Channel ports.

Creating a Fibre Channel Port Channel

Procedure

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

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

Step 3 Expand the node for the fabric where you want to create the port channel.

Step 4 Right-click the **FC Port Channels** node and choose **Create Port Channel**.

Step 5 In the **Set Port Channel Name** page of the **Create Port Channel** wizard, do the following:

a) Complete the following fields:

Name	Description
ID field	The identifier for the port channel. Enter an integer between 1 and 256. This ID cannot be changed after the port channel has been saved.
Name field	A user-defined name for the port channel. 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).

b) Click **Next**.

Step 6 In the **Add Ports** page of the **Create Port Channel** wizard, do the following:

a) From the **Port Channel Admin Speed** drop-down list, select one of the following data transfer rates for traffic on the port channel:

- **1 Gbps**
- **2 Gbps**
- **4 Gbps**
- **8 Gbps**
- **Auto—**Cisco UCS determines the data transfer rate.

b) In the **Ports** table, choose one or more ports to include in the port channel.

c) Click the **>>** button to add the ports to the **Ports in the port channel** table.
You can use the **<<** button to remove ports from the port channel.

Step 7 Click **Finish**.

Enabling a Fibre Channel Port Channel

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **SAN Cloud** > ***Fabric*** > **FC Port Channels**.

Step 3 Click the port channel you want to enable.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Enable Port Channel**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Disabling a Fibre Channel Port Channel

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **SAN Cloud** > *Fabric* > **FC Port Channels**.

Step 3 Click the port channel you want to disable.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Disable Port Channel**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Adding Ports to and Removing Ports from a Fibre Channel Port Channel

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **SAN Cloud** > *Fabric* > **FC Port Channels**.

Step 3 Click the port channel to which you want to add or remove ports.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Add Ports**.

Step 6 In the **Add Ports** dialog box, do one of the following:

- To add ports, choose one or more ports in the **Ports** table, and then click the **>>** button to add the ports to the **Ports in the port channel** table.
- To remove ports, choose one or more ports in the **Ports in the port channel** table, and then click the **<<** button to remove the ports from the port channel and add them to the **Ports** table.

Step 7 Click **OK**.

Modifying the Properties of a Fibre Channel Port Channel

Note If you are connecting two Fibre Channel port channels, the admin speed for both port channels must match for the link to operate. If the admin speed for one or both of the Fibre Channel port channels is set to auto, Cisco UCS adjusts the admin speed automatically.

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **SAN Cloud** > ***Fabric*** > **FC Port Channels**.

Step 3 Click the port channel that you want to modify.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Properties** area, change the values in one or more of the following fields:

Name	Description
Name field	The user-defined name given to the port channel. This name can be between 1 and 16 alphanumeric characters.
VSAN drop-down list	The VSAN associated with the port channel.
Port Channel Admin Speed drop-down list	The admin speed of the port channel. This can be: • **1 Gbps** • **2 Gbps** • **4 Gbps** • **8 Gbps** • **auto**

Step 6 Click **Save Changes**.

Deleting a Fibre Channel Port Channel

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **SAN Cloud** > ***Fabric*** > **FC Port Channels**.

Step 3 Right-click the port channel you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

FCoE Port Channels

A FCoE port channel allows you to group several physical FCoE ports to create one logical FCoE port channel. At a physical level, the FCoE port channel carries FCoE traffic over an Ethernet port channel. So an FCoE port channel with a set of members is essentially an ethernet port channel with the same members. This ethernet port channel is used as a physical transport for FCoE traffic.

For each FCoE port channel, Cisco UCS Manager creates a VFC internally and binds it to an Ethernet port channel. FCoE traffic received from the hosts is sent over the VFC the same way as the FCoE traffic is sent over FC uplinks.

Creating an FCoE Port Channel

Procedure

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

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

Step 3 Expand the node for the fabric where you want to create the port channel.

Step 4 Right-click the **FCoE Port Channels** node and choose **Create FCoE Port Channel**.

Step 5 In the **Set Port Channel Name** page of the **Create FCoE Port Channel** wizard, do the following:

a) Complete the following fields:

Name	Description
ID field	The identifier for the port channel. Enter an integer between 1 and 256. This ID cannot be changed after the port channel has been saved.
Name field	A user-defined name for the port channel. 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).

b) Click **Next**.

Step 6 In the **Add Ports** page of the **Create FCoE Port Channel** wizard, do the following:

a) In the **Ports** table, choose one or more ports to include in the port channel.

b) Click the >> button to add the ports to the **Ports in the port channel** table.
You can use the << button to remove ports from the port channel.

Step 7 Click **Finish**.

Deleting an FCoE Port Channel

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** **SAN Cloud** *Fabric* **FCoE Port Channels**.

Step 3 Right-click the port channel you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Unified Uplink Port Channel

When you create an Ethernet port channel and an FCoE port channel with the same ID, it is called the unified port channel. When the unified port channel is created, a physical Ethernet port channel and a VFC are created on the fabric interconnect with the specified members. The physical Ethernet port channel is used to carry both Ethernet and FCoE traffic. The VFC binds FCoE traffic to the Ethernet port channel.

The following rules will apply to the member port sets of unified uplink port channel:

- The Ethernet port channel and FCoE port channel on the same ID, that is configured as a unified port channel, must have the same set of member ports.
- When you add a member port channel to the Ethernet port channel, Cisco UCS Manager adds the same port channel to FCoE port channel as well. Similarly adding a member to FCoE port channel adds the member port to Ethernet port channel.
- When you delete a member port from one of the port channels, Cisco UCS Manager automatically deletes the member port from the other port channel.

If you disable an Ethernet uplink port channel, it disables the underlying physical port channel in an unified uplink port channel. So, even if the FCoE uplink is enabled, the FCoE uplink port channel also goes down. But if you disable an FCoE uplink port channel, only the VFC goes down. If the Ethernet uplink port channel is enabled, it can still function properly in the unified uplink port channel.

Adapter Port Channels

An adapter port channel groups all the physical links from a Cisco UCS Virtual Interface Card (VIC) to an IOM into one logical link.

Adapter port channels are created and managed internally by Cisco UCS Manager when it detects that the correct hardware is present. Adapter port channels cannot be configured manually. Adapter port channels are viewable using the Cisco UCS Manager GUI or Cisco UCS Manager CLI

Viewing Adapter Port Channels

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis_Number*** > **Servers** > ***Server_Number*** > **Interface Cards**

Step 3 Click the adapter for which you want to view the adapter port channels.

Step 4 In the **Work** pane, click the **DCE Interfaces** tab.

Step 5 To view details of the adapter port channel, click the link in the **Port Channel** column.

Fabric Port Channels

Fabric port channels allow you to group several of the physical links from an IOM to a fabric interconnect into one logical link for redundancy and bandwidth sharing. As long as one link in the fabric port channel remains active, the fabric port channel continues to operate.

If the correct hardware is connected, fabric port channels are created by Cisco UCS Manager in the following ways:

- During chassis discovery according to the settings configured in the chassis discovery policy.
- After chassis discovery according to the settings configured in the chassis connectivity policy for a specific chassis.

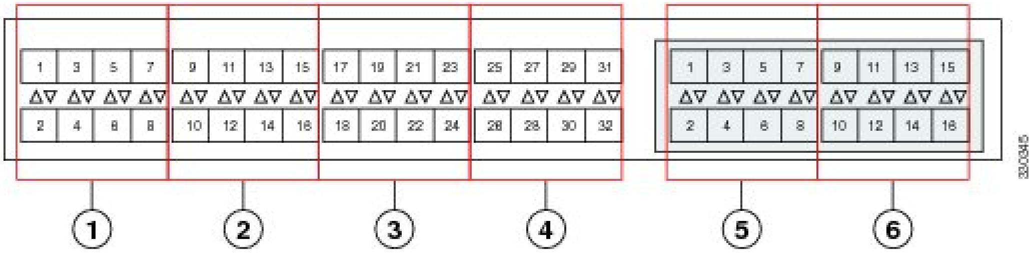
For each IOM there is a single fabric port channel. Each uplink connecting an IOM to a fabric interconnect can be configured as a discrete link or included in the port channel, but an uplink cannot belong to more than one fabric port channel. For example, if a chassis with two IOMs is discovered and the chassis discovery policy is configured to create fabric port channels, Cisco UCS Manager creates two separate fabric port channels: one for the uplinks connecting IOM-1 and another for the uplinks connecting IOM-2. No other chassis can join these fabric port channels. Similarly, uplinks belonging to the fabric port channel for IOM-1 cannot join the fabric port channel for IOM-2.

Cabling Considerations for Fabric Port Channels

When you configure the links between the Cisco UCS 2200 Series FEX and a Cisco UCS 6200 series fabric interconnect in fabric port channel mode, the available VIF namespace on the adapter varies depending on where the FEX uplinks are connected to the fabric interconnect ports.

Inside the 6248 fabric interconnect there are six sets of eight contiguous ports, with each set of ports managed by a single chip. When uplinks are connected such that all of the uplinks from an FEX are connected to a set of ports managed by a single chip, Cisco UCS Manager maximizes the number of VIFs used in service profiles deployed on the blades in the chassis. If uplink connections from an IOM are distributed across ports managed by separate chips, the VIF count is decreased.

Figure 1: Port Groups for Fabric Port Channels



Caution Adding a second link to a fabric port channel port group is disruptive and will automatically increase the available amount of VIF namespace from 63 to 118. Adding further links is not disruptive and the VIF namespace stays at 118.

Caution Linking a chassis to two fabric port channel port groups is disruptive and does not affect the VIF namespace unless it is manually acknowledged. The VIF namespace is then automatically set to the smaller size fabric port channel port group usage (either 63 or 118 VIFs) of the two groups.

For high availability cluster mode applications, symmetric cabling configurations are strongly recommended. If the cabling is asymmetric, the maximum number of VIFs available is the smaller of the two cabling configurations.

For more information on the maximum number of VIFs for your Cisco UCS environment, see the configuration limits document for your hardware and software configuration.

Configuring a Fabric Port Channel

Procedure

Step 1 To include all links from the IOM to the fabric interconnect in a fabric port channel during chassis discovery, set the link grouping preference in the chassis discovery policy to port channel.
Configuring the Chassis/FEX Discovery Policy, on page 180

Step 2 To include links from individual chassis in a fabric port channel during chassis discovery, set the link grouping preference in the chassis connectivity policy to port channel.
Configuring a Chassis Connectivity Policy, on page 181

Step 3 After chassis discovery, enable or disable additional fabric port channel member ports.
Enabling or Disabling a Fabric Port Channel Member Port, on page 99

What to Do Next

To add or remove chassis links from a fabric port channel after making a change to the chassis discovery policy or the chassis connectivity policy, reacknowledge the chassis. Chassis reacknowledgement is not required to enable or disable chassis member ports from a fabric port channel

Viewing Fabric Port Channels

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > *Chassis Number* > **IO Modules**.

Step 3 Click the IOM for which you want to view the fabric port channels.

Step 4 In the **Work** pane, click the **Fabric Ports** tab.

Step 5 To view details of the fabric port channel, click the link in the **Port Channel** column.

Enabling or Disabling a Fabric Port Channel Member Port

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Internal LAN** > *Fabric* > **Port Channels**.

Step 3 Expand the port channel for which you want to enable or disable a member port.

Step 4 Click the ethernet interface for the member port you want to enable or disable.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click one of the following:

- **Enable Interface**
- **Disable Interface**

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Server Ports with the Internal Fabric Manager

Internal Fabric Manager

The Internal Fabric Manager provides a single interface where you can configure server ports for a fabric interconnect in a Cisco UCS domain. The Internal Fabric Manager is accessible from the **General** tab for that fabric interconnect.

Some of the configuration that you can do in the Internal Fabric Manager can also be done in nodes on the **Equipment** tab, on the **LAN** tab, or in the LAN Uplinks Manager.

Launching the Internal Fabric Manager

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Click **Fixed Module**.

Step 4 In the **Work** pane, click **Internal Fabric Manager** in the **Actions** area.
The Internal Fabric Manager opens in a separate window.

Configuring a Server Port with the Internal Fabric Manager

Procedure

Step 1 In the Internal Fabric Manager, click the down arrows to expand the **Unconfigured Ports** area.

Step 2 Right-click the port that you want to configure and choose **Configure as Server Port**.

Step 3 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 4 If you have completed all tasks in the Internal Fabric Manager, click **OK**.

Unconfiguring a Server Port with the Internal Fabric Manager

Procedure

Step 1 In the Internal Fabric Manager, click the server port in the **Server Ports** table.

Step 2 Click **Unconfigure Port**.

Step 3 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 4 If you have completed all tasks in the Internal Fabric Manager, click **OK**.

Enabling a Server Port with the Internal Fabric Manager

Procedure

Step 1 In the Internal Fabric Manager, click the server port in the **Server Ports** table.

Step 2 Click **Enable Port**.

Step 3 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 4 If you have completed all tasks in the Internal Fabric Manager, click **OK**.

Disabling a Server Port with the Internal Fabric Manager

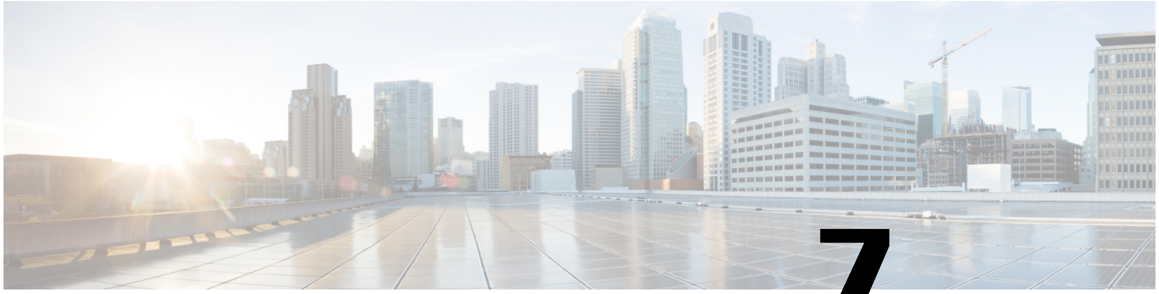
Procedure

Step 1 In the Internal Fabric Manager, click the server port in the **Server Ports** table.

Step 2 Click **Disable Port**.

Step 3 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 4 If you have completed all tasks in the Internal Fabric Manager, click **OK**.



CHAPTER 7

Configuring Communication Services

This chapter includes the following sections:

Communication Services

You can use the following communication services to interface third-party applications with Cisco UCS:

Communication Service	Description
CIM XML	This service is disabled by default and is only available in read-only mode. The default port is 5988. This common information model is one of the standards defined by the Distributed Management Task Force.

Communication Service	Description
HTTP	This service is enabled on port 80 by default. You must enable either HTTP or HTTPS to run Cisco UCS Manager GUI. If you select HTTP, all data is exchanged in clear text mode. For security purposes, we recommend that you enable HTTPS and disable HTTP. By default, Cisco UCS redirects any attempt to communicate via HTTP to the HTTPS equivalent. We recommend that you do not change this behavior. **Note** If you are upgrading to Cisco UCS, version 1.4(1), this does not happen by default. If you want to redirect any attempt to communicate via HTTP to an HTTPS equivalent, you should enable **Redirect HTTP to HTTPS** in Cisco UCS Manager.
HTTPS	This service is enabled on port 443 by default. With HTTPS, all data is exchanged in encrypted mode through a secure server. For security purposes, we recommend that you only use HTTPS and either disable or redirect HTTP communications.
SMASH CLP	This service is enabled for read-only access and supports a limited subset of the protocols, such as the **show** command. You cannot disable it. This shell service is one of the standards defined by the Distributed Management Task Force.
SNMP	This service is disabled by default. If enabled, the default port is 161. You must configure the community and at least one SNMP trap. Enable this service only if your system includes integration with an SNMP server.
SSH	This service is enabled on port 22. You cannot disable it, nor can you change the default port. This service provides access to the Cisco UCS Manager CLI.
Telnet	This service is disabled by default. This service provides access to the Cisco UCS Manager CLI.

Configuring CIM-XML

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **CIM-XML** area, click the **enabled** radio button.

The **CIM-XML** area expands to display the available configuration options.

Step 5 (Optional) In the **Port** field, change the default port that Cisco UCS Manager GUI will use for CIM-XML. The default port is 5988.

Step 6 Click **Save Changes**.

Configuring HTTP

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Click the **Communication Services** tab.

Step 4 In the **HTTP** area, click the **enabled** radio button.
The **HTTP** area expands to display the available configuration options.

Step 5 (Optional) In the **Port** field, change the default port that Cisco UCS Manager GUI uses for HTTP.
The default port is 80.

Step 6 (Optional) In the **Redirect HTTP to HTTPS** field, click the **enabled** radio button.
You must also configure and enable HTTPS to enable redirection of HTTP logins to the HTTPS login. Once enabled, you cannot disable the redirection until you have disabled HTTPS.

Note If you redirect HTTP to HTTPS, you cannot use HTTP to access Cisco UCS Manager GUI. Redirection disables HTTP as it automatically redirects to HTTPS.

Step 7 Click **Save Changes**.

Configuring HTTPS

Certificates, Key Rings, and Trusted Points

HTTPS uses components of the Public Key Infrastructure (PKI) to establish secure communications between two devices, such as a client's browser and Cisco UCS Manager.

Encryption Keys and Key Rings

Each PKI device holds a pair of asymmetric Rivest-Shamir-Adleman (RSA) encryption keys, one kept private and one made public, stored in an internal key ring. A message encrypted with either key can be decrypted with the other key. To send an encrypted message, the sender encrypts the message with the receiver's public key, and the receiver decrypts the message using its own private key. A sender can also prove its ownership of a public key by encrypting (also called 'signing') a known message with its own private key. If a receiver can successfully decrypt the message using the public key in question, the sender's possession of the corresponding private key is proven. Encryption keys can vary in length, with typical lengths from 512 bits to 2048 bits. In general, a longer key is more secure than a shorter key. Cisco UCS Manager provides a default key ring with an initial 1024-bit key pair, and allows you to create additional key rings.

The default key ring certificate must be manually regenerated if the cluster name changes or the certificate expires.

This operation is only available in the UCS Manager CLI.

Certificates

To prepare for secure communications, two devices first exchange their digital certificates. A certificate is a file containing a device's public key along with signed information about the device's identity. To merely support encrypted communications, a device can generate its own key pair and its own self-signed certificate. When a remote user connects to a device that presents a self-signed certificate, the user has no easy method to verify the identity of the device, and the user's browser will initially display an authentication warning. By default, Cisco UCS Manager contains a built-in self-signed certificate containing the public key from the default key ring.

Trusted Points

To provide stronger authentication for Cisco UCS Manager, you can obtain and install a third-party certificate from a trusted source, or trusted point, that affirms the identity of your device. The third-party certificate is signed by the issuing trusted point, which can be a root certificate authority (CA) or an intermediate CA or trust anchor that is part of a trust chain that leads to a root CA. To obtain a new certificate, you must generate a certificate request through Cisco UCS Manager and submit the request to a trusted point.

Important The certificate must be in Base64 encoded X.509 (CER) format.

Creating a Key Ring

Cisco UCS Manager supports a maximum of 8 key rings, including the default key ring.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Key Management**.

Step 3 Right-click **Key Management** and choose **Create Key Ring**.

Step 4 In the **Create Key Ring** dialog box, do the following:

a) In the **Name** field, enter a unique name for the key ring.

b) In the **Modulus** field, select one of the following radio buttons to specify the SSL key length in bits:

- **Mod512**
- **Mod1024**
- **Mod1536**
- **Mod2048**
- **Mod2560**

- **Mod3072**
- **Mod3584**
- **Mod4096**

c) Click **OK**.

What to Do Next

Create a certificate request for this key ring.

Creating a Certificate Request for a Key Ring

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Key Management**.

Step 3 Click the key ring for which you want to create a certificate request.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **General** tab, click **Create Certificate Request**.

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

Name	Description
DNS field	The domain name assigned to the network that is common to all host names.
Locality field	The city or town in which the company requesting the certificate is headquartered. Enter up to 64 characters. You can use any letters, numbers, or spaces, as well as the following special characters: , (comma), . (period), @ (at sign), ^ (carat), ((open parenthesis),) (close parenthesis), - (dash), _ (underscore), + (plus sign), : (colon), / (forward slash).
State field	The state or province in which the company requesting the certificate is headquartered. Enter up to 64 characters. You can use any letters, numbers, or spaces, as well as the following special characters: , (comma), . (period), @ (at sign), ^ (carat), ((open parenthesis),) (close parenthesis), - (dash), _ (underscore), + (plus sign), : (colon), / (forward slash).
Country field	The country code corresponding to the country in which the company resides. Enter two alphabetic characters.

Name	Description
Organization Name field	The organization requesting the certificate. Enter up to 64 characters. You can use any letters, numbers, or spaces, as well as the following special characters: , (comma), . (period), @ (at sign), ^ (carat), ((open parenthesis),) (close parenthesis), - (dash), _ (underscore), + (plus sign), : (colon), / (forward slash).
Organization Unit Name field	The organizational unit. Enter up to 64 characters. You can use any letters, numbers, or spaces, as well as the following special characters: , (comma), . (period), @ (at sign), ^ (carat), ((open parenthesis),) (close parenthesis), - (dash), _ (underscore), + (plus sign), : (colon), / (forward slash).
Email field	The email address associated with the request.
Password field	An optional password for this request.
Confirm Password field	If you specified a password, enter it again for confirmation.
Subject field	The fully qualified domain name of the fabric interconnect.
IP Address field	The IP address of the fabric interconnect.

Step 7 Click **OK**.

Step 8 Copy the text of the certificate request out of the **Request** field and save in a file.

Step 9 Send the file with the certificate request to the trust anchor or certificate authority.

What to Do Next

Create a trusted point and set the certificate chain for the certificate of trust received from the trust anchor.

Creating a Trusted Point

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Key Management**.

Step 3 Right-click **Key Management** and choose **Create Trusted Point**.

Step 4 In the **Create Trusted Point** dialog box, complete the following fields:

Name	Description
Name field	The name of the trusted point. 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.
Certificate Chain field	The certificate information for this trusted point. **Important** The certificate must be in Base64 encoded X.509 (CER) format.

Step 5 Click **OK**.

What to Do Next

When you receive the certificate from the trust anchor or certificate authority, import it into the key ring.

Importing a Certificate into a Key Ring

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Key Management**.

Step 3 Click the key ring into which you want to import the certificate.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Certificate** area, complete the following fields:

a) From the **Trusted Point** drop-down list, select the trusted point for the trust anchor that granted this certificate.

b) In the **Certificate** field, paste the text from the certificate you received from the trust anchor or certificate authority.

Important The certificate must be in Base64 encoded X.509 (CER) format.

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

Step 6 Click **Save Changes**.

What to Do Next

Configure your HTTPS service with the key ring.

Configuring HTTPS

Caution After you complete the HTTPS configuration, including changing the port and key ring to be used by HTTPS, all current HTTP and HTTPS sessions are closed without warning as soon as you save or commit the transaction.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **HTTPS** area, click the **enabled** radio button.
The **HTTPS** area expands to display the available configuration options.

Step 5 Complete the following fields:

Name	Description
Admin State field	This can be one of the following: • **Enabled** • **Disabled** If **Admin State** is enabled, Cisco UCS Manager GUI displays the rest of the fields in this section.
Port field	The port to use for HTTPS connections. Specify an integer between 1 and 65535. This service is enabled on port 443 by default.
Operational Port field	The port Cisco UCS Manager requires for system-level HTTPS communication. You cannot change this port.
Key Ring drop-down list	The key ring for HTTPS connections.
Cipher Suite Mode field	The level of Cipher Suite security used by the Cisco UCS domain. This can be one of the following: • **High Strength** • **Medium Strength** • **Low Strength** • **Custom—**Allows you to specify a user-defined Cipher Suite specification string.

Name	Description
Cipher Suite field	If you select **Custom** in the **Cipher Suite Mode** field, specify the user-defined Cipher Suite specification string in this field. The Cipher Suite specification string can contain up to 256 characters and must conform to the OpenSSL Cipher Suite specifications. You cannot use any spaces or special characters except ! (exclamation point), + (plus sign), - (hyphen), and : (colon). For details, see http://httpd.apache.org/docs/2.0/mod/mod_ssl.html#sslciphersuite. For example, the medium strength specification string Cisco UCS Manager uses as the default is: ALL:!ADH:!EXPORT56:!LOW:RC4+RSA:+HIGH:+MEDIUM:+EXP:+eNULL

Step 6 Click **Save Changes**.

Deleting a Key Ring

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Key Management**.

Step 3 Right-click the key ring you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a Trusted Point

Before You Begin

Ensure that the trusted point is not used by a key ring.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Key Management**.

Step 3 Right-click the trusted point you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 5 Click **OK**.

Configuring SNMP

Information about SNMP

The Simple Network Management Protocol (SNMP) is an application-layer protocol that provides a message format for communication between SNMP managers and agents. SNMP provides a standardized framework and a common language used for the monitoring and management of devices in a network.

SNMP Functional Overview

The SNMP framework consists of three parts:

- An SNMP manager—The system used to control and monitor the activities of network devices using SNMP.
- An SNMP agent—The software component within Cisco UCS, the managed device, that maintains the data for Cisco UCS and reports the data, as needed, to the SNMP manager. Cisco UCS includes the agent and a collection of MIBs. To enable the SNMP agent and create the relationship between the manager and agent, enable and configure SNMP in Cisco UCS Manager.
- A managed information base (MIB)—The collection of managed objects on the SNMP agent. Cisco UCS release 1.4(1) and higher support a larger number of MIBs than earlier releases.

Cisco UCS supports SNMPv1, SNMPv2c and SNMPv3. Both SNMPv1 and SNMPv2c use a community-based form of security. SNMP is defined in the following:

- RFC 3410 (http://tools.ietf.org/html/rfc3410)
- RFC 3411 (http://tools.ietf.org/html/rfc3411)
- RFC 3412 (http://tools.ietf.org/html/rfc3412)
- RFC 3413 (http://tools.ietf.org/html/rfc3413)
- RFC 3414 (http://tools.ietf.org/html/rfc3414)
- RFC 3415 (http://tools.ietf.org/html/rfc3415)
- RFC 3416 (http://tools.ietf.org/html/rfc3416)
- RFC 3417 (http://tools.ietf.org/html/rfc3417)
- RFC 3418 (http://tools.ietf.org/html/rfc3418)
- RFC 3584 (http://tools.ietf.org/html/rfc3584)

SNMP Notifications

A key feature of SNMP is the ability to generate notifications from an SNMP agent. These notifications do not require that requests be sent from the SNMP manager. Notifications can indicate improper user authentication, restarts, the closing of a connection, loss of connection to a neighbor router, or other significant events.

Cisco UCS Manager generates SNMP notifications as either traps or informs. Traps are less reliable than informs because the SNMP manager does not send any acknowledgment when it receives a trap, and Cisco UCS Manager cannot determine if the trap was received. An SNMP manager that receives an inform request acknowledges the message with an SNMP response protocol data unit (PDU). If the Cisco UCS Manager does not receive the PDU, it can send the inform request again.

SNMP Security Levels and Privileges

SNMPv1, SNMPv2c, and SNMPv3 each represent a different security model. The security model combines with the selected security level to determine the security mechanism applied when the SNMP message is processed.

The security level determines the privileges required to view the message associated with an SNMP trap. The privilege level determines whether the message needs to be protected from disclosure or authenticated. The supported security level depends upon which security model is implemented. SNMP security levels support one or more of the following privileges:

- noAuthNoPriv—No authentication or encryption
- authNoPriv—Authentication but no encryption
- authPriv—Authentication and encryption

SNMPv3 provides for both security models and security levels. A security model is an authentication strategy that is set up for a user and the role in which the user resides. A security level is the permitted level of security within a security model. A combination of a security model and a security level determines which security mechanism is employed when handling an SNMP packet.

Supported Combinations of SNMP Security Models and Levels

The following table identifies what the combinations of security models and levels mean.

Table 3: SNMP Security Models and Levels

Model	Level	Authentication	Encryption	What Happens
v1	noAuthNoPriv	Community string	No	Uses a community string match for authentication.
v2c	noAuthNoPriv	Community string	No	Uses a community string match for authentication.
v3	noAuthNoPriv	Username	No	Uses a username match for authentication.

Model	Level	Authentication	Encryption	What Happens
v3	authNoPriv	HMAC-MD5 or HMAC-SHA	No	Provides authentication based on the Hash-Based Message Authentication Code (HMAC) Message Digest 5 (MD5) algorithm or the HMAC Secure Hash Algorithm (SHA).
v3	authPriv	HMAC-MD5 or HMAC-SHA	DES	Provides authentication based on the HMAC-MD5 or HMAC-SHA algorithms. Provides Data Encryption Standard (DES) 56-bit encryption in addition to authentication based on the Cipher Block Chaining (CBC) DES (DES-56) standard.

SNMPv3 Security Features

SNMPv3 provides secure access to devices by a combination of authenticating and encrypting frames over the network. SNMPv3 authorizes management operations only by configured users and encrypts SNMP messages. The SNMPv3 User-Based Security Model (USM) refers to SNMP message-level security and offers the following services:

- Message integrity—Ensures that messages have not been altered or destroyed in an unauthorized manner and that data sequences have not been altered to an extent greater than can occur non-maliciously.
- Message origin authentication—Ensures that the claimed identity of the user on whose behalf received data was originated is confirmed.
- Message confidentiality and encryption—Ensures that information is not made available or disclosed to unauthorized individuals, entities, or processes.

SNMP Support in Cisco UCS

Cisco UCS provides the following support for SNMP:

Support for MIBs

Cisco UCS supports read-only access to MIBs.

For information about the specific MIBs available for Cisco UCS and where you can obtain them, see the MIB Quick Reference for Cisco UCS.

Authentication Protocols for SNMPv3 Users

Cisco UCS supports the following authentication protocols for SNMPv3 users:

- HMAC-MD5-96 (MD5)
- HMAC-SHA-96 (SHA)

AES Privacy Protocol for SNMPv3 Users

Cisco UCS uses Advanced Encryption Standard (AES) as one of the privacy protocols for SNMPv3 message encryption and conforms with RFC 3826.

The privacy password, or priv option, offers a choice of DES or 128-bit AES encryption for SNMP security encryption. If you enable AES-128 configuration and include a privacy password for an SNMPv3 user, Cisco UCS Manager uses the privacy password to generate a 128-bit AES key. The AES privacy password can have a minimum of eight characters. If the passphrases are specified in clear text, you can specify a maximum of 64 characters.

Enabling SNMP and Configuring SNMP Properties

SNMP messages from a Cisco UCS domain display the fabric interconnect name rather than the system name.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **SNMP** area, complete the following fields:

Name	Description
Admin State field	This can be one of the following: • **Enabled** • **Disabled** Enable this service only if your system includes integration with an SNMP server. If **Admin State** is enabled, Cisco UCS Manager GUI displays the rest of the fields in this section.
Port field	The port on which Cisco UCS Manager communicates with the SNMP host. You cannot change the default port.

Name	Description
Community/Username field	The default SNMP v1 or v2c community name or SNMP v3 username Cisco UCS Manager includes on any trap messages it sends to the SNMP host. Enter an alphanumeric string between 1 and 32 characters. Do not use @ (at sign), \ (backslash), " (double quote), ? (question mark) or an empty space. The default is public.
System Contact field	The system contact person responsible for the SNMP implementation. Enter a string of up to 255 characters, such as an email address or a name and telephone number.
System Location field	The location of the host on which the SNMP agent (server) runs. Enter an alphanumeric string up to 510 characters.

Step 5 Click **Save Changes**.

What to Do Next

Create SNMP traps and users.

Creating an SNMP Trap

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **SNMP Traps** area, click **+**.

Step 5 In the **Create SNMP Trap** dialog box, complete the following fields:

Name	Description
IP Address field	The IP address of the SNMP host to which Cisco UCS Manager should send the trap.
Community/Username field	The SNMP v1 or v2c community name or the SNMP v3 username Cisco UCS Manager includes when it sends the trap to the SNMP host. This must be the same as the community or username that is configured for the SNMP service. Enter an alphanumeric string between 1 and 32 characters. Do not use @ (at sign), \ (backslash), " (double quote), ? (question mark) or an empty space.

Name	Description
Port field	The port on which Cisco UCS Manager communicates with the SNMP host for the trap. Enter an integer between 1 and 65535. The default port is 162.
Version field	The SNMP version and model used for the trap. This can be one of the following: • **V1** • **V2c** • **V3**
Type field	If you select **V2c** or **V3** for the version, the type of trap to send. This can be one of the following: • **Traps** • **Informs**
v3 Privilege field	If you select **V3** for the version, the privilege associated with the trap. This can be one of the following: • **Auth—**Authentication but no encryption • **Noauth—**No authentication or encryption • **Priv—**Authentication and encryption

Step 6 Click **OK**.

Step 7 Click **Save Changes**.

Deleting an SNMP Trap

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **SNMP Traps** area, click the row in the table that corresponds to the user you want to delete.

Step 5 Click the **Delete** icon to the right of the table.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **Save Changes**.

Creating an SNMPv3 user

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **SNMP Users** area, click **+**.

Step 5 In the **Create SNMP User** dialog box, complete the following fields:

Name	Description
Name field	The username assigned to the SNMP user. Enter up to 32 letters or numbers. The name must begin with a letter and you can also specify _ (underscore), . (period), @ (at sign), and - (hyphen). **Note** You cannot create an SNMP username that is identical to a locally authenticated username.
Auth Type field	The authorization type. This can be one of the following: • **MD5** • **SHA**
Use AES-128 check box	If checked, this user uses AES-128 encryption.
Password field	The password for this user.
Confirm Password field	The password again for confirmation purposes.

Name	Description
Privacy Password field	The privacy password for this user.
Confirm Privacy Password field	The privacy password again for confirmation purposes.

Step 6 Click **OK**.

Step 7 Click **Save Changes**.

Deleting an SNMPv3 User

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Select the **Communication Services** tab.

Step 4 In the **SNMP Users** area, click the row in the table that corresponds to the user you want to delete.

Step 5 Click the **Delete** icon to the right of the table.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **Save Changes**.

Enabling Telnet

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Click the **Communication Services** tab.

Step 4 In the **Telnet** area, click the **enabled** radio button.

Step 5 Click **Save Changes**.

Disabling Communication Services

Note We recommend that you disable all communication services that are not required to interface with other network applications.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 On the **Communication Services** tab, click the **disable** radio button for each service that you want to disable.

Step 4 Click **Save Changes**.

CHAPTER 8

Configuring Authentication

This chapter includes the following sections:

Authentication Services

Cisco UCS supports two methods to authenticate user logins:

- Through user accounts local to Cisco UCS Manager
- Remotely through one of the following protocols:
  - LDAP
  - RADIUS
  - TACACS+

Guidelines and Recommendations for Remote Authentication Providers

If a system is configured for one of the supported remote authentication services, you must create a provider for that service to ensure that Cisco UCS Manager can communicate with it. In addition, you need to be aware of the following guidelines that impact user authorization:

User Accounts in Remote Authentication Services

User accounts can exist locally in Cisco UCS Manager or in the remote authentication server.

The temporary sessions for users who log in through remote authentication services can be viewed through Cisco UCS Manager GUI or Cisco UCS Manager CLI.

User Roles in Remote Authentication Services

If you create user accounts in the remote authentication server, you must ensure that the accounts include the roles those users require for working in Cisco UCS Manager and that the names of those roles match the names used in Cisco UCS Manager. Depending on the role policy, a user may not be allowed to log in or will be granted only read-only privileges.

User Attributes in Remote Authentication Providers

For RADIUS and TACACS+ configurations, you must configure a user attribute for Cisco UCS in each remote authentication provider through which users log in to Cisco UCS Manager. This user attribute holds the roles and locales assigned to each user.

Note This step is not required for LDAP configurations that use LDAP Group Mapping to assign roles and locales.

When a user logs in, Cisco UCS Manager does the following:

1. Queries the remote authentication service.
2. Validates the user.
3. If the user is validated, checks for the roles and locales assigned to that user.

The following table contains a comparison of the user attribute requirements for the remote authentication providers supported by Cisco UCS.

Table 4: Comparison of User Attributes by Remote Authentication Provider

Authentication Provider	Custom Attribute	Schema Extension	Attribute ID Requirements
LDAP	Not required if group mapping is used Optional if group mapping is not used	Optional. You can choose to do either of the following: • Do not extend the LDAP schema and configure an existing, unused attribute that meets the requirements. • Extend the LDAP schema and create a custom attribute with a unique name, such as CiscoAVPair.	The Cisco LDAP implementation requires a unicode type attribute. If you choose to create the CiscoAVPair custom attribute, use the following attribute ID: 1.3.6.1.4.1.9.287247.1 A sample OID is provided in the following section.
RADIUS	Optional	Optional. You can choose to do either of the following: • Do not extend the RADIUS schema and use an existing, unused attribute that meets the requirements. • Extend the RADIUS schema and create a custom attribute with a unique name, such as cisco-avpair.	The vendor ID for the Cisco RADIUS implementation is 009 and the vendor ID for the attribute is 001. The following syntax example shows how to specify multiples user roles and locales if you choose to create the cisco-avpair attribute: `shell:roles="admin,aaa" shell:locales="L1,abc"`. Use a comma "," as the delimiter to separate multiple values.
TACACS+	Required	Required. You must extend the schema and create a custom attribute with the name cisco-av-pair.	The cisco-av-pair name is the string that provides the attribute ID for the TACACS+ provider. The following syntax example shows how to specify multiples user roles and locales when you create the cisco-av-pair attribute: `cisco-av-pair=shell:roles="admin aaa" shell:locales*"L1 abc"`. Using an asterisk (*) in the cisco-av-pair attribute syntax flags the locale as optional, preventing authentication failures for other Cisco devices that use the same authorization profile. Use a space as the delimiter to separate multiple values.

Sample OID for LDAP User Attribute

The following is a sample OID for a custom CiscoAVPair attribute:

```
CN=CiscoAVPair,CN=Schema,
CN=Configuration,CN=X
objectClass: top
objectClass: attributeSchema
cn: CiscoAVPair
distinguishedName: CN=CiscoAVPair,CN=Schema,CN=Configuration,CN=X
instanceType: 0x4
uSNCreated: 26318654
attributeID: 1.3.6.1.4.1.9.287247.1
attributeSyntax: 2.5.5.12
isSingleValued: TRUE
showInAdvancedViewOnly: TRUE
adminDisplayName: CiscoAVPair
adminDescription: UCS User Authorization Field
oMSyntax: 64
lDAPDisplayName: CiscoAVPair
name: CiscoAVPair
objectCategory: CN=Attribute-Schema,CN=Schema,CN=Configuration,CN=X
```

LDAP Group Rule

The LDAP group rule is used to determine whether Cisco UCS should use LDAP groups when assigning user roles and locales to a remote user.

Nested LDAP Groups

Beginning with Cisco UCS Manager release 2.1(2), you can search LDAP groups that are nested within another group defined in an LDAP group map. With this new capability, you do not always need to create subgroups in a group map in Cisco UCS Manager.

Note Nested LDAP search support is supported only for Microsoft Active Directory servers. The supported versions are Microsoft Windows 2003 SP3, Microsoft Windows 2008 R2, and Microsoft Windows 2012.

Using the LDAP nesting feature, you can add an LDAP group as a member of another group and nest groups to consolidate member accounts and reduce the replication of traffic.

Be default, user rights are inherited when you nest an LDAP group within another group. For example, if you make Group_1 a member of Group_2, the users in Group_1 will have the same permissions as the members of Group_2. You can then search users that are members of Group_1 by choosing only Group_2 in the LDAP group map, instead of having to seach Group_1 and Group_2 separately.

Configuring LDAP Providers

Configuring Properties for LDAP Providers

The properties that you configure in this task are the default settings for all provider connections of this type defined in Cisco UCS Manager. If an individual provider includes a setting for any of these properties, Cisco UCS uses that setting and ignores the default setting.

Before You Begin

If you are using Active Directory as your LDAP server, create a user account in the Active Directory server to bind with Cisco UCS. This account should be given a non-expiring password.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Complete the following fields in the **Properties** area:

Name	Description
Timeout field	The length of time in seconds the system should spend trying to contact the LDAP database before it times out. Enter an integer from 1 to 60 seconds. The default value is 30 seconds. This property is required.
Vendor field	This selection identifies the vendor that is providing the LDAP provider or server details. If the LDAP provider is Microsoft Active Directory, select **MS-AD**. If the LDAP provider is not Microsoft Active Directory, select **Open Ldap**. The default is **Open Ldap**. **Note** If the vendor selection is **MS-AD** and the ldap-group-rule is enabled and set for recursive search, then Cisco UCS Manager will be able to search through nested LDAP groups. Nested LDAP search is supported only with Active Directory. The server versions supported are Windows 2003 Sp2, Windows 2008 R2, and Windows 2012.
Attribute field	An LDAP attribute that stores the values for the user roles and locales. This property is always a name-value pair. The system queries the user record for the value that matches this attribute name. If you do not want to extend your LDAP schema, you can configure an existing, unused LDAP attribute with the Cisco UCS roles and locales. Alternatively, you can create an attribute named CiscoAVPair in the remote authentication service with the following attribute ID: 1.3.6.1.4.1.9.287247.1

Name	Description
Base DN field	The specific distinguished name in the LDAP hierarchy where the server should begin a search when a remote user logs in and the system attempts to get the user's DN based on their username. The length of the base DN can be set to a maximum of 255 characters minus the length of CN=username, where username identifies the remote user attempting to access Cisco UCS Manager using LDAP authentication. This property is required. If you do not specify a base DN on this tab then you must specify one on the **General** tab for every LDAP provider defined in this Cisco UCS domain.
Filter field	The LDAP search is restricted to those user names that match the defined filter. This property is required. If you do not specify a filter on this tab then you must specify one on the **General** tab for every LDAP provider defined in this Cisco UCS domain.

Note User login will fail if the userdn for an LDAP user exceeds 255 characters.

Step 4 Click **Save Changes**.

What to Do Next

Create an LDAP provider.

Creating an LDAP Provider

Cisco UCS Manager supports a maximum of 16 LDAP providers.

Before You Begin

If you are using Active Directory as your LDAP server, create a user account in the Active Directory server to bind with Cisco UCS. This account should be given a non-expiring password.

- In the LDAP server, perform one of the following configurations:
    - ◦ Configure LDAP groups. LDAP groups contain user role and locale information.
    - ◦ Configure users with the attribute that holds the user role and locale information for Cisco UCS Manager. You can choose whether to extend the LDAP schema for this attribute. If you do not want to extend the schema, use an existing LDAP attribute to hold the Cisco UCS user roles and locales. If you prefer to extend the schema, create a custom attribute, such as the CiscoAVPair attribute.

      The Cisco LDAP implementation requires a unicode type attribute.

      If you choose to create the CiscoAVPair custom attribute, use the following attribute ID: 1.3.6.1.4.1.9.287247.1

- ◦ For a cluster configuration, add the management port IPv4 or IPv6 addresses for both fabric interconnects. This configuration ensures that remote users can continue to log in if the first fabric interconnect fails and the system fails over to the second fabric interconnect. All login requests are sourced from these IP addresses, not the virtual IPv4 or IPv6 address used by Cisco UCS Manager.

- If you want to use secure communications, create a trusted point containing the certificate of the root certificate authority (CA) of the LDAP server in Cisco UCS Manager.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Create LDAP Provider**.

Step 5 On the **Create LDAP Provider** page of the wizard, do the following:

a) Complete the following fields with information about the LDAP service you want to use:

Name	Description
Hostname field	The hostname or IP address on which the LDAP provider resides. If SSL is enabled, this field must exactly match a Common Name (CN) in the security certificate of the LDAP database. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Order field	The order in which Cisco UCS uses this provider to authenticate users. Enter an integer between 1 and 16, or enter lowest-available or 0 (zero) if you want Cisco UCS to assign the next available order based on the other providers defined in this Cisco UCS domain.
Bind DN field	The distinguished name (DN) for an LDAP database account that has read and search permissions for all objects under the base DN. The maximum supported string length is 255 ASCII characters.

Name	Description
Base DN field	The specific distinguished name in the LDAP hierarchy where the server should begin a search when a remote user logs in and the system attempts to get the user's DN based on their username. The length of the base DN can be set to a maximum of 255 characters minus the length of CN=username, where username identifies the remote user attempting to access Cisco UCS Manager using LDAP authentication. This value is required unless a default base DN has been set on the LDAP **General** tab.
Port field	The port through which Cisco UCS communicates with the LDAP database. The standard port number is 389.
Enable SSL check box	If checked, encryption is required for communications with the LDAP database. If unchecked, authentication information will be sent as clear text. LDAP uses STARTTLS. This allows encrypted communication using port 389.
Filter field	The LDAP search is restricted to those user names that match the defined filter. This value is required unless a default filter has been set on the LDAP **General** tab.
Attribute field	An LDAP attribute that stores the values for the user roles and locales. This property is always a name-value pair. The system queries the user record for the value that matches this attribute name. If you do not want to extend your LDAP schema, you can configure an existing, unused LDAP attribute with the Cisco UCS roles and locales. Alternatively, you can create an attribute named CiscoAVPair in the remote authentication service with the following attribute ID: 1.3.6.1.4.1.9.287247.1 This value is required unless a default attribute has been set on the LDAP **General** tab.
Password field	The password for the LDAP database account specified in the **Bind DN** field. You can enter any standard ASCII characters except for space, § (section sign), ? (question mark), or = (equal sign).
Confirm Password field	The LDAP database password repeated for confirmation purposes.
Timeout field	The length of time in seconds the system should spend trying to contact the LDAP database before it times out. Enter an integer from 1 to 60 seconds, or enter 0 (zero) to use the global timeout value specified on the LDAP **General** tab. The default is 30 seconds.

Name	Description
Vendor radio button	The LDAP vendor that you want to use. This can be one of the following: • Open Ldap—The open source implementation of the LDAP protocol. • MS AD—Microsoft Active Directory.

b) Click **Next**.

Step 6 On the **LDAP Group Rule** page of the wizard, do the following:

a) Complete the following fields:

Name	Description
Group Authorization field	Whether Cisco UCS also searches LDAP groups when authenticating and assigning user roles and locales to remote users. This can be one of the following: • **Disable**—Cisco UCS does not access any LDAP groups. • **Enable**—Cisco UCS searches all LDAP groups mapped in this Cisco UCS domain. If the remote user is found, Cisco UCS assigns the user roles and locales defined for that LDAP group in the associated LDAP group map. **Note** Role and locale assignment is cumulative. If a user is included in multiple groups, or has a role or locale specified in the LDAP attribute, Cisco UCS assigns that user all the roles and locales mapped to any of those groups or attributes.
Group Recursion field	Whether Cisco UCS searches both the mapped groups and their parent groups. This can be one of the following: • **Non Recursive**—Cisco UCS searches only the groups mapped in this Cisco UCS domain. If none of the groups containing the user explicitly set the user's authorization properties, Cisco UCS uses the default settings. • **Recursive**—Cisco UCS searches each mapped group and all its parent groups for the user's authorization properties. These properties are cumulative, so for each group Cisco UCS finds with explicit authorization property settings, it applies those settings to the current user. Otherwise it uses the default settings.
Target Attribute field	The attribute Cisco UCS uses to determine group membership in the LDAP database. The supported string length is 63 characters. The default string is memberOf.

b) Click **Finish**.

What to Do Next

For implementations involving a single LDAP database, select LDAP as the authentication service.

For implementations involving multiple LDAP databases, configure an LDAP provider group.

Changing the LDAP Group Rule for an LDAP Provider

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Expand **LDAP Providers** and choose the LDAP provider for which you want to change the group rule.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **LDAP Group Rules** area, complete the following fields:

Name	Description
Group Authorization field	Whether Cisco UCS also searches LDAP groups when authenticating and assigning user roles and locales to remote users. This can be one of the following: • **Disable—**Cisco UCS does not access any LDAP groups. • **Enable—**Cisco UCS searches all LDAP groups mapped in this Cisco UCS domain. If the remote user is found, Cisco UCS assigns the user roles and locales defined for that LDAP group in the associated LDAP group map. **Note** Role and locale assignment is cumulative. If a user is included in multiple groups, or has a role or locale specified in the LDAP attribute, Cisco UCS assigns that user all the roles and locales mapped to any of those groups or attributes.

Name	Description
Group Recursion field	Whether Cisco UCS searches both the mapped groups and their parent groups. This can be one of the following: • **Non Recursive—**Cisco UCS searches only the groups mapped in this Cisco UCS domain. If none of the groups containing the user explicitly set the user's authorization properties, Cisco UCS uses the default settings. • **Recursive—**Cisco UCS searches each mapped group and all its parent groups for the user's authorization properties. These properties are cumulative, so for each group Cisco UCS finds with explicit authorization property settings, it applies those settings to the current user. Otherwise it uses the default settings.
Target Attribute field	The attribute Cisco UCS uses to determine group membership in the LDAP database. The supported string length is 63 characters. The default string is memberOf.

Step 6 Click **Save Changes**.

Deleting an LDAP Provider

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Expand **LDAP Providers**.

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

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

LDAP Group Mapping

For organizations that already use LDAP groups to restrict access to LDAP databases, group membership information can be used by UCSM to assign a role or locale to an LDAP user during login. This eliminates the need to define role or locale information in the LDAP user object when Cisco UCS Manager is deployed.

When a user logs in to Cisco UCS Manager, information about the user's role and locale are pulled from the LDAP group map. If the role and locale criteria match the information in the policy, access is granted.

Role and locale definitions are configured locally in Cisco UCS Manager and do not update automatically based on changes to an LDAP directory. When deleting or renaming LDAP groups in an LDAP directory, it is important that you update Cisco UCS Manager with the change.

An LDAP group map can be configured to include any of the following combinations of roles and locales:

- Roles only
- Locales only
- Both roles and locales

For example, consider an LDAP group representing a group of server administrators at a specific location. The LDAP group map might be configured to include user roles like server-profile and server-equipment. To restrict access to server administrators at a specific location, the locale could be set to a particular site name.

Note Cisco UCS Manager includes many out-of-the-box user roles but does not include any locales. Mapping an LDAP provider group to a locale requires that you create a custom locale.

Creating an LDAP Group Map

Before You Begin

- Create an LDAP group in the LDAP server.
- Configure the distinguished name for the LDAP group in the LDAP server.
- Create locales in Cisco UCS Manager (optional).
- Create custom roles in Cisco UCS Manager (optional).

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Right-click **LDAP Group Maps** and choose **Create LDAP Group Map**.

Step 4 In the **Create LDAP Group Map** dialog box, do the following:

a) In the **LDAP Group DN** field, enter the distinguished name of the group in the LDAP database.

Important This name must match the name in the LDAP database exactly.

b) In the **Roles** table, check the check boxes for all roles that you want to assign to users who are included in the group map.

c) In the **Locales** table, check the check boxes for all locales that you want to assign to users who are included in the group map.

d) Click **OK**.

What to Do Next

Set the LDAP group rule.

Deleting an LDAP Group Map

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Expand **LDAP Group Maps**.

Step 4 Right-click the LDAP group map you want to delete and choose **Delete**.

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

Configuring RADIUS Providers

Configuring Properties for RADIUS Providers

The properties that you configure in this task are the default settings for all provider connections of this type defined in Cisco UCS Manager. If an individual provider includes a setting for any of these properties, Cisco UCS uses that setting and ignores the default setting.

Procedure

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

Step 2 In the **Admin** tab, expand **User Management** > **RADIUS**.

Step 3 Complete the following fields in the **Properties** area:

Name	Description
Timeout field	The length of time in seconds the system should spend trying to contact the RADIUS database before it times out. Enter an integer from 1 to 60 seconds, or enter 0 (zero) to use the global timeout value specified on the RADIUS **General** tab. The default is 5 seconds.
Retries field	The number of times to retry the connection before the request is considered to have failed.

Step 4 Click **Save Changes**.

What to Do Next

Create a RADIUS provider.

Creating a RADIUS Provider

Cisco UCS Manager supports a maximum of 16 RADIUS providers.

Before You Begin

Perform the following configuration in the RADIUS server:

- Configure users with the attribute that holds the user role and locale information for Cisco UCS Manager. You can choose whether to extend the RADIUS schema for this attribute. If you do not want to extend the schema, use an existing RADIUS attribute to hold the Cisco UCS user roles and locales. If you prefer to extend the schema, create a custom attribute, such as the cisco-avpair attribute.

  The vendor ID for the Cisco RADIUS implementation is 009 and the vendor ID for the attribute is 001.

  The following syntax example shows how to specify multiples user roles and locales if you choose to create the cisco-avpair attribute: `shell:roles="admin,aaa" shell:locales="L1,abc"`. Use a comma "," as the delimiter to separate multiple values.

- For a cluster configuration, add the management port IPv4 or IPv6 addresses for both fabric interconnects. This configuration ensures that remote users can continue to log in if the first fabric interconnect fails and the system fails over to the second fabric interconnect. All login requests are sourced from these IP addresses, not the virtual IP address used by Cisco UCS Manager.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **RADIUS**.

Step 3 In the **Create RADIUS Provider** dialog box:

a) Complete the fields with the information about the RADIUS service you want to use.

Name	Description
Hostname field	The hostname or IP address on which the RADIUS provider resides. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Order field	The order in which Cisco UCS uses this provider to authenticate users. Enter an integer between 1 and 16, or enter lowest-available or 0 (zero) if you want Cisco UCS to assign the next available order based on the other providers defined in this Cisco UCS domain.

Name	Description
Key field	The SSL encryption key for the database.
Confirm Key field	The SSL encryption key repeated for confirmation purposes.
Authorization Port field	The port through which Cisco UCS communicates with the RADIUS database.
Timeout field	The length of time in seconds the system should spend trying to contact the RADIUS database before it times out. Enter an integer from 1 to 60 seconds, or enter 0 (zero) to use the global timeout value specified on the RADIUS **General** tab. The default is 5 seconds.
Retries field	The number of times to retry the connection before the request is considered to have failed. If desired, enter an integer between 0 and 5. If you do not specify a value, Cisco UCS uses the value specified on the RADIUS **General** tab.

b) Click **OK**.

Step 4 Click **Save Changes**.

What to Do Next

For implementations involving a single RADIUS database, select RADIUS as the primary authentication service.

For implementations involving multiple RADIUS databases, configure a RADIUS provider group.

Deleting a RADIUS Provider

Procedure

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

Step 2 In the **Admin** tab, expand **User Management** > **RADIUS**.

Step 3 Right-click the RADIUS provider you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring TACACS+ Providers

Configuring Properties for TACACS+ Providers

The properties that you configure in this task are the default settings for all provider connections of this type defined in Cisco UCS Manager. If an individual provider includes a setting for any of these properties, Cisco UCS uses that setting and ignores the default setting.

Procedure

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

Step 2 In the **Admin** tab, expand **User Management** > **TACACS+**.

Step 3 In the **Properties** area, complete the **Timeout** field:
The length of time in seconds the system should spend trying to contact the TACACS+ database before it times out.

Enter an integer from 1 to 60 seconds, or enter 0 (zero) to use the global timeout value specified on the TACACS+ **General** tab. The default is 5 seconds.

Step 4 Click **Save Changes**.

What to Do Next

Create an TACACS+ provider.

Creating a TACACS+ Provider

Cisco UCS Manager supports a maximum of 16 TACACS+ providers.

Before You Begin

Perform the following configuration in the TACACS+ server:

- Create the cisco-av-pair attribute. You cannot use an existing TACACS+ attribute.

  The cisco-av-pair name is the string that provides the attribute ID for the TACACS+ provider.

  The following syntax example shows how to specify multiples user roles and locales when you create the cisco-av-pair attribute: `cisco-av-pair=shell:roles="admin aaa" shell:locales*"L1 abc"`. Using an asterisk (*) in the cisco-av-pair attribute syntax flags the locale as optional, preventing authentication failures for other Cisco devices that use the same authorization profile. Use a space as the delimiter to separate multiple values.

- For a cluster configuration, add the management port IPv4 or IPv6 addresses for both fabric interconnects. This configuration ensures that remote users can continue to log in if the first fabric interconnect fails and the system fails over to the second fabric interconnect. All login requests are sourced from these IP addresses, not the virtual IP address used by Cisco UCS Manager.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **TACACS+**.

Step 3 In the **Actions** area of the **General** tab, click **Create TACACS+ Provider**.

Step 4 In the **Create TACACS+ Provider** dialog box:

a) Complete the fields with the information about the TACACS+ service you want to use.

Name	Description
Hostname field	The hostname or IP address on which the TACAS+ provider resides. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Order field	The order in which Cisco UCS uses this provider to authenticate users. Enter an integer between 1 and 16, or enter lowest-available or 0 (zero) if you want Cisco UCS to assign the next available order based on the other providers defined in this Cisco UCS domain.
Key field	The SSL encryption key for the database.
Confirm Key field	The SSL encryption key repeated for confirmation purposes.
Port field	The port through which Cisco UCS should communicate with the TACACS+ database. Enter an integer between 1 and 65535. The default port is 49.
Timeout field	The length of time in seconds the system should spend trying to contact the TACACS+ database before it times out. Enter an integer from 1 to 60 seconds, or enter 0 (zero) to use the global timeout value specified on the TACACS+ **General** tab. The default is 5 seconds.

b) Click **OK**.

Step 5 Click **Save Changes**.

What to Do Next

For implementations involving a single TACACS+ database, select TACACS+ as the primary authentication service.

For implementations involving multiple TACACS+ databases, configure a TACACS+ provider group.

Deleting a TACACS+ Provider

Procedure

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

Step 2 In the **Admin** tab, expand **User Management** > **TACACS+**.

Step 3 Right-click the TACACS+ provider you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Multiple Authentication Systems

Multiple Authentication Systems

You can configure Cisco UCS to use multiple authentication systems by configuring the following features:

- Provider groups
- Authentication domains

Provider Groups

A provider group is a set of providers that will be used by Cisco UCS during the authentication process. Cisco UCS Manager allows you to create a maximum of 16 provider groups, with a maximum of eight providers allowed per group.

During authentication, all the providers within a provider group are tried in order. If all of the configured servers are unavailable or unreachable, Cisco UCS Manager automatically falls back to the local authentication method using the local username and password.

Creating an LDAP Provider Group

Creating an LDAP provider group allows you to authenticate using multiple LDAP databases.

Note Authenticating with a single LDAP database does not require you to set up an LDAP provider group.

Before You Begin

Create one or more LDAP providers.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Right-click **LDAP Provider Groups** and choose **Create LDAP Provider Group**.

Step 4 In the **Create LDAP Provider Group** dialog box, do the following:

a) In the **Name** field, enter a unique name for the group.
This name can be between 1 and 127 characters.

b) In the **LDAP Providers** table, choose one or more providers to include in the group.

c) Click the **>>** button to add the providers to the **Included Providers** table.
You can use the **<<** button to remove providers from the group.

d) After you have added all desired providers to the provider group, click **OK**.

What to Do Next

Configure an authentication domain or select a default authentication service.

Deleting an LDAP Provider Group

Before You Begin

Remove the provider group from an authentication configuration.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **LDAP**.

Step 3 Expand **LDAP Provider Groups**.

Step 4 Right-click the LDAP provider group you want to delete and choose **Delete**.

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

Creating a RADIUS Provider Group

Creating a RADIUS provider group allows you to authenticate using multiple RADIUS databases.

Note Authenticating with a single RADIUS database does not require you to set up a RADIUS provider group.

Before You Begin

Create one or more RADIUS providers.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **RADIUS**.

Step 3 Right-click **RADIUS Provider Groups** and choose **Create RADIUS Provider Group**.

Step 4 In the **Create RADIUS Provider Group** dialog box, do the following:

a) In the **Name** field, enter a unique name for the group.
This name can be between 1 and 127 ASCII characters.

b) In the **RADIUS Providers** table, choose one or more providers to include in the group.

c) Click the **>>** button to add the providers to the **Included Providers** table.
You can use the **<<** button to remove providers from the group.

d) After you have added all desired providers to the provider group, click **OK**.

What to Do Next

Configure an authentication domain or select a default authentication service.

Deleting a RADIUS Provider Group

You cannot delete a provider group if it is being used by an authentication configuration.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **RADIUS**.

Step 3 Expand **RADIUS Provider Groups**.

Step 4 Right-click the RADIUS provider group you want to delete and choose **Delete**.

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

Creating a TACACS+ Provider Group

Creating a TACACS+ provider group allows you to authenticate using multiple TACACS+ databases.

Note Authenticating with a single TACACS+ database does not require you to set up a TACACS+ provider group.

Before You Begin

Create one or more TACACS+ providers.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **TACACS+**.

Step 3 Right-click **TACACS+ Provider Groups** and choose **Create TACACS+ Provider Group**.

Step 4 In the **Create TACACS+ Provider Group** dialog box, do the following:

a) In the **Name** field, enter a unique name for the group.
This name can be between 1 and 127 ASCII characters.

b) In the **TACACS+ Providers** table, choose one or more providers to include in the group.

c) Click the **>>** button to add the providers to the **Included Providers** table.
You can use the **<<** button to remove providers from the group.

d) After you have added all desired providers to the provider group, click **OK**.

Deleting a TACACS+ Provider Group

You cannot delete a provider group if it is being used by an authentication configuration.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **TACACS+**.

Step 3 Expand **TACACS+ Provider Groups**.

Step 4 Right-click the TACACS+ provider group you want to delete and choose **Delete**.

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

Authentication Domains

Authentication domains are used by Cisco UCS Manager to leverage multiple authentication systems. Each authentication domain is specified and configured during login. If no authentication domain is specified, the default authentication service configuration is used.

You can create up to eight authentication domains. Each authentication domain is associated with a provider group and realm in Cisco UCS Manager. If no provider group is specified, all servers within the realm are used.

Creating an Authentication Domain

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **Authentication**.

Step 3 Right-click **Authentication Domains** and choose **Create a Domain**.

Step 4 In the **Create a Domain** dialog box, complete the following fields:

Name	Description
Name field	The name of the domain. 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. **Note** For systems using remote authentication protocol, the authentication domain name is considered part of the user name and counts toward the 32-character limit for locally created user names. Because Cisco UCS inserts 5 characters for formatting, authentication will fail if the domain name and user name combined character total exceeds 27.
Web Session Refresh Period field	When a web client connects to Cisco UCS Manager, the client needs to send refresh requests to Cisco UCS Manager to keep the web session active. This option specifies the maximum amount of time allowed between refresh requests for a user in this domain. If this time limit is exceeded, Cisco UCS Manager considers the web session to be inactive, but it does not terminate the session. Specify an integer between 60 and 172800. The default is 600 seconds. **Note** The number of seconds set for the **Web Session Refresh Period** must be less than the number of seconds set for the **Web Session Timeout**. Do not set the **Web Session Refresh Period** to the same value as the **Web Session Timeout**.
Web Session Timeout field	The maximum amount of time that can elapse after the last refresh request before Cisco UCS Manager considers a web session to have ended. If this time limit is exceeded, Cisco UCS Manager automatically terminates the web session. Specify an integer between 60 and 172800. The default is 7200 seconds.

Name	Description
Realm field	The authentication protocol that will be applied to users in this domain. This can be one of the following: • **Local—**The user account must be defined locally in this Cisco UCS domain. • **Radius—**The user must be defined on the RADIUS server specified for this Cisco UCS domain. • **Tacacs—**The user must be defined on the TACACS+ server specified for this Cisco UCS domain. • **Ldap—**The user must be defined on the LDAP server specified for this Cisco UCS domain.
Provider Group drop-down list	If the **Realm** is set to anything other than **Local**, this field allows you to select the associated provider group, if any.

Step 5 Click **OK**.

Selecting a Primary Authentication Service

Selecting the Console Authentication Service

Before You Begin

If the system uses a remote authentication service, create a provider for that authentication service. If the system uses only local authentication through Cisco UCS, you do not need to create a provider first.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **Authentication**.

Step 3 Click **Native Authentication**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Console Authentication** area, complete the following fields:

Name	Description
Realm field	The method by which a user logging into the console is authenticated. This can be one of the following: • **Local**—The user account must be defined locally in this Cisco UCS domain. • **Radius**—The user must be defined on the RADIUS server specified for this Cisco UCS domain. • **Tacacs**—The user must be defined on the TACACS+ server specified for this Cisco UCS domain. • **Ldap**—The user must be defined on the LDAP server specified for this Cisco UCS domain. • **None**—If the user account is local to this Cisco UCS domain, no password is required when the user logs into the console.
Provider Group drop-down list	The provider group to be used to authenticate a user logging into the console.

Step 6 Click **Save Changes**.

Selecting the Default Authentication Service

Before You Begin

If the system uses a remote authentication service, create a provider for that authentication service. If the system uses only local authentication through Cisco UCS, you do not need to create a provider first.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **Authentication**.

Step 3 Click **Native Authentication**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Default Authentication** area, complete the following fields:

Name	Description
Realm drop-down list	The default method by which a user is authenticated during remote login. This can be one of the following: • **Local—**The user account must be defined locally in this Cisco UCS domain. • **Radius—**The user must be defined on the RADIUS server specified for this Cisco UCS domain. • **Tacacs—**The user must be defined on the TACACS+ server specified for this Cisco UCS domain. • **Ldap—**The user must be defined on the LDAP server specified for this Cisco UCS domain. • **None—**If the user account is local to this Cisco UCS domain, no password is required when the user logs in remotely.
Provider Group drop-down list	The default provider group to be used to authenticate the user during remote login.

Step 6 Click **Save Changes**.

Role Policy for Remote Users

By default, if user roles are not configured in Cisco UCS Manager read-only access is granted to all users logging in to Cisco UCS Manager from a remote server using the LDAP, RADIUS, or TACACS protocols. For security reasons, it might be desirable to restrict access to those users matching an established user role in Cisco UCS Manager.

You can configure the role policy for remote users in the following ways:

assign-default-role

Does not restrict user access to Cisco UCS Manager based on user roles. Read-only access is granted to all users unless other user roles have been defined in Cisco UCS Manager.

This is the default behavior.

no-login

Restricts user access to Cisco UCS Manager based on user roles. If user roles have not been assigned for the remote authentication system, access is denied.

Configuring the Role Policy for Remote Users

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **Authentication**.

Step 3 Click **Native Authentication**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Role Policy for Remote Users** field, click one of the following radio buttons to determine what happens when a user attempts to log in and the remote authentication provider does not supply a user role with the authentication information:

- **No Login—**The user is not allowed to log in to the system, even if the username and password are correct.
- **Assign Default Role—**The user is allowed to log in with a read-only user role.

Step 6 Click **Save Changes**.

CHAPTER 9

Configuring Organizations

This chapter includes the following sections:

Organizations in a Multitenancy Environment

Multitenancy allows you to divide the large physical infrastructure of an Cisco UCS domain into logical entities known as organizations. As a result, you can achieve a logical isolation between organizations without providing a dedicated physical infrastructure for each organization.

You can assign unique resources to each tenant through the related organization, in the multitenant environment. These resources can include different policies, pools, and quality of service definitions. You can also implement locales to assign or restrict user privileges and roles by organization, if you do not want all users to have access to all organizations.

If you set up a multitenant environment, all organizations are hierarchical. The top-level organization is always root. The policies and pools that you create in root are system-wide and are available to all organizations in the system. However, any policies and pools created in other organizations are only available to organizations that are above it in the same hierarchy. For example, if a system has organizations named Finance and HR that are not in the same hierarchy, Finance cannot use any policies in the HR organization, and HR cannot access any policies in the Finance organization. However, both Finance and HR can use policies and pools in the root organization.

If you create organizations in a multitenant environment, you can also set up one or more of the following for each organization or for a suborganization in the same hierarchy:

- Resource pools
- Policies
- Service profiles

- Service profile templates

The root organization is always the top level organization.

Hierarchical Name Resolution in a Multi-Tenancy Environment

In a multi-tenant environment, Cisco UCS uses the hierarchy of an organization to resolve the names of policies and resource pools. When Cisco UCS Manager searches for details of a policy or a resource assigned to a pool, the following occurs:

1. Cisco UCS Manager checks for policies and pools with the specified name within the organization assigned to the service profile or policy.
2. If a policy is found or an available resource is inside a pool, Cisco UCS Manager uses that policy or resource. If the pool does not have any available resources at the local level, Cisco UCS Manager moves up in the hierarchy to the parent organization and searches for a pool with the same name. Cisco UCS Manager repeats this step until the search reaches the root organization.
3. If the search reaches the root organization and has not found an available resource or policy, Cisco UCS Manager returns to the local organization and begins to search for a default policy or available resource in the default pool.
4. If an applicable default policy or available resource in a default pool is found, Cisco UCS Manager uses that policy or resource. If the pool does not have any available resources, Cisco UCS Manager moves up in the hierarchy to the parent organization and searches for a default pool. Cisco UCS Manager repeats this step until the search reaches the root organization.
5. If Cisco UCS Manager cannot find an applicable policy or available resource in the hierarchy, it returns an allocation error.

Example: Server Pool Name Resolution in a Single-Level Hierarchy

In this example, all organizations are at the same level below the root organization. For example, a service provider creates separate organizations for each customer. In this configuration, organizations only have access to the policies and resource pools assigned to that organization and to the root organization.

In this example, a service profile in the XYZcustomer organization is configured to use servers from the XYZcustomer server pool. When resource pools and policies are assigned to the service profile, the following occurs:

1. Cisco UCS Manager checks for an available server in the XYZcustomer server pool.
2. If the XYZcustomer server pool has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the pool does not have an available server, Cisco UCS Manager checks the root organization for a server pool with the same name.
3. If the root organization includes an XYZcustomer server pool and that pool has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the pool does not have an available server, Cisco UCS Manager returns to the XYZcustomer organization to check the default server pool.
4. If the default pool in the XYZcustomer organization has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the default pool does not have an available server, Cisco UCS Manager checks the default server pool in the root organization.

5 If the default server pool in the root organization has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the default pool does not have an available server, Cisco UCS Manager returns an allocation error.

Example: Server Pool Name Resolution in a Multi-Level Hierarchy

In this example, each organization includes at least one suborganization. For example, a company could create organizations for each major division in the company and for subdivisions of those divisions. In this configuration, each organization has access to its local policies and resource pools and to the resource pools in the parent hierarchy.

In this example, the Finance organization includes two sub-organizations, AccountsPayable and AccountsReceivable. A service profile in the AccountsPayable organization is configured to use servers from the AP server pool. When resource pools and policies are assigned to the service profile, the following occurs:

1 Cisco UCS Manager checks for an available server in the AP server pool defined in the service profile.

2 If the AP server pool has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the pool does not have an available server, Cisco UCS Manager moves one level up the hierarchy and checks the Finance organization for a pool with the same name.

3 If the Finance organization includes a pool with the same name and that pool has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the pool does not have an available server, Cisco UCS Manager moves one level up in the hierarchy and checks the root organization for a pool with the same name.

4 If the root organization includes a pool with the same name and that pool has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the pool does not have an available server, Cisco UCS Manager returns to the AccountsPayable organization to check the default server pool.

5 If the default pool in the AccountsPayable organization has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the default pool does not have an available server, Cisco UCS Manager moves one level up in the hierarchy and checks the default server pool in the Finance organization.

6 If the default pool in the Finance organization has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the default pool does not have an available server, Cisco UCS Manager moves one level up in the hierarchy and checks the default server pool in the root organization.

7 If the default server pool in the root organization has an available server, Cisco UCS Manager associates that server with the service profile and discontinues the search. If the default pool does not have an available server, Cisco UCS Manager returns an allocation error.

Creating an Organization under the Root Organization

Procedure

Step 1 On the toolbar, choose **New** > **Create Organization**.

Step 2 In the **Name** field of the **Create Organization** dialog box, enter a unique name for the organization.

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.

Step 3 In the **Description** field, enter a description for the organization.

Step 4 Click **OK**.

Creating an Organization under a Sub-Organization

Procedure

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

Step 2 In the **Servers** tab, expand **Service Profiles** > **root**.
You can also access the **Sub-Organizations** node under the **Policies** or **Pools** nodes.

Step 3 Expand the **Sub-Organizations** node and do one of the following:

- To create an organization directly under root, right-click **Sub-Organizations** and choose **Create Organization**.
- To create an organization under a lower-level sub-organization, expand the sub-organization nodes in the hierarchy and then right-click the sub-organization under which you want to create the new organization and choose **Create Organization**.

Step 4 In the **Name** field of the **Create Organization** dialog box, enter a unique name for the organization.
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.

Step 5 In the **Description** field, enter a description for the organization.

Step 6 Click **OK**.

Deleting an Organization

Procedure

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

Step 2 Navigate to the organization that you want to delete.

Step 3 Right-click the organization and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 10

Configuring Role-Based Access Control

This chapter includes the following sections:

Role-Based Access Control

Role-Based Access Control (RBAC) is a method of restricting or authorizing system access for users based on user roles and locales. A role defines the privileges of a user in the system and the locale defines the organizations (domains) that a user is allowed access. Because users are not directly assigned privileges, management of individual user privileges is simply a matter of assigning the appropriate roles and locales.

A user is granted write access to desired system resources only if the assigned role grants the access privileges and the assigned locale allows access. For example, a user with the Server Administrator role in the Engineering organization could update server configurations in the Engineering organization but could not update server configurations in the Finance organization unless the locales assigned to the user include the Finance organization.

User Accounts for Cisco UCS

User accounts are used to access the system. Up to 48 local user accounts can be configured in each Cisco UCS Manager domain. Each user account must have a unique username and password.

A user account can be set with an SSH public key. The public key can be set in either of the two formats: OpenSSH or SECSH.

Admin Account

Each Cisco UCS domain has an admin account. The admin account is a default user account and cannot be modified or deleted. This account is the system administrator or superuser account and has full privileges. There is no default password assigned to the admin account; you must choose the password during the initial system setup.

The admin account is always active and does not expire. You cannot configure the admin account as inactive.

Locally Authenticated User Accounts

A locally authenticated user account is authenticated directly through the fabric interconnect and can be enabled or disabled by anyone with admin or aaa privileges. Once a local user account is disabled, the user cannot log in. Configuration details for disabled local user accounts are not deleted by the database. If you re-enable a disabled local user account, the account becomes active again with the existing configuration, including username and password.

Remotely Authenticated User Accounts

A remotely authenticated user account is any user account that is authenticated through LDAP, RADIUS, or TACACS+.

If a user maintains a local user account and a remote user account simultaneously, the roles defined in the local user account override those maintained in the remote user account.

Expiration of User Accounts

User accounts can be configured to expire at a predefined time. When the expiration time is reached, the user account is disabled.

By default, user accounts do not expire.

Note After you configure a user account with an expiration date, you cannot reconfigure the account to not expire. You can, however, configure the account with the latest expiration date available.

Guidelines for Cisco UCS Usernames

The username is also used as the login ID for Cisco UCS Manager. When you assign login IDs to Cisco UCS user accounts, consider the following guidelines and restrictions:

- The login ID can contain between 1 and 32 characters, including the following:
    - Any alphabetic character
    - Any digit
    - _ (underscore)
    - - (dash)
    - . (dot)

- The login ID must be unique within Cisco UCS Manager.
- The login ID must start with an alphabetic character. It cannot start with a number or a special character, such as an underscore.
- The login ID is case-sensitive.
- You cannot create an all-numeric login ID.
- After you create a user account, you cannot change the login ID. You must delete the user account and create a new one.

Reserved Words: Locally Authenticated User Accounts

The following words cannot be used when creating a local user account in Cisco UCS.

- root
- bin
- daemon
- adm
- lp
- sync
- shutdown
- halt
- news
- uucp
- operator
- games
- gopher
- nobody
- nscd
- mailnull
- mail
- rpcuser
- rpc
- mtsuser
- ftpuser
- ftp
- man
- sys

- samdme
- debug

Guidelines for Cisco UCS Passwords

A password is required for each locally authenticated user account. A user with admin or aaa privileges can configure Cisco UCS Manager to perform a password strength check on user passwords. If the password strength check is enabled, each user must have a strong password.

Cisco recommends that each user have a strong password. If you enable the password strength check for locally authenticated users, Cisco UCS Manager rejects any password that does not meet the following requirements:

- Must contain a minimum of 8 characters and a maximum of 80 characters.
- Must contain at least three of the following:
    - Lower case letters
    - Upper case letters
    - Digits
    - Special characters
- Must not contain a character that is repeated more than 3 times consecutively, such as aaabbb.
- Must not be identical to the username or the reverse of the username.
- Must pass a password dictionary check. For example, the password must not be based on a standard dictionary word.
- Must not contain the following symbols: $ (dollar sign), ? (question mark), and = (equals sign).
- Should not be blank for local user and admin accounts.

Web Session Limits for User Accounts

Web session limits are used by Cisco UCS Manager to restrict the number of web sessions (both GUI and XML) a given user account is permitted to access at any one time.

Each Cisco UCS Manager domain supports a maximum of 32 concurrent web sessions per user and 256 total user sessions. By default, the number of concurrent web sessions allowed by Cisco UCS Manager is set to 32 per user, but this value can be configured up to the system maximum of 256.

User Roles

User roles contain one or more privileges that define the operations that are allowed for a user. One or more roles can be assigned to each user. Users with multiple roles have the combined privileges of all assigned roles. For example, if Role1 has storage-related privileges, and Role2 has server-related privileges, users with Role1 and Role2 have both storage-related and server-related privileges.

A Cisco UCS domain can contain up to 48 user roles, including the default user roles. Any user roles configured after the first 48 will be accepted, but will be inactive with faults raised.

All roles include read access to all configuration settings in the Cisco UCS domain. Users with read-only roles cannot modify the system state.

Roles can be created, modified to add new or remove existing privileges, or deleted. When a role is modified, the new privileges are applied to all users that have that role. Privilege assignment is not restricted to the privileges defined for the default roles. That is, you can use a custom set of privileges to create a unique role. For example, the default Server Administrator and Storage Administrator roles have a different set of privileges, but a new Server and Storage Administrator role can be created that combines the privileges of both roles.

If a role is deleted after it has been assigned to users, it is also deleted from those user accounts.

User profiles on AAA servers (RADIUS or TACACS+) should be modified to add the roles corresponding to the privileges granted to that user. The attribute is used to store the role information. The AAA servers return this attribute with the request and parse it to get the roles. LDAP servers return the roles in the user profile attributes.

Note If a local user account and a remote user account have the same username, any roles assigned to the remote user are overridden by those assigned to the local user.

Default User Roles

The system contains the following default user roles:

AAA Administrator

Read-and-write access to users, roles, and AAA configuration. Read access to the rest of the system.

Administrator

Complete read-and-write access to the entire system. The default admin account is assigned this role by default and it cannot be changed.

Facility Manager

Read-and-write access to power management operations through the power-mgmt privilege. Read access to the rest of the system.

Network Administrator

Read-and-write access to fabric interconnect infrastructure and network security operations. Read access to the rest of the system.

Operations

Read-and-write access to systems logs, including the syslog servers, and faults. Read access to the rest of the system.

Read-Only

Read-only access to system configuration with no privileges to modify the system state.

Server Compute

Read and write access to most aspects of service profiles. However the user cannot create, modify or delete vNICs or vHBAs.

Server Equipment Administrator

Read-and-write access to physical server related operations. Read access to the rest of the system.

Server Profile Administrator

Read-and-write access to logical server related operations. Read access to the rest of the system.

Server Security Administrator

Read-and-write access to server security related operations. Read access to the rest of the system.

Storage Administrator

Read-and-write access to storage operations. Read access to the rest of the system.

Reserved Words: User Roles

The following words cannot be used when creating custom roles in Cisco UCS.

- network-admin
- network-operator
- vdc-admin
- vdc-operator
- server-admin

Privileges

Privileges give users assigned to user roles access to specific system resources and permission to perform specific tasks. The following table lists each privilege and the user role given that privilege by default.

Tip Detailed information about these privileges and the tasks that they enable users to perform is available in *Privileges in Cisco UCS* available at the following URL: http://www.cisco.com/en/US/products/ps10281/prod_technical_reference_list.html.

Table 5: User Privileges

Privilege	Description	Default Role Assignment
aaa	System security and AAA	AAA Administrator
admin	System administration	Administrator

Privilege	Description	Default Role Assignment
ext-lan-config	External LAN configuration	Network Administrator
ext-lan-policy	External LAN policy	Network Administrator
ext-lan-qos	External LAN QoS	Network Administrator
ext-lan-security	External LAN security	Network Administrator
ext-san-config	External SAN configuration	Storage Administrator
ext-san-policy	External SAN policy	Storage Administrator
ext-san-qos	External SAN QoS	Storage Administrator
ext-san-security	External SAN security	Storage Administrator
fault	Alarms and alarm policies	Operations
operations	Logs and Smart Call Home	Operations
org-management	Organization management	Operations
pod-config	Pod configuration	Network Administrator
pod-policy	Pod policy	Network Administrator
pod-qos	Pod QoS	Network Administrator
pod-security	Pod security	Network Administrator
power-mgmt	Read-and-write access to power management operations	Facility Manager
read-only	Read-only access Read-only cannot be selected as a privilege; it is assigned to every user role.	Read-Only
server-equipment	Server hardware management	Server Equipment Administrator
server-maintenance	Server maintenance	Server Equipment Administrator
server-policy	Server policy	Server Equipment Administrator
server-security	Server security	Server Security Administrator
service-profile-compute	Service profile compute	Server Compute Administrator

Privilege	Description	Default Role Assignment
service-profile-config	Service profile configuration	Server Profile Administrator
service-profile-config-policy	Service profile configuration policy	Server Profile Administrator
service-profile-ext-access	Service profile end point access	Server Profile Administrator
service-profile-network	Service profile network	Network Administrator
service-profile-network-policy	Service profile network policy	Network Administrator
service-profile-qos	Service profile QoS	Network Administrator
service-profile-qos-policy	Service profile QoS policy	Network Administrator
service-profile-security	Service profile security	Server Security Administrator
service-profile-security-policy	Service profile security policy	Server Security Administrator
service-profile-server	Service profile server management	Server Profile Administrator
service-profile-server-oper	Service profile consumer	Server Profile Administrator
service-profile-server-policy	Service profile pool policy	Server Security Administrator
service-profile-storage	Service profile storage	Storage Administrator
service-profile-storage-policy	Service profile storage policy	Storage Administrator

User Locales

A user can be assigned one or more locales. Each locale defines one or more organizations (domains) the user is allowed access, and access would be limited to the organizations specified in the locale. One exception to this rule is a locale without any organizations, which gives unrestricted access to system resources in all organizations.

A Cisco UCS domain can contain up to 48 user locales. Any user locales configured after the first 48 will be accepted, but will be inactive with faults raised.

Users with admin or aaa privileges can assign organizations to the locale of other users. The assignment of organizations is restricted to only those in the locale of the user assigning the organizations. For example, if a locale contains only the Engineering organization then a user assigned that locale can only assign the Engineering organization to other users.

Note You cannot assign a locale to users with one or more of the following privileges:

- aaa
- admin
- fault
- operations

You can hierarchically manage organizations. A user that is assigned at a top level organization has automatic access to all organizations under it. For example, an Engineering organization can contain a Software Engineering organization and a Hardware Engineering organization. A locale containing only the Software Engineering organization has access to system resources only within that organization; however, a locale that contains the Engineering organization has access to the resources for both the Software Engineering and Hardware Engineering organizations.

Configuring User Roles

Creating a User Role

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Right-click **User Services** and choose **Create Role**.
You can also right-click **Roles** to access that option.

Step 4 In the **Create Role** dialog box, complete the following fields:

Name	Description
Name field	A user-defined name for this user role. 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.
Privileges list box	A list of the privileges defined in the system. Click a privilege to view a description of that privilege. Check the check box to assign that privilege to the selected user.
Help Section	
Description field	A description of the most recent privilege you clicked in the **Privileges** list box.

Step 5 Click **OK**.

Adding Privileges to a User Role

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Roles** node.

Step 4 Choose the role to which you want to add privileges.

Step 5 In the **General** tab, check the boxes for the privileges you want to add to the role.

Step 6 Click **Save Changes**.

Removing Privileges from a User Role

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Roles** node.

Step 4 Choose the role from which you want to remove privileges.

Step 5 In the **General** tab, uncheck the boxes for the privileges you want to remove from the role.

Step 6 Click **Save Changes**.

Deleting a User Role

When you delete a user role, Cisco UCS Manager removes that role from all user accounts to which the role has been assigned.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Roles** node.

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

Step 5 In the **Delete** dialog box, click **Yes**.

Configuring Locales

Creating a Locale

Before You Begin

One or more organizations must exist before you create a locale.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Right-click **Locales** and choose **Create a Locale**.

Step 4 In the **Create Locale** page, do the following:

a) In the **Name** field, enter a unique name for the locale.
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.

b) Click **Next**.

Step 5 In the **Assign Organizations** dialog box, do the following:

a) Expand the **Organizations** area to view the organizations in the Cisco UCS domain.
b) Expand the **root** node to see the sub-organizations.
c) Click an organization that you want to assign to the locale.
d) Drag the organization from the **Organizations** area and drop it into the design area on the right.
e) Repeat Steps b and c until you have assigned all desired organizations to the locale.

Step 6 Click **Finish**.

What to Do Next

Add the locale to one or more user accounts. For more information, see Changing the Locales Assigned to a Locally Authenticated User Account, on page 167.

Assigning an Organization to a Locale

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Locales** node and click the locale to which you want to add an organization.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Organizations** area, click **+** on the table icon bar.

Step 6 In the **Assign Organizations** dialog box, do the following:

a) Expand the **Organizations** area to view the organizations in the Cisco UCS domain.
b) Expand the **root** node to see the sub-organizations.
c) Click an organization that you want to assign to the locale.
d) Drag the organization from the **Organizations** area and drop it into the design area on the right.
e) Repeat Steps b and c until you have assigned all desired organizations to the locale.

Step 7 Click **OK**.

Deleting an Organization from a Locale

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Locales** node and click the locale from which you want to delete an organization.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Organizations** area, right-click the organization that you want to delete from the locale and choose **Delete**.

Step 6 Click **Save Changes**.

Deleting a Locale

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Locales** node.

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

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

Configuring Locally Authenticated User Accounts

Creating a User Account

At a minimum, we recommend that you create the following users:

- Server administrator account
- Network administrator account
- Storage administrator

Note After you create the user account, if you make any changes to any of the user account fields from the Cisco UCS Manager GUI, make sure to enter the password again.

Before You Begin

Perform the following tasks, if the system includes any of the following:

- Remote authentication services, ensure the users exist in the remote authentication server with the appropriate roles and privileges.
- Multi-tenancy with organizations, create one or more locales. If you do not have any locales, all users are created in root and are assigned roles and privileges in all organizations.
- SSH authentication, obtain the SSH key.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Right-click **User Services** and choose **Create User** to open the **User Properties** dialog box.
You can also right-click **Locally Authenticated Users** to access that option.

Step 4 Complete the following fields with the required information about the user:

Name	Description
Login ID field	The account name that is used when logging into this account. This account must be unique and meet the following guidelines and restrictions for Cisco UCS Manager user accounts: • The login ID can contain between 1 and 32 characters, including the following: ◦ Any alphabetic character ◦ Any digit ◦ _ (underscore) ◦ - (dash) ◦ . (dot) • The login ID must be unique within Cisco UCS Manager. • The login ID must start with an alphabetic character. It cannot start with a number or a special character, such as an underscore. • The login ID is case-sensitive. • You cannot create an all-numeric login ID. • After you create a user account, you cannot change the login ID. You must delete the user account and create a new one. After you save the user, the login ID cannot be changed. You must delete the user account and create a new one.
First Name field	The first name of the user. This field can contain up to 32 characters.
Last Name field	The last name of the user. This field can contain up to 32 characters.
Email field	The email address for the user.
Phone field	The telephone number for the user.

Name	Description
Password field	The password associated with this account. If password strength check is enabled, a user's password must be strong and Cisco UCS Manager rejects any password that does not meet the following requirements: • Must contain a minimum of 8 characters and a maximum of 80 characters. • Must contain at least three of the following: ◦ Lower case letters ◦ Upper case letters ◦ Digits ◦ Special characters • Must not contain a character that is repeated more than 3 times consecutively, such as aaabbb. • Must not be identical to the username or the reverse of the username. • Must pass a password dictionary check. For example, the password must not be based on a standard dictionary word. • Must not contain the following symbols: $ (dollar sign), ? (question mark), and = (equals sign). • Should not be blank for local user and admin accounts.
Confirm Password field	The password a second time for confirmation purposes.
Account Status field	If the status is set to **Active**, a user can log into Cisco UCS Manager with this login ID and password.
Account Expires check box	If checked, this account expires and cannot be used after the date specified in the **Expiration Date** field. **Note** After you configure a user account with an expiration date, you cannot reconfigure the account to not expire. You can, however, configure the account with the latest expiration date available.
Expiration Date field	The date on which the account expires. The date should be in the format yyyy-mm-dd. Click the down arrow at the end of this field to view a calendar that you can use to select the expiration date. **Note** Cisco UCS Manager GUI displays this field when you check the **Account Expires** check box.

Step 5 In the **Roles** area, check one or more boxes to assign roles and privileges to the user account.

Note Do not assign locales to users with an admin or aaa role.

Step 6 (Optional) If the system includes organizations, check one or more check boxes in the **Locales** area to assign the user to the appropriate locales.

Step 7 In the **SSH** area, complete the following fields:

a) In the **Type** field, click the following:

- **Password Required—**The user must enter a password when they log in.
- **Key—**SSH encryption is used when this user logs in.

b) If you chose **Key**, enter the SSH key in the **SSH data** field.

Step 8 Click **OK**.

Enabling the Password Strength Check for Locally Authenticated Users

You must be a user with admin or aaa privileges to enable the password strength check. If the password strength check is enabled, Cisco UCS Manager does not permit a user to choose a password that does not meet the guidelines for a strong password.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Click the **Locally Authenticated Users** node.

Step 4 In the **Work** pane, check the **Password Strength Check** check box in the **Properties** area.

Step 5 Click **Save Changes**.

Setting the Web Session Limits for Cisco UCS Manager GUI Users

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Communication Services**.

Step 3 Click the **Communication Services** tab.

Step 4 In the **Web Session Limits** area, complete the following fields:

Name	Description
Maximum Sessions Per User field	The maximum number of concurrent HTTP and HTTPS sessions allowed for each user. Enter an integer between 1 and 256.
Maximum Sessions field	The maximum number of concurrent HTTP and HTTPS sessions allowed for all users within the system. Enter an integer between 1 and 256.

Step 5 Click **Save Changes**.

Changing the Locales Assigned to a Locally Authenticated User Account

Note Do not assign locales to users with an admin or aaa role.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services** > **Locally Authenticated Users**.

Step 3 Click the user account that you want to modify.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Locales** area, do the following:

- To assign a new locale to the user account, check the appropriate check boxes.
- To remove a locale from the user account, uncheck the appropriate check boxes.

Step 6 Click **Save Changes**.

Changing the Roles Assigned to a Locally Authenticated User Account

Changes in user roles and privileges do not take effect until the next time the user logs in. If a user is logged in when you assign a new role to or remove an existing role from a user account, the active session continues with the previous roles and privileges.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services** > **Locally Authenticated Users**.

Step 3 Click the user account that you want to modify.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Roles** area, do the following:

- To assign a new role to the user account, check the appropriate check boxes.
- To remove a role from the user account, uncheck the appropriate check boxes.

Step 6 Click **Save Changes**.

Enabling a User Account

You must be a user with admin or aaa privileges to enable or disable a local user account.

Before You Begin

Create a local user account.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services** > **Locally Authenticated Users**.

Step 3 Click the user that you want to enable.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Account Status** field, click the **active** radio button.

Step 6 Click **Save Changes**.

Disabling a User Account

You must be a user with admin or aaa privileges to enable or disable a local user account.

Note If you change the password on a disabled account through the Cisco UCS Manager GUI, the user cannot use this changed password after you enable the account and make it active. The user must enter the required password again after the account is enabled and made active.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services** > **Locally Authenticated Users**.

Step 3 Click the user that you want to disable.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Account Status** field, click the **inactive** radio button.
The admin user account is always set to active. It cannot be modified.

Step 6 Click **Save Changes**.

Clearing the Password History for a Locally Authenticated User

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services** > **Locally Authenticated Users**.

Step 3 Click the user for whom you want to clear the password history.

Step 4 In the **Actions** area, click **Clear Password History**.

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

Deleting a Locally Authenticated User Account

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Expand the **Locally Authenticated Users** node.

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

Step 5 In the **Delete** dialog box, click **Yes**.

Password Profile for Locally Authenticated Users

The password profile contains the password history and password change interval properties for all locally authenticated users of Cisco UCS Manager. You cannot specify a different password profile for each locally authenticated user.

Note You must have admin or aaa privileges to change the password profile properties. Except for password history, these properties do not apply to users with admin or aaa privileges.

Password History Count

The password history count allows you to prevent locally authenticated users from reusing the same password over and over again. When this property is configured, Cisco UCS Manager stores passwords that were previously used by locally authenticated users up to a maximum of 15 passwords. The passwords are stored in reverse chronological order with the most recent password first to ensure that the only the oldest password can be reused when the history count threshold is reached.

A user must create and use the number of passwords configured in the password history count before being able to reuse one. For example, if you set the password history count to 8, a locally authenticated user cannot reuse the first password until after the ninth password has expired.

By default, the password history is set to 0. This value disables the history count and allows users to reuse previously passwords at any time.

If necessary, you can clear the password history count for a locally authenticated user and enable reuse of previous passwords.

Password Change Interval

The password change interval enables you to restrict the number of password changes a locally authenticated user can make within a given number of hours. The following table describes the two configuration options for the password change interval.

Interval Configuration	Description	Example
No password change allowed	This option does not allow passwords for locally authenticated users to be changed within a specified number of hours after a password change. You can specify a no change interval between 1 and 745 hours. By default, the no change interval is 24 hours.	For example, to prevent passwords from being changed within 48 hours after a locally authenticated user changes his or her password, set the following: • Change during interval to disable • No change interval to 48
Password changes allowed within change interval	This option specifies the maximum number of times that passwords for locally authenticated users can be changed within a pre-defined interval. You can specify a change interval between 1 and 745 hours and a maximum number of password changes between 0 and 10. By default, a locally authenticated user is permitted a maximum of 2 password changes within a 48 hour interval.	For example, to allow to be changed a maximum of once within 24 hours after a locally authenticated user changes his or her password, set the following: • Change during interval to enable • Change count to 1 • Change interval to 24

Configuring the Maximum Number of Password Changes for a Change Interval

You must have admin or aaa privileges to change the password profile properties. Except for password history, these properties do not apply to users with admin or aaa privileges.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Click the **Locally Authenticated Users** node.

Step 4 In the **Password Profile** area, do the following:

a) In the **Change During Interval** field, click **Enable**.

b) In the **Change Count** field, enter the maximum number of times a locally authenticated user can change his or her password during the Change Interval.
This value can be anywhere from 0 to 10.

c) In the **Change Interval** field, enter the maximum number of hours over which the number of password changes specified in the **Change Count** field are enforced.
This value can be anywhere from 1 to 745 hours.

For example, if this field is set to 48 and the**Change Count** field is set to 2, a locally authenticated user can make no more than 2 password changes within a 48 hour period.

Step 5 Click **Save Changes**.

Configuring a No Change Interval for Passwords

You must have admin or aaa privileges to change the password profile properties. Except for password history, these properties do not apply to users with admin or aaa privileges.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Click the **Locally Authenticated Users** node.

Step 4 In the **Password Profile** area, do the following:

a) In the **Change During Interval** field, click **Disable**.

b) In the **No Change Interval** field, enter the minimum number of hours that a locally authenticated user must wait before changing a newly created password.
This value can be anywhere from 1 to 745 hours.

This interval is ignored if the **Change During Interval** property is not set to **Disable**.

Step 5 Click **Save Changes**.

Configuring the Password History Count

You must have admin or aaa privileges to change the password profile properties.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **User Management** > **User Services**.

Step 3 Click the **Locally Authenticated Users** node.

Step 4 In the **Password Profile** area, enter the number of unique passwords that a locally authenticated user must create before that user can reuse a previously used password in the **History Count** field.
This value can be anywhere from 0 to 15.

By default, the **History Count** field is set to 0, which disables the history count and allows users to reuse previously used passwords at any time.

Step 5 Click **Save Changes**.

Monitoring User Sessions

You can monitor Cisco UCS Manager sessions for both locally authenticated users and remotely authenticated users, whether they logged in through the CLI or the GUI.

Procedure

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

Step 2 In the **Admin** tab, expand **All** > **User Management**.

Step 3 Click the **User Services** node.

Step 4 In the **Work** pane, click the **Sessions** tab.
The tab displays the following details of user sessions:

Name	Description
Name column	The name for the session.
User column	The username that is involved in the session.
Fabric ID column	The fabric interconnect that the user logged in to for the session.
Login Time column	The date and time the session started.

Name	Description
Refresh Period column	When a web client connects to Cisco UCS Manager, the client needs to send refresh requests to Cisco UCS Manager to keep the web session active. This option specifies the maximum amount of time allowed between refresh requests for a user in this domain. If this time limit is exceeded, Cisco UCS Manager considers the web session to be inactive, but it does not terminate the session.
Session Timeout column	The maximum amount of time that can elapse after the last refresh request before Cisco UCS Manager considers a web session to have ended. If this time limit is exceeded, Cisco UCS Manager automatically terminates the web session.
Terminal Type column	The kind of terminal the user is logged in through.
Host column	The IP address from which the user is logged in.
Current Session column	If this column displays **Y**, the associated user session is currently active.

CHAPTER 11

Configuring DNS Servers

This chapter includes the following sections:

DNS Servers in Cisco UCS

You need to specify an external DNS server for each Cisco UCS domain to use if the system requires name resolution of hostnames. For example, you cannot use a name such as www.cisco.com when you are configuring a setting on a fabric interconnect if you do not configure a DNS server. You would need to use the IP address of the server. You can configure up to four DNS servers for each Cisco UCS domain.

Note When you configure multiple DNS servers, the system searches for the servers only in any random order. If a local management command requires DNS server lookup, it can only search for three DNS servers in random order.

Adding a DNS Server

Procedure

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

Step 2 In the **Admin** tab, expand **All** > **Communication Services**.

Step 3 Click **DNS Management**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **DNS Server** area, click **+**.

Step 6 In the **Specify DNS Server** dialog box, enter the IP address of the DNS server.

Step 7 Click **OK**.

Deleting a DNS Server

Procedure

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

Step 2 In the **Admin** tab, expand **All** > **Communication Services**.

Step 3 Click **DNS Management**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **DNS Server** area, right-click the DNS server you want to delete and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **Save Changes**.

CHAPTER 12

Configuring System-Related Policies

This chapter includes the following sections:

Configuring the Chassis/FEX Discovery Policy

Chassis/FEX Discovery Policy

The chassis/FEX discovery policy determines how the system reacts when you add a new chassis or FEX. Cisco UCS Manager uses the settings in the chassis/FEX discovery policy to determine the minimum threshold for the number of links between the chassis or FEX and the fabric interconnect and whether to group links from the IOM to the fabric interconnect in a fabric port channel.

Chassis Links

If you have a Cisco UCS domain that has some of the chassis wired with 1 link, some with 2 links, some with 4 links, and some with 8 links we recommend that you configure the chassis/FEX discovery policy for the minimum number links in the domain so that Cisco UCS Manager can discover all chassis.

Tip If you want to establish highest available chassis connectivity in a Cisco UCS domain where Fabric Interconnect is connected to different types of IO Modules supporting different max number of uplinks, select platform max value. Setting platform max would ensure that Cisco UCS Manager would discover the chassis including the connections and servers only when maximum supported IOM uplinks are connected per IO Module.

After the initial discovery, you must reacknowledge the chassis that are wired for a greater number of links and Cisco UCS Manager configures the chassis to use all available links.

Cisco UCS Manager cannot discover any chassis that is wired for fewer links than are configured in the chassis/FEX discovery policy. For example, if the chassis/FEX discovery policy is configured for 4 links, Cisco UCS Manager cannot discover any chassis that is wired for 1 link or 2 links. Reacknowledgement of the chassis does not resolve this issue.

The following table provides an overview of how the chassis/FEX discovery policy works in a multi-chassis Cisco UCS domain:

Table 6: Chassis/FEX Discovery Policy and Chassis Links

Number of Links Wired for the Chassis	1-Link Discovery Policy	2-Link Discovery Policy	4-Link Discovery Policy	8-Link Discovery Policy	Platform-Max Discovery Policy
1 link between IOM and fabric interconnects	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 1 link.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.
2 links between IOM and fabric interconnects	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 1 link. After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 2 link.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.

Number of Links Wired for the Chassis	1-Link Discovery Policy	2-Link Discovery Policy	4-Link Discovery Policy	8-Link Discovery Policy	Platform-Max Discovery Policy
4 links between IOM and fabric interconnects	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 1 link. After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 2 links. After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 4 link.	Chassis connections and servers cannot be discovered by Cisco UCS Manager and are not added to the Cisco UCS domain.	If the IOM has 4 links, the chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 4 links. If the IOM has 8 links, the chassis is not fully discovered by Cisco UCS Manager.
8 links between IOM and fabric interconnects	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 1 link. After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 2 links. After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 4 links. After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 8 links.	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS domain as a chassis wired with 8 links.

Link Grouping

For hardware configurations that support fabric port channels, link grouping determines whether all of the links from the IOM to the fabric interconnect are grouped into a fabric port channel during chassis discovery. If the link grouping preference is set to port channel, all of the links from the IOM to the fabric interconnect are grouped in a fabric port channel. If set to no group, links from the IOM to the fabric interconnect are not grouped in a fabric port channel.

Once a fabric port channel is created, links can be added or removed by changing the link group preference and reacknowledging the chassis, or by enabling or disabling the chassis from the port channel.

Note The link grouping preference only takes effect if both sides of the links between an IOM or FEX and the fabric interconnect support fabric port channels. If one side of the links does not support fabric port channels, this preference is ignored and the links are not grouped in a port channel.

Configuring the Chassis/FEX Discovery Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Global Policies** subtab.

Step 5 In the **Chassis/FEX Discovery Policy** area, complete the following fields:

Name	Description
Action field	Specifies the minimum threshold for the number of links between the chassis or FEX and the fabric interconnect. This can be one of the following: • **1-link** • **2-link** • **4-link** • **8-link** • **Platform Max**
Link Grouping Preference field	Specifies whether the links from the IOMs or FEXes to the fabric interconnects are grouped in a port channel. This can be one of the following: • **None—**No links are grouped in a port channel • **Port Channel—**All links from an IOM or FEX to a fabric interconnect are grouped in a port channel **Note** The link grouping preference only takes effect if both sides of the links between an IOM or FEX and the fabric interconnect support fabric port channels. If one side of the links does not support fabric port channels, this preference is ignored and the links are not grouped in a port channel.

Step 6 Click **Save Changes**.

What to Do Next

To customize fabric port channel connectivity for a specific chassis, configure the chassis connectivity policy.

Configuring the Chassis Connectivity Policy

Chassis Connectivity Policy

The chassis connectivity policy determines the whether a specific chassis is included in a fabric port channel after chassis discovery. This policy is helpful for users who want to configure one or more chassis differently from what is specified in the global chassis discovery policy. The chassis connectivity policy also allows for different connectivity modes per fabric interconnect, further expanding the level of control offered with regards to chassis connectivity.

By default, the chassis connectivity policy is set to global. This means that connectivity control is configured when the chassis is newly discovered, using the settings configured in the chassis discovery policy. Once the chassis is discovered, the chassis connectivity policy controls whether the connectivity control is set to none or port channel.

Note The chassis connectivity policy is created by Cisco UCS Manager only when the hardware configuration supports fabric port channels. At this time, only the 6200 series fabric interconnects and the 2200 series IOMs support this feature. For all other hardware combinations, Cisco UCS Manager does not create a chassis connectivity policy.

Configuring a Chassis Connectivity Policy

Changing the connectivity mode for a chassis could result in decreased VIF namespace.

Caution Changing the connectivity mode for a chassis results in chassis reacknowledgement. Traffic may be disrupted during this time.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Click the chassis for which you want to configure the connectivity between the IOMs and fabric interconnects.

Step 4 In the **Work** pane, click the **Connectivity Policy** tab.

Step 5 For each IOM in the chassis, choose one of the following values in the **Admin State** field for the chassis and fabric connectivity:

- **None—**No links are grouped in a port channel
- **Port Channel—**All links from an IOM to a fabric interconnect are grouped in a port channel.
- **Global—**The chassis inherits this configuration from the chassis discovery policy. This is the default value.

Step 6 Click **Save Changes**.

Configuring the Rack Server Discovery Policy

Rack Server Discovery Policy

The rack server discovery policy determines how the system reacts when you add a new rack-mount server. Cisco UCS Manager uses the settings in the rack server discovery policy to determine whether any data on the hard disks are scrubbed and whether server discovery occurs immediately or needs to wait for explicit user acknowledgement.

Cisco UCS Manager cannot discover any rack-mount server that has not been correctly cabled and connected to the fabric interconnects. For information about how to integrate a supported Cisco UCS rack-mount server with Cisco UCS Manager, see the appropriate rack-mount server integration guide.

Configuring the Rack Server Discovery Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Global Policies** subtab.

Step 5 In the **Rack Server Discovery Policy** area, complete the following fields:

Name	Description
Action field	The way Cisco UCS Manager reacts when you add a new rack server. This can be one of the following: • **Immediate**—Cisco UCS Manager attempts to discover new servers automatically • **User Acknowledged**—Cisco UCS Manager waits until the user tells it to search for new servers
Scrub Policy drop-down list	The scrub policy to run on a newly discovered server if that server meets the criteria in the selected server pool policy qualification.

Step 6 Click **Save Changes**.

Configuring the Aging Time for the MAC Address Table

Aging Time for the MAC Address Table

To efficiently switch packets between ports, the fabric interconnect maintains a MAC address table. It dynamically builds the MAC address table by using the MAC source address from the packets received and the associated port on which the packets were learned. The fabric interconnect uses an aging mechanism, defined by a configurable aging timer, to determine how long an entry remains in the MAC address table. If an address remains inactive for a specified number of seconds, it is removed from the MAC address table.

You can configure the amount of time (age) that a MAC address entry (MAC address and associated port) remains in the MAC address table.

Configuring the Aging Time for the MAC Address Table

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Global Policies** subtab.

Step 5 In the **MAC Address Table Aging** area, complete the following fields:

Name	Description
Aging Time field	The length of time an idle MAC address remains in the MAC address table before it is removed by Cisco UCS. This can be one of the following: • **Never—**MAC addresses are never removed from the table regardless of how long they have been idle. • **Mode Default—**The system uses the default value. If the fabric interconnect is set to end-host mode, the default is 14,500 seconds. If it is set to switching mode, the default is 300 seconds. • **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field which allows you to enter a custom value.
dd:hh:mm:ss field	The length of time a MAC address must remain idle before Cisco UCS removes it from the MAC address table. This field is only visible if you choose **other** for the aging time. Enter a time in the format days:hours:minutes:seconds.

Step 6 Click **Save Changes**.

CHAPTER 13

Managing Licenses

This chapter includes the following sections:

Licenses

Each Cisco UCS fabric interconnect comes with several port licenses that are factory installed and shipped with the hardware. Fabric interconnects can be purchased fully licensed or partially licensed. Additional licenses can also be purchased after delivery.

At a minimum, each fabric interconnect ships with the following counted licenses pre-installed:

- Cisco UCS 6120XP fabric interconnect—pre-installed licenses for the first eight Ethernet ports enabled in Cisco UCS Manager and any Fibre Channel ports on expansion modules
- Cisco UCS 6140XP fabric interconnect—pre-installed licenses for the first sixteen Ethernet ports enabled in Cisco UCS Manager and any Fibre Channel ports on expansion modules
- Cisco UCS 6248 fabric interconnect—pre-installed licenses for the first twelve unified ports enabled in Cisco UCS Manager. Expansion modules come with eight licenses that can be used on the expansion module or the base module.

- Cisco UCS 6296 fabric interconnect—pre-installed licenses for the first eighteen unified ports enabled in Cisco UCS Manager. Expansion modules come with eight licenses that can be used on the expansion module or the base module.

Note The eight default licenses that come with a 6200 series fabric interconnect expansion module can be used to enable ports on the base module, but will travel with the expansion module if it is removed. Upon removal of an expansion module, any default expansion module licenses being used by the base module are removed from the ports on the base module, resulting in unlicensed ports.

Port licenses are not bound to physical ports. When you disable a licensed port, that license is then retained for use with the next enabled port. If you want to use additional fixed ports, you must purchase and install licenses for those ports.

Important Licenses are not portable across product generations. Licenses purchased for 6100 series fabric interconnects cannot be used to enable ports on 6200 series fabric interconnects or vice-versa.

Grace Period

If you attempt to use a port that does not have an installed license, Cisco UCS initiates a 120 day grace period. The grace period is measured from the first use of the port without a license and is paused when a valid license file is installed. The amount of time used in the grace period is retained by the system.

Note Each physical port has its own grace period. Initiating the grace period on a single port does not initiate the grace period for all ports.

If a licensed port is unconfigured, that license is transferred to a port functioning within a grace period. If multiple ports are acting within grace periods, the license is moved to the port whose grace period is closest to expiring.

High Availability Configurations

To avoid inconsistencies during failover, we recommend that both fabric interconnects in the cluster have the same number of ports licensed. If symmetry is not maintained and failover occurs, Cisco UCS enables the missing licenses and initiates the grace period for each port being used on the failover node.

Obtaining the Host ID for a Fabric Interconnect

The host ID is also known as the serial number.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects**.

Step 3 Click the node for the fabric interconnect for which you want to obtain the host ID.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Properties** area, the host ID is listed in the **Serial Number (SN)** field.

What to Do Next

Obtain the required licenses from Cisco.

Obtaining a License

Note This process may change after the release of this document. If one or more of these steps no longer applies, contact your Cisco representative for information on how to obtain a license file.

Before You Begin

Obtain the following:

- Host ID or serial number for the fabric interconnect
- Claim certificate or other proof of purchase document for the fabric interconnect or expansion module

Procedure

Step 1 Obtain the product authorization key (PAK) from the claim certificate or other proof of purchase document.

Step 2 Locate the website URL in the claim certificate or proof of purchase document.

Step 3 Access the website URL for the fabric interconnect and enter the serial number and the PAK.
Cisco sends you the license file by email. The license file is digitally signed to authorize use on only the requested fabric interconnect. The requested features are also enabled once Cisco UCS Manager accesses the license file.

What to Do Next

Install the license on the fabric interconnect.

Downloading Licenses to the Fabric Interconnect from the Local File System

Note In a cluster setup, we recommend that you download and install licenses to both fabric interconnects in matching pairs. An individual license is only downloaded to the fabric interconnect that is used to initiate the download.

Before You Begin

Obtain the required licenses from Cisco.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 Click the node for the fabric interconnect to which you want to download the license.

Step 4 In the **Work** pane, click the **Download Tasks** tab.

Step 5 Click **Download License**.

Step 6 In the **Download License** dialog box, click the **Local File System** radio button in the **Location of the Image File** field.

Step 7 In the **Filename** field, type the full path and and name of the license file.
If you do not know the exact path to the folder where the license file is located, click **Browse** and navigate to the file.

Step 8 Click **OK**.
Cisco UCS Manager GUI begins downloading the license to the fabric interconnect.

Step 9 (Optional) Monitor the status of the download on the **Download Tasks** tab.

Note If Cisco UCS Manager reports that the bootflash is out of space, delete obsolete bundles on the **Packages** tab to free up space. To view the available space in bootflash, navigate to the fabric interconnect on the **Equipment** tab and expand the **Local Storage Information** area on the **General** tab.

Step 10 Repeat this task until all the required licenses have been downloaded to the fabric interconnect.

What to Do Next

After all of the download tasks have completed, install the licenses.

Downloading Licenses to the Fabric Interconnect from a Remote Location

Note In a cluster setup, we recommend that you download and install licenses to both fabric interconnects in matching pairs. An individual license is only downloaded to the fabric interconnect that is used to initiate the download.

Before You Begin

Obtain the required licenses from Cisco.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 Click the node for the fabric interconnect to which you want to download the license.

Step 4 In the **Work** pane, click the **Download Tasks** tab.

Step 5 Click **Download License**.

Step 6 In the **Download License** dialog box, click the **Remote File System** radio button in the **Location of the Image File** field.

Step 7 Complete the following fields:

Name	Description
Protocol field	The protocol to use when communicating with the remote server. This can be one of the following: • **FTP** • **TFTP** • **SCP** • **SFTP**
Server field	The IP address or hostname of the remote server on which the files resides. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Filename field	The name of the license file you want to download.

Name	Description
Path field	The absolute path to the license file on the remote server, if required. If you use SCP, the absolute path is always required. If you use any other protocol, you may not need to specify a remote path if the file resides in the default download folder. For details about how your file server is configured, contact your system administrator.
User field	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password field	The password for the remote server username. This field does not apply if the protocol is TFTP.

Step 8 Click **OK**.
Cisco UCS Manager GUI begins downloading the license to the fabric interconnect.

Step 9 (Optional) Monitor the status of the download on the **Download Tasks** tab.

Note If Cisco UCS Manager reports that the bootflash is out of space, delete obsolete bundles on the **Packages** tab to free up space. To view the available space in bootflash, navigate to the fabric interconnect on the **Equipment** tab and expand the **Local Storage Information** area on the **General** tab.

Step 10 Repeat this task until all the required licenses have been downloaded to the fabric interconnect.

What to Do Next

After all of the download tasks have completed, install the licenses.

Installing a License

Before You Begin

Obtain the required licenses from Cisco.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 In the **Work** pane, click the **Downloaded License Files** tab.

Step 4 Choose the license you want to install from the table.

Step 5 Click the **Install License** button.

Step 6 In the **Install License** dialog box, click **Yes**.
Cisco UCS Manager GUI installs the license and activates the unlicensed port or feature.

Viewing the Licenses Installed on a Fabric Interconnect

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 In the **Work** pane, click the **Installed Licenses** tab to view the following details of all licenses installed on the fabric interconnect:

Name	Description
License File ID column	The unique identifier for the license.
Operational State column	The operational state of the license.
Operational State Description column	Details about the operational state.
Scope column	The fabric on which this license is installed.
Version column	The version of the license.

Name	Description
Administrative State column	The administrative state of the license. This can be one of the following: • **Delete Failed—**Cisco UCS could not delete the license. If this if the first time the delete failed, resubmit the delete request. If it fails a second time, contact Cisco TAC. • **Delete Pending—**The user has requested that Cisco UCS delete the license file from this fabric interconnect. • **Deleted—**Cisco UCS has finished deleting the license file, but it has not yet been removed from the database. • **Deleting—**Cisco UCS is currently deleting the license. • **Install Failed—**Cisco UCS could not install the license. If this if the first time the installation failed, reinstall the license. If it fails a second time, contact Cisco TAC. • **Install Pending—**The license has been downloaded but is not yet installed. • **Installed—**The license file is installed on the fabric interconnect. • **Installing—**Cisco UCS is currently installing the license. • **Stale—**The license file applies to an older fabric interconnect and cannot be used on the current fabric interconnect. The license file should be deleted and, if necessary, replaced with a current license. • **Unknown—**The state cannot be determined. • **Validated—**Cisco UCS has verified that this is a valid Cisco license file.

Step 4 Click a license in the table to view the following details of that license in the **Contents** tab below:
You may need to expand the license file to view the details of individual licenses in the file.

Name	Description
Name column	A navigation tree that allows you to view a particular component and its subcomponents. You can right-click a component to view any actions available for that component.
Total Qty column	The total number of licenses available in the license package file.
Type column	The license type.
Expiry column	The date that the licenses expire.
Quantity column	The quantity of licenses of the given type in the license package file.

Name	Description
PAK column	The Product Authentication Key (PAK) associated with this license, if available.
Signature column	The signature key associated with the licenses of the given type.
Vendor column	The company that issued the license package file.
Version column	The version of the license package file.

Determining the Grace Period Available for a Port or Feature

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 Click a feature in the table to view the following details, including the used grace period, of that feature in the **General** tab below:

Name	Description
Name field	The name of the feature to which the license applies.
Scope field	The fabric associated with the license.
Absolute Quantity field	The total number of licenses available. This value is the sum of the number of default licenses plus the number of purchased licenses.
Used Quantity field	The number of licenses currently being used by the system. If this value exceeds the total number of licenses available, then some ports will stop functioning after their associated grace period expires.
Default Quantity field	The default number of licenses provided for this Cisco UCS domain.
Operational State field	The operational state of the license.
Grace Period Used field	The amount of time (in seconds) used in the grace period. After the grace period ends, Cisco UCS sends alert messages until a new license is purchased.

Name	Description
Peer License Count Comparison field	The number of licenses on the peer fabric interconnect compared to this fabric interconnect. This can be one of the following: • **exceeds—**the peer fabric interconnect has more licenses installed than this fabric interconnect • **lacks—**the peer fabric interconnect has fewer licenses installed than this fabric interconnect • **matching—**the same number of licenses are installed on both fabric interconnects

Determining the Expiry Date of a License

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 In the **Work** pane, click the **Installed Licenses** tab.

Step 4 Click a license in the table to view the details of that license in the **Contents** tab below.

Step 5 In the **Contents** tab, expand the license file to view all licenses in the file.

Step 6 In the **Expiry** column, view the expiry date of the license.

Uninstalling a License

Note Permanent licenses cannot be uninstalled if they are in use. You can only uninstall a permanent license that is not in use. If you try to delete a permanent license that is being used, Cisco UCS Manager rejects the request with an error message.

Before You Begin

Back up the Cisco UCS Manager configuration.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **License Management**.

Step 3 In the **Work** pane, click the **Installed Licenses** tab.

Step 4 Choose the license you want to uninstall from the table.

Step 5 Click the **Clear License** button.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Cisco UCS Manager deactivates the license, removes the license from the list of licenses, and deletes the license from the fabric interconnect. The port is moved into unlicensed mode. In a cluster setup, you must uninstall the license from the other fabric interconnect.

CHAPTER 14

Managing Virtual Interfaces

This chapter includes the following sections:

Virtual Interfaces

In a blade server environment, the number of vNICs and vHBAs configurable for a service profile is determined by adapter capability and the amount of virtual interface (VIF) namespace available on the adapter. In Cisco UCS, portions of VIF namespace are allotted in chunks called VIFs. Depending on your hardware, the maxiumum number of VIFs are allocated on a predefined, per-port basis.
The maximum number of VIFs varies based on hardware capability and port connectivity. For each configured vNIC or vHBA, one or two VIFs are allocated. Stand-alone vNICs and vHBAs use one VIF and failover vNICs and vHBAs use two.

The following variables affect the number of VIFs available to a blade server, and therefore, how many vNICs and vHBAs you can configure for a service profile.

- Maximum number of VIFs supported on your fabric interconnect
- How the fabric interconnects are cabled
- If your fabric interconnect and IOM are configured in fabric port channel mode

For more information about the maximum number of VIFs supported by your hardware configuration, see *Cisco UCS 6100 and 6200 Series Configuration Limits for Cisco UCS Manager* for your software release.

Virtual Interface Subscription Management and Error Handling

For fabric interconnects grouped in a port-channel, changes to the way you connect the fabric interconnect to the I/O module could result in a drastic change to the number of VIFs available to a blade server. To help you track the effect of these changes, Cisco UCS Manager maintains the following metrics:

- Maximum number of VIFs supported by hardware
- Connectivity type

If you change your configuration in a way that decreases the number of VIFs available to a blade, UCS Manager will display a warning and ask you if you want to proceed. This includes several scenarios, including times where adding or moving a connection decreases the number of VIFs.

CHAPTER 15

Registering Cisco UCS Domains with Cisco UCS Central

This chapter includes the following sections:

Registration of Cisco UCS Domains

You can have Cisco UCS Central manage some or all of the Cisco UCS domains in your data center.

If you want to have Cisco UCS Central manage a Cisco UCS domain, you need to register that domain. When you register, you need to choose which types of policies and other configurations, such as backups and firmware, will be managed by Cisco UCS Central and which by Cisco UCS Manager. You can have Cisco UCS Central manage the same types of policies and configurations for all registered Cisco UCS domains or you can choose to have different settings for each registered Cisco UCS domain.

Before you register a Cisco UCS domain with Cisco UCS Central, do the following:

- Configure an NTP server and the correct time zone in both Cisco UCS Manager and Cisco UCS Central to ensure that they are in sync. If the time and date in the Cisco UCS domain and Cisco UCS Central are out of sync, the registration might fail.
- Obtain the hostname or IP address of Cisco UCS Central
- Obtain the shared secret that you configured when you deployed Cisco UCS Central

Note You cannot change or swap the IP addresses used by Cisco UCS Manager in a domain that is registered with Cisco UCS Central. If you need to change or swap that IP address, you must first unregister the domain from Cisco UCS Central. You can reregister the Cisco UCS domain after you have changed or swapped the IP address.

Policy Resolution between Cisco UCS Manager and Cisco UCS Central

For each Cisco UCS domain that you register with Cisco UCS Central, you can choose which application will manage certain policies and configuration settings. This policy resolution does not have to be the same for every Cisco UCS domain that you register with the same Cisco UCS Central.

You have the following options for resolving these policies and configuration settings:

- **Local**—The policy or configuration is determined and managed by Cisco UCS Manager.
- **Global**—The policy or configuration is determined and managed by Cisco UCS Central.

The following table contains a list of the policies and configuration settings that you can choose to have managed by either Cisco UCS Manager or Cisco UCS Central:

Name	Description
Infrastructure & Catalog Firmware	Determines whether the Capability Catalog and infrastructure firmware policy are defined locally or come from Cisco UCS Central.
Date & Time	Determines whether the date and time is defined locally or comes from Cisco UCS Central.
Communication	Determines whether HTTP, CIM XML, Telnet, SNMP, web session limits, and Management Interfaces Monitoring Policy settings are defined locally or in Cisco UCS Central.
Faults	Determines whether the Global Fault Policy is defined locally or in Cisco UCS Central.
Security	Determines whether authentication and native domains, LDAP, RADIUS, TACACS+, trusted points, locales, and user roles are defined locally or in Cisco UCS Central.
DNS Management	Determines whether DNS servers are defined locally or in Cisco UCS Central.
Config Backup	Determines whether the Full State Backup Policy and All Configuration Export Policy are defined locally or in Cisco UCS Central.
Monitoring	Determines whether Call Home, Syslog, and TFTP Core Exporter settings are defined locally or in Cisco UCS Central.

Name	Description
Managed Endpoint	Determines whether managed endpoints are defined locally or in Cisco UCS Central.
Power Management	Determines whether the power management is defined locally or in Cisco UCS Central.
Power Supply Unit	Determines whether power supply units are defined locally or in Cisco UCS Central.

Registering a Cisco UCS Domain with Cisco UCS Central

Note You cannot change or swap the IP addresses used by Cisco UCS Manager in a domain that is registered with Cisco UCS Central. If you need to change or swap that IP address, you must first unregister the domain from Cisco UCS Central. You can reregister the Cisco UCS domain after you have changed or swapped the IP address.

Before You Begin

Configure an NTP server and the correct time zone in both Cisco UCS Manager and Cisco UCS Central to ensure that they are in sync. If the time and date in the Cisco UCS domain and Cisco UCS Central are out of sync, the registration might fail.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management**.

Step 3 Click the **UCS Central** node.

Step 4 In the **Work** pane, click the **UCS Central** tab.

Step 5 In the **Actions** area, click **Register With UCS Central**.

Step 6 In the **Register with UCS Central** dialog box, do the following:

a) Complete the following fields:

Name	Description
Hostname/IP Address field	The hostname or IP address of the virtual machine where Cisco UCS Central is deployed. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.

Name	Description
Shared Secret field	The shared secret (or password) that was configured when Cisco UCS Central was deployed.

b) In the **Policy Resolution Control** area, click one of the following radio buttons for each of the fields:

- **Local**—The policy or configuration is determined and managed by Cisco UCS Manager.
- **Global**—The policy or configuration is determined and managed by Cisco UCS Central.

c) Click **OK**.

Modifying Policy Resolutions between Cisco UCS Manager and Cisco UCS Central

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management**.

Step 3 Click the **UCS Central** node.

Step 4 In the **Work** pane, click the **UCS Central** tab.

Step 5 In the **Policy Resolution Control** area, click one of the following radio buttons for each of the fields:

- **Local**—The policy or configuration is determined and managed by Cisco UCS Manager.
- **Global**—The policy or configuration is determined and managed by Cisco UCS Central.

Step 6 Click **Save Changes**.

Unregistering a Cisco UCS Domain from Cisco UCS Central

When you unregister a Cisco UCS domain from Cisco UCS Central, Cisco UCS Manager no longer receives updates to global policies.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management**.

Step 3 Click the **UCS Central** node.

Step 4 In the **Work** pane, click the **UCS Central** tab.

Step 5 In the **Actions** area, click **Unregister From UCS Central**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **OK**.

PART III

Network Configuration

CHAPTER 16

Using the LAN Uplinks Manager

This chapter includes the following sections:

LAN Uplinks Manager

The LAN Uplinks Manager provides a single interface where you can configure the connections between Cisco UCS and the LAN. You can use the LAN Uplinks Manager to create and configure the following:

- Ethernet switching mode
- Uplink Ethernet ports
- Port channels
- LAN pin groups
- Named VLANs
- Server ports
- QoS system classes

Some of the configuration that you can do in the LAN Uplinks Manager can also be done in nodes on other tabs, such as the **Equipment** tab or the **LAN** tab.

Launching the LAN Uplinks Manager

Procedure

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

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

Step 3 In the **Work** pane, click the **LAN Uplinks Manager** link on the **LAN Uplinks** tab.
The LAN Uplinks Manager opens in a separate window.

Changing the Ethernet Switching Mode with the LAN Uplinks Manager

Important When you change the Ethernet switching mode, Cisco UCS Manager logs you out and restarts the fabric interconnect. For a cluster configuration, Cisco UCS Manager restarts both fabric interconnects. The second fabric interconnect can take several minutes to complete the change in Ethernet switching mode and become system ready. The configuration is retained.

While the fabric interconnects are rebooting, all blade servers will lose all LAN and SAN connectivity, causing a complete outage of all services on the blades. This may cause the operating system to crash.

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Uplink Mode** area, click one of the following buttons:

- **Set Ethernet Switching Mode**
- **Set Ethernet End-Host Mode**

The button for the current switching mode is dimmed.

Step 3 In the dialog box, click **Yes**.
Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager GUI.

Configuring a Port with the LAN Uplinks Manager

All of the port types listed are configurable on both the fixed and expansion module, including server ports, which are not configurable on the 6100 series fabric interconnect expansion module, but are configurable on the 6200 series fabric interconnect expansion module.

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Ports** area, click the down arrows to expand the **Unconfigured Ports** section.

Step 3 Expand **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 4 Expand one of the following:

- **Fixed Module—**To configure a port in the fixed module as a server port or an uplink Ethernet port.
- **Expansion Module** ***Number*** **—**To enable a port in an expansion module as an uplink Ethernet port. You cannot configure ports in expansion modules as server ports.

If no ports are listed below the node that you expanded, all ports in that module have already been configured.

Step 5 Right-click the port that you want to configure and choose one of the following:

- **Configure as Server Port**
- **Configure as Uplink Port**

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Server Ports

Enabling a Server Port with the LAN Uplinks Manager

This procedure assumes that the port has been configured as a server port, but is disabled.

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Ports** area, click the down arrows to expand the **Server Ports** section.

Step 3 Expand **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 4 Right-click the port that you want to enable and choose **Enable**.

Disabling a Server Port with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Ports** area, click the down arrows to expand the **Server Ports** section.

Step 3 Expand **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 4 Right-click the port that you want to disable and choose **Disable**.

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

Unconfiguring a Server Port with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Ports** area, click the down arrows to expand the **Server Ports** section.

Step 3 Expand **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 4 Right-click the port that you want to unconfigure and choose **Unconfigure**.

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

Configuring Uplink Ethernet Ports

Enabling an Uplink Ethernet Port with the LAN Uplinks Manager

This procedure assumes that the port has been configured as an uplink Ethernet port, but is disabled.

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Interfaces** > **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 3 Right-click the port that you want to enable and choose **Enable Interface**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Disabling an Uplink Ethernet Port with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Interfaces** > **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 3 Right-click the port that you want to disable and choose **Disable Interfaces**.
You can select multiple ports if you want to disable more than one uplink Ethernet port.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

The disabled port is removed from the list of enabled interfaces and returned to the **Unconfigured Ports** list.

Unconfiguring an Uplink Ethernet Port with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Interfaces** > **Fabric Interconnects** > ***Fabric_Interconnect_Name*** .

Step 3 Click the port that you want to unconfigure.
You can select multiple ports if you want to unconfigure more than one uplink Ethernet port.

Step 4 Click **Disable Interface**.

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

The disabled port is removed from the list of enabled interfaces and returned to the **Unconfigured Ports** list.

Configuring Uplink Ethernet Port Channels

Creating a Port Channel with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, click **Create Port Channel**.

Step 3 From the pop-up menu, select one of the following fabric interconnects where you want to create the port channel:

- **Fabric Interconnect A**
- **Fabric Interconnect B**

Step 4 In the **Set Port Channel Name** page of the **Create Port Channel** wizard, do the following:

a) Complete the following fields:

Name	Description
ID field	The identifier for the port channel. Enter an integer between 1 and 256. This ID cannot be changed after the port channel has been saved.
Name field	A user-defined name for the port channel. 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).

b) Click **Next**.

Step 5 In the **Add Ports** page of the **Create Port Channel** wizard, do the following:

a) In the **Ports** table, choose one or more ports to include in the port channel.

b) Click the **>>** button to add the ports to the **Ports in the port channel** table.
You can use the **<<** button to remove ports from the port channel.

Note Cisco UCS Manager warns you if you select a port that has been configured as a server port. You can click **Yes** in the dialog box to reconfigure that port as an uplink Ethernet port and include it in the port channel.

Step 6 Click **Finish**.

Enabling a Port Channel with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Port Channels** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Right-click the port channel that you want to enable and choose **Enable Port Channel**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Disabling a Port Channel with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Port Channels** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Right-click the port channel that you want to disable and choose **Disable Port Channel**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Adding Ports to a Port Channel with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Port Channels** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Right-click the port channel to which you want to add ports and choose **Add Ports**.

Step 4 In the **Add Ports** dialog box, do the following:

a) In the **Ports** table, choose one or more ports to include in the port channel.

b) Click the **>>** button to add the ports to the **Ports in the port channel** table.
You can use the **<<** button to remove ports from the port channel.

Note Cisco UCS Manager warns you if you select a port that has been configured as a server port. You can click **Yes** in the dialog box to reconfigure that port as an uplink Ethernet port and include it in the port channel.

Step 5 Click **OK**.

Removing Ports from a Port Channel with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Port Channels** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Expand the port channel from which you want to remove ports.

Step 4 Right-click the port you want to remove from the port channel and choose **Delete**.

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

Deleting a Port Channel with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, expand **Port Channels** > **Fabric Interconnects** > ***Fabric_Interconnect_Name***.

Step 3 Right-click the port channel you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring LAN Pin Groups

Creating a Pin Group with the LAN Uplinks Manager

In a system with two fabric interconnects, you can associate the pin group with only one fabric interconnect or with both fabric interconnects.

Before You Begin

Configure the ports and port channels with which you want to configure the pin group. You can only include ports and port channels configured as uplink ports in a LAN pin group.

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Port Channels and Uplinks** area, click **Create Pin Group**.

Step 3 In the **Create LAN Pin Group** dialog box, enter a unique name and description for the pin group.

Step 4 To pin traffic for fabric interconnect A, do the following in the **Targets** area:

a) Check the **Fabric Interconnect A** check box.

b) Click the drop-down arrow on the **Interface** field and navigate through the tree-style browser to select the port or port channel you want to associate with the pin group.

Step 5 To pin traffic for fabric interconnect B, do the following in the **Targets** area:

a) Check the **Fabric Interconnect B** check box.

b) Click the drop-down arrow on the **Interface** field and navigate through the tree-style browser to select the port or port channel you want to associate with the pin group.

Step 6 Click **OK**.

What to Do Next

Include the pin group in a vNIC template.

Deleting a Pin Group with the LAN Uplinks Manager

Procedure

Step 1 In the LAN Uplinks Manager, click the **LAN Uplinks** tab.

Step 2 In the **Pin Groups** area, right-click the pin group you want to delete and choose **Delete**.

Step 3 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Named VLANs

Creating a Named VLAN with the LAN Uplinks Manager

In a Cisco UCS domain with two switches, you can create a named VLAN that is accessible to both switches or to only one switch.

Important You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved.

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

Procedure

Step 1 In the LAN Uplinks Manager, click the **VLANs** tab.

Step 2 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 3 In the **Create VLANs** dialog box, complete the following fields:

Name	Description
VLAN Name/Prefix field	For a single VLAN, this is the VLAN name. For a range of VLANs, this is the prefix that the system uses for each VLAN name. The VLAN name is case sensitive. 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 has been saved.
Multicast Policy drop-down list	The multicast policy associated with this VLAN.
Create Multicast Policy link	Click this link to create a new multicast policy that will be available to all VLANs.
Configuration options	You can choose one of the following: • **Common/Global**—The VLANs apply to both fabrics and use the same configuration parameters in both cases • **Fabric A**—The VLANs only apply to fabric A. • **Fabric B**—The VLAN only apply to fabric B. • **Both Fabrics Configured Differently**—The VLANs apply to both fabrics but you can specify different VLAN IDs for each fabric. For upstream disjoint L2 networks, we recommend that you choose **Common/Global** to create VLANs that apply to both fabrics.

Name	Description
VLAN IDs field	To create one VLAN, enter a single numeric ID. To create multiple VLANs, enter individual IDs or ranges of IDs separated by commas. A VLAN ID can: • Be between 1 and 3967 • Be between 4048 and 4093 • Overlap with other VLAN IDs already defined on the system For example, to create six VLANs with the IDs 4, 22, 40, 41, 42, and 43, you would enter 4, 22, 40-43. **Important** You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved. VLANs in the LAN cloud and FCoE VLANs in the SAN cloud must have different IDs. Using the same ID for a VLAN and an FCoE VLAN in a VSAN results in a critical fault and traffic disruption for all vNICs and uplink ports using that VLAN. Ethernet traffic is dropped on any VLAN which has an ID that overlaps with an FCoE VLAN ID.
Sharing Type field	Whether this VLAN is subdivided into private or secondary VLANs. This can be one of the following: • **None**—This VLAN does not have any secondary or private VLANs. • **Primary**—This VLAN can have one or more secondary VLANs, as shown in the **Secondary VLANs** area. • **Isolated**—This is a private VLAN. The primary VLAN with which it is associated is shown in the **Primary VLAN** drop-down list.
Primary VLAN drop-down list	If the **Sharing Type** field is set to **Isolated**, this is the primary VLAN associated with this private VLAN.
Permitted Orgs for VLAN(s)	Select the organization from the displayed list for the VLAN. This VLAN will be available for the organizations you select here.
Check Overlap button	Click this button to determine whether the VLAN ID overlaps with any other IDs on the system.

Step 4 Click **OK**.

Cisco UCS Manager adds the VLAN to one of the following **VLANs** nodes:

- The **LAN Cloud** > **VLANs** node for a VLAN accessible to both fabric interconnects.
- The ***Fabric_Interconnect_Name*** > **VLANs** node for a VLAN accessible to only one fabric interconnect.

Deleting a Named VLAN with the LAN Uplinks Manager

If Cisco UCS Manager includes a named VLAN with the same VLAN ID as the one you delete, the VLAN is not removed from the fabric interconnect configuration until all named VLANs with that ID are deleted.

Procedure

Step 1 In the LAN Uplinks Manager, click the **VLANs** tab.

Step 2 Click one of the following subtabs, depending upon what type of VLAN you want to delete:

Subtab	Description
All	Displays all VLANs in the Cisco UCS domain.
Dual Mode	Displays the VLANs that are accessible to both fabric interconnects.
Fabric A	Displays the VLANs that are accessible to only fabric interconnect A.
Fabric B	Displays the VLANs that are accessible to only fabric interconnect B.

Step 3 In the table, click the VLAN you want to delete.
You can use the Shift key or Ctrl key to select multiple entries.

Step 4 Right-click the highlighted VLAN or VLANs and select **Delete**.

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

Configuring QoS System Classes with the LAN Uplinks Manager

The type of adapter in a server may limit the maximum MTU supported. For example, network MTU above the maximums may cause the packet to be dropped for the following adapters:

- The Cisco UCS M71KR CNA adapter, which supports a maximum MTU of 9216.
- The Cisco UCS 82598KR-CI adapter, which supports a maximum MTU of 14000.

Procedure

Step 1 In the LAN Uplinks Manager, click the **QoS** tab.

Step 2 Update the following properties for the system class you want to configure to meet the traffic management needs of the system:

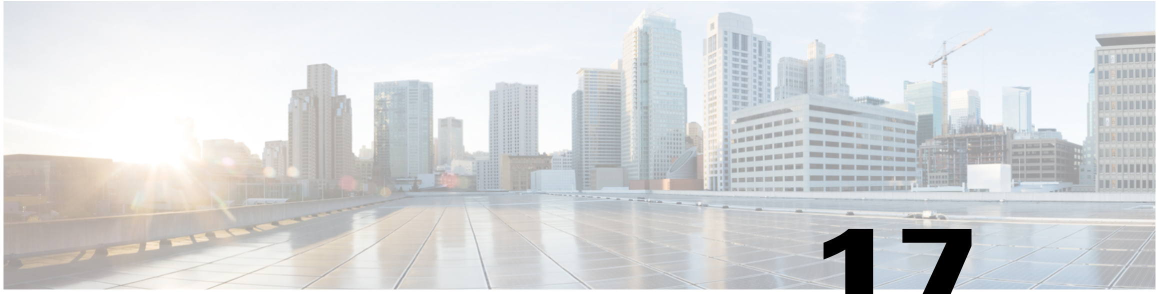
Note Some properties may not be configurable for all system classes.

Name	Description
Enabled check box	If checked, the associated QoS class is configured on the fabric interconnect and can be assigned to a QoS policy. If unchecked, the class is not configured on the fabric interconnect and any QoS policies associated with this class default to **Best Effort** or, if a system class is configured with a Cos of 0, to the Cos 0 system class. **Note** This field is always checked for **Best Effort** and **Fibre Channel**.
CoS field	The class of service. You can enter an integer value between 0 and 6, with 0 being the lowest priority and 6 being the highest priority. We recommend that you do not set the value to 0, unless you want that system class to be the default system class for traffic if the QoS policy is deleted or the assigned system class is disabled. **Note** This field is set to 7 for internal traffic and to **any** for **Best Effort**. Both of these values are reserved and cannot be assigned to any other priority.
Packet Drop check box	If checked, packet drop is allowed for this class. If unchecked, packets cannot be dropped during transmission. This field is always unchecked for the **Fibre Channel** class, which never allows dropped packets, and always checked for **Best Effort**, which always allows dropped packets.
Weight drop-down list	This can be one of the following: • An integer between 1 and 10. If you enter an integer, Cisco UCS determines the percentage of network bandwidth assigned to the priority level as described in the **Weight (%)** field. • **best-effort**. • **none**.
Weight (%) field	To determine the bandwidth allocated to a channel, Cisco UCS: **1** Adds the weights for all the channels **2** Divides the channel weight by the sum of all weights to get a percentage **3** Allocates that percentage of the bandwidth to the channel

Name	Description
MTU drop-down list	The maximum transmission unit for the channel. This can be one of the following: • An integer between 1500 and 9216. This value corresponds to the maximum packet size. • **fc—**A predefined packet size of 2240. • **normal—**A predefined packet size of 1500. **Note** This field is always set to **fc** for **Fibre Channel**.
Multicast Optimized check box	If checked, the class is optimized to send packets to multiple destinations simultaneously. **Note** This option is not applicable to the **Fibre Channel**.

Step 3 Do one of the following:

- Click **OK** to save your changes and exit from the LAN Uplinks Manager.
- Click **Apply** to save your changes without exiting from the LAN Uplinks Manager.



CHAPTER 17

Configuring VLANs

This chapter includes the following sections:

Named VLANs

A named VLAN creates a connection to a specific external LAN. The VLAN isolates traffic to that external LAN, including broadcast traffic.

The name that you assign to a VLAN ID adds a layer of abstraction that allows you to globally update all servers associated with service profiles that use the named VLAN. You do not need to reconfigure the servers individually to maintain communication with the external LAN.

You can create more than one named VLAN with the same VLAN ID. For example, if servers that host business services for HR and Finance need to access the same external LAN, you can create VLANs named HR and Finance with the same VLAN ID. Then, if the network is reconfigured and Finance is assigned to a different LAN, you only have to change the VLAN ID for the named VLAN for Finance.

In a cluster configuration, you can configure a named VLAN to be accessible only to one fabric interconnect or to both fabric interconnects.

Guidelines for VLAN IDs

Important You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved.

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

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.

The VLAN name is case sensitive.

Private VLANs

A private VLAN (PVLAN) partitions the Ethernet broadcast domain of a VLAN into subdomains and allows you to isolate some ports. Each subdomain in a PVLAN includes a primary VLAN and one or more secondary VLANs. All secondary VLANs in a PVLAN must share the same primary VLAN. The secondary VLAN ID differentiates one subdomain from another.

Isolated VLANs

All secondary VLANs in a Cisco UCS domain must be isolated VLANs. Cisco UCS does not support community VLANs.

Note You cannot configure an isolated VLAN to be used together with a regular VLAN.

Ports on Isolated VLANs

Communications on an isolated VLAN can only use the associated port in the primary VLAN. These ports are isolated ports and are not configurable in Cisco UCS Manager. If the primary VLAN includes multiple secondary VLANs, those isolated VLANs cannot communicate directly with each other.

An isolated port is a host port that belongs to an isolated secondary VLAN. This port has complete isolation from other ports within the same private VLAN domain. PVLANs block all traffic to isolated ports except traffic from promiscuous ports. Traffic received from an isolated port is forwarded only to promiscuous ports. You can have more than one isolated port in a specified isolated VLAN. Each port is completely isolated from all other ports in the isolated VLAN.

Guidelines for Uplink Ports

When you create PVLANs, be aware of the following guidelines:

- The uplink Ethernet port channel cannot be in promiscuous mode.
- Each primary VLAN can have only one isolated VLAN.
- VIFs on VNTAG adapters can have only one isolated VLAN.

Guidelines for VLAN IDs

Important You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved.

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

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.

The VLAN name is case sensitive.

VLAN Port Limitations

Cisco UCS Manager limits the number of VLAN port instances that can be configured under border and server domains on a fabric interconnect to 6000.

Types of Ports Included in the VLAN Port Count

The following types of ports are counted in the VLAN port calculation:

- Border uplink Ethernet ports
- Border uplink Ether-channel member ports
- FCoE ports in a SAN cloud
- Ethernet ports in a NAS cloud
- Static and dynamic vNICs created through service profiles
- VM vNICs created as part of a port profile in a hypervisor in hypervisor domain

Based on the number of VLANs configured for these ports, Cisco UCS Manager keeps track of the cumulative count of VLAN port instances and enforces the VLAN port limit during validation. Cisco UCS Manager reserves some pre-defined VLAN port resources for control traffic. These include management VLANs configured under HIF and NIF ports.

VLAN Port Limit Enforcement

Cisco UCS Manager validates VLAN port availability during the following operations.

- Configuring and unconfiguring border ports and border port channels
- Adding or removing VLANs from a cloud
- Configuring or unconfiguring SAN or NAS ports
- Associating or disassociating service profiles that contain configuration changes
- Configuring or unconfiguring VLANs under vNICs or vHBAs
- Upon receiving creation or deleting notifications from a VMWare vNIC, from an ESX hypervisor

  Note This is outside the control of Cisco UCS Manager

- Fabric interconnect reboot
- Cisco UCS Manager upgrade or downgrade

Cisco UCS Manager strictly enforces the VLAN port limit on service profile operations. If Cisco UCS Manager detects that you have exceeded the VLAN port limit service profile configuration will fail during deployment.

Exceeding the VLAN port count in a border domain is less disruptive. When the VLAN port count is exceeded in a border domainCisco UCS Manager changes the allocation status to Exceeded. In order to change the status back to Available, you should complete one of the following actions:

- Unconfigure one or more border ports
- Remove VLANs from the LAN cloud
- Unconfigure one or more vNICs or vHBAs

Configuring Named VLANs

Creating a Named VLAN

In a Cisco UCS domain that is configured for high availability, you can create a named VLAN that is accessible to both fabric interconnects or to only one fabric interconnect.

Important You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved.

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

Procedure

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

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

Step 3 In the **Work** pane, click the **VLANs** tab.

Step 4 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 5 In the **Create VLANs** dialog box, complete the following fields:

Name	Description
VLAN Name/Prefix field	For a single VLAN, this is the VLAN name. For a range of VLANs, this is the prefix that the system uses for each VLAN name. The VLAN name is case sensitive. 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 has been saved.
Multicast Policy drop-down list	The multicast policy associated with this VLAN.
Create Multicast Policy link	Click this link to create a new multicast policy that will be available to all VLANs.
Configuration options	You can choose one of the following: • **Common/Global—**The VLANs apply to both fabrics and use the same configuration parameters in both cases • **Fabric A—**The VLANs only apply to fabric A. • **Fabric B—**The VLAN only apply to fabric B. • **Both Fabrics Configured Differently—**The VLANs apply to both fabrics but you can specify different VLAN IDs for each fabric. For upstream disjoint L2 networks, we recommend that you choose **Common/Global** to create VLANs that apply to both fabrics.

Name	Description
VLAN IDs field	To create one VLAN, enter a single numeric ID. To create multiple VLANs, enter individual IDs or ranges of IDs separated by commas. A VLAN ID can: • Be between 1 and 3967 • Be between 4048 and 4093 • Overlap with other VLAN IDs already defined on the system For example, to create six VLANs with the IDs 4, 22, 40, 41, 42, and 43, you would enter 4, 22, 40-43. **Important** You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved. VLANs in the LAN cloud and FCoE VLANs in the SAN cloud must have different IDs. Using the same ID for a VLAN and an FCoE VLAN in a VSAN results in a critical fault and traffic disruption for all vNICs and uplink ports using that VLAN. Ethernet traffic is dropped on any VLAN which has an ID that overlaps with an FCoE VLAN ID.
Sharing Type field	Whether this VLAN is subdivided into private or secondary VLANs. This can be one of the following: • **None—**This VLAN does not have any secondary or private VLANs. • **Primary—**This VLAN can have one or more secondary VLANs, as shown in the **Secondary VLANs** area. • **Isolated—**This is a private VLAN. The primary VLAN with which it is associated is shown in the **Primary VLAN** drop-down list.
Primary VLAN drop-down list	If the **Sharing Type** field is set to **Isolated**, this is the primary VLAN associated with this private VLAN.
Permitted Orgs for VLAN(s)	Select the organization from the displayed list for the VLAN. This VLAN will be available for the organizations you select here.
Check Overlap button	Click this button to determine whether the VLAN ID overlaps with any other IDs on the system.

Step 6 If you clicked the **Check Overlap** button, do the following:

a) Click the **Overlapping VLANs** tab and review the following fields to verify that the VLAN ID does not overlap with any IDs assigned to existing VLANs.

Name	Description
Fabric ID column	This can be one of the following: • **A** • **B** • **Dual**—The component is accessible to either fabric interconnect. This setting applies to virtual LAN and SAN networks created at the system level as opposed to the fabric interconnect level.
Name column	The name of the VLAN.
VLAN column	The numeric id for the VLAN.
DN column	The full path to the VLAN. Click the link in this column to view the properties for the VLAN.

b) Click the **Overlapping VSANs** tab and review the following fields to verify that the VLAN ID does not overlap with any FCoE VLAN IDs assigned to existing VSANs:

Name	Description
Fabric ID column	This can be one of the following: • **A** • **B** • **Dual**—The component is accessible to either fabric interconnect. This setting applies to virtual LAN and SAN networks created at the system level as opposed to the fabric interconnect level.
Name column	The name of the VSAN.
ID column	The numeric id for the VSAN.
FCoE VLAN ID column	The unique identifier assigned to the VLAN used for Fibre Channel connections.
DN column	The full path to the VSAN. Click the link in this column to view the properties for the VSAN.

c) Click **OK**.

d) If Cisco UCS Manager identified any overlapping VLAN IDs or FCoE VLAN IDs, change the VLAN ID to one that does not overlap with an existing VLAN.

Step 7 Click **OK**.
Cisco UCS Manager adds the VLAN to one of the following **VLANs** nodes:

- The **LAN Cloud** > **VLANs** node for a VLAN accessible to both fabric interconnects.
- The ***Fabric_Interconnect_Name*** > **VLANs** node for a VLAN accessible to only one fabric interconnect.

Deleting a Named VLAN

If Cisco UCS Manager includes a named VLAN with the same VLAN ID as the one you delete, the VLAN is not removed from the fabric interconnect configuration until all named VLANs with that ID are deleted.

If you are deleting a private primary VLAN, make sure to reassign the secondary VLANs to another working primary VLAN.

Before You Begin

Before you delete a VLAN from a fabric interconnect, ensure that the VLAN has been removed from all vNICs and vNIC templates.

Note If you delete a VLAN that is assigned to a vNIC or vNIC template, the vNIC could allow that VLAN to flap.

Procedure

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

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

Step 3 In the **Work** pane, click the **VLANs** tab.

Step 4 Click one of the following subtabs, depending upon what type of VLAN you want to delete:

Subtab	Description
All	Displays all VLANs in the Cisco UCS domain.
Dual Mode	Displays the VLANs that are accessible to both fabric interconnects.
Fabric A	Displays the VLANs that are accessible to only fabric interconnect A.
Fabric B	Displays the VLANs that are accessible to only fabric interconnect B.

Step 5 In the table, click the VLAN you want to delete.
You can use the Shift key or Ctrl key to select multiple entries.

Step 6 Right-click the highlighted VLAN or VLANs and select **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Private VLANs

Creating a Primary VLAN for a Private VLAN

In a Cisco UCS domain that is configured for high availability, you can create a primary VLAN that is accessible to both fabric interconnects or to only one fabric interconnect.

Important You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved.

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

Procedure

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

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

Step 3 In the **Work** pane, click the **VLANs** tab.

Step 4 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 5 In the **Create VLANs** dialog box, complete the following fields:

Name	Description
VLAN Name/Prefix field	For a single VLAN, this is the VLAN name. For a range of VLANs, this is the prefix that the system uses for each VLAN name. The VLAN name is case sensitive. 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 has been saved.
Multicast Policy drop-down list	The multicast policy associated with this VLAN.
Create Multicast Policy link	Click this link to create a new multicast policy that will be available to all VLANs.

Name	Description
Configuration options	You can choose one of the following: • **Common/Global—**The VLANs apply to both fabrics and use the same configuration parameters in both cases • **Fabric A—**The VLANs only apply to fabric A. • **Fabric B—**The VLAN only apply to fabric B. • **Both Fabrics Configured Differently—**The VLANs apply to both fabrics but you can specify different VLAN IDs for each fabric. For upstream disjoint L2 networks, we recommend that you choose **Common/Global** to create VLANs that apply to both fabrics.
VLAN IDs field	To create one VLAN, enter a single numeric ID. To create multiple VLANs, enter individual IDs or ranges of IDs separated by commas. A VLAN ID can: • Be between 1 and 3967 • Be between 4048 and 4093 • Overlap with other VLAN IDs already defined on the system For example, to create six VLANs with the IDs 4, 22, 40, 41, 42, and 43, you would enter 4, 22, 40-43. **Important** You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved. VLANs in the LAN cloud and FCoE VLANs in the SAN cloud must have different IDs. Using the same ID for a VLAN and an FCoE VLAN in a VSAN results in a critical fault and traffic disruption for all vNICs and uplink ports using that VLAN. Ethernet traffic is dropped on any VLAN which has an ID that overlaps with an FCoE VLAN ID.
Sharing Type field	Whether this VLAN is subdivided into private or secondary VLANs. This can be one of the following: • **None—**This VLAN does not have any secondary or private VLANs. • **Primary—**This VLAN can have one or more secondary VLANs, as shown in the **Secondary VLANs** area. • **Isolated—**This is a private VLAN. The primary VLAN with which it is associated is shown in the **Primary VLAN** drop-down list.
Primary VLAN drop-down list	If the **Sharing Type** field is set to **Isolated**, this is the primary VLAN associated with this private VLAN.

Name	Description
Permitted Orgs for VLAN(s)	Select the organization from the displayed list for the VLAN. This VLAN will be available for the organizations you select here.
Check Overlap button	Click this button to determine whether the VLAN ID overlaps with any other IDs on the system.

Step 6 If you clicked the **Check Overlap** button, do the following:

a) Click the **Overlapping VLANs** tab and review the following fields to verify that the VLAN ID does not overlap with any IDs assigned to existing VLANs.

Name	Description
Fabric ID column	This can be one of the following: • **A** • **B** • **Dual**—The component is accessible to either fabric interconnect. This setting applies to virtual LAN and SAN networks created at the system level as opposed to the fabric interconnect level.
Name column	The name of the VLAN.
VLAN column	The numeric id for the VLAN.
DN column	The full path to the VLAN. Click the link in this column to view the properties for the VLAN.

b) Click the **Overlapping VSANs** tab and review the following fields to verify that the VLAN ID does not overlap with any FCoE VLAN IDs assigned to existing VSANs:

Name	Description
Fabric ID column	This can be one of the following: • **A** • **B** • **Dual**—The component is accessible to either fabric interconnect. This setting applies to virtual LAN and SAN networks created at the system level as opposed to the fabric interconnect level.
Name column	The name of the VSAN.
ID column	The numeric id for the VSAN.

Name	Description
FCoE VLAN ID column	The unique identifier assigned to the VLAN used for Fibre Channel connections.
DN column	The full path to the VSAN. Click the link in this column to view the properties for the VSAN.

c) Click **OK**.

d) If Cisco UCS Manager identified any overlapping VLAN IDs or FCoE VLAN IDs, change the VLAN ID to one that does not overlap with an existing VLAN.

Step 7 Click **OK**.
Cisco UCS Manager adds the primary VLAN to one of the following **VLANs** nodes:

- The **LAN Cloud** > **VLANs** node for a primary VLAN accessible to both fabric interconnects.
- The ***Fabric_Interconnect_Name*** > **VLANs** node for a primary VLAN accessible to only one fabric interconnect.

Creating a Secondary VLAN for a Private VLAN

In a Cisco UCS domain that is configured for high availability, you can create a secondary VLAN that is accessible to both fabric interconnects or to only one fabric interconnect.

Important You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved.

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

Before You Begin

Create the primary VLAN.

Procedure

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

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

Step 3 In the **Work** pane, click the **VLANs** tab.

Step 4 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 5 In the **Create VLANs** dialog box, complete the following fields:

Name	Description
VLAN Name/Prefix field	For a single VLAN, this is the VLAN name. For a range of VLANs, this is the prefix that the system uses for each VLAN name. The VLAN name is case sensitive. 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 has been saved.
Multicast Policy drop-down list	The multicast policy associated with this VLAN.
Create Multicast Policy link	Click this link to create a new multicast policy that will be available to all VLANs.
Configuration options	You can choose one of the following: • **Common/Global—**The VLANs apply to both fabrics and use the same configuration parameters in both cases • **Fabric A—**The VLANs only apply to fabric A. • **Fabric B—**The VLAN only apply to fabric B. • **Both Fabrics Configured Differently—**The VLANs apply to both fabrics but you can specify different VLAN IDs for each fabric. For upstream disjoint L2 networks, we recommend that you choose **Common/Global** to create VLANs that apply to both fabrics.
VLAN IDs field	To create one VLAN, enter a single numeric ID. To create multiple VLANs, enter individual IDs or ranges of IDs separated by commas. A VLAN ID can: • Be between 1 and 3967 • Be between 4048 and 4093 • Overlap with other VLAN IDs already defined on the system For example, to create six VLANs with the IDs 4, 22, 40, 41, 42, and 43, you would enter 4, 22, 40-43. **Important** You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved. VLANs in the LAN cloud and FCoE VLANs in the SAN cloud must have different IDs. Using the same ID for a VLAN and an FCoE VLAN in a VSAN results in a critical fault and traffic disruption for all vNICs and uplink ports using that VLAN. Ethernet traffic is dropped on any VLAN which has an ID that overlaps with an FCoE VLAN ID.

Name	Description
Sharing Type field	Whether this VLAN is subdivided into private or secondary VLANs. This can be one of the following: • **None—**This VLAN does not have any secondary or private VLANs. • **Primary—**This VLAN can have one or more secondary VLANs, as shown in the **Secondary VLANs** area. • **Isolated—**This is a private VLAN. The primary VLAN with which it is associated is shown in the **Primary VLAN** drop-down list.
Primary VLAN drop-down list	If the **Sharing Type** field is set to **Isolated**, this is the primary VLAN associated with this private VLAN.
Permitted Orgs for VLAN(s)	Select the organization from the displayed list for the VLAN. This VLAN will be available for the organizations you select here.
Check Overlap button	Click this button to determine whether the VLAN ID overlaps with any other IDs on the system.

Note The multicast policy is associated to the primary VLAN not the secondary VLAN.

Step 6 If you clicked the **Check Overlap** button, do the following:

a) Click the **Overlapping VLANs** tab and review the following fields to verify that the VLAN ID does not overlap with any IDs assigned to existing VLANs.

Name	Description
Fabric ID column	This can be one of the following: • **A** • **B** • **Dual—**The component is accessible to either fabric interconnect. This setting applies to virtual LAN and SAN networks created at the system level as opposed to the fabric interconnect level.
Name column	The name of the VLAN.
VLAN column	The numeric id for the VLAN.
DN column	The full path to the VLAN. Click the link in this column to view the properties for the VLAN.

b) Click the **Overlapping VSANs** tab and review the following fields to verify that the VLAN ID does not overlap with any FCoE VLAN IDs assigned to existing VSANs:

Name	Description
Fabric ID column	This can be one of the following: • **A** • **B** • **Dual**—The component is accessible to either fabric interconnect. This setting applies to virtual LAN and SAN networks created at the system level as opposed to the fabric interconnect level.
Name column	The name of the VSAN.
ID column	The numeric id for the VSAN.
FCoE VLAN ID column	The unique identifier assigned to the VLAN used for Fibre Channel connections.
DN column	The full path to the VSAN. Click the link in this column to view the properties for the VSAN.

c) Click **OK**.

d) If Cisco UCS Manager identified any overlapping VLAN IDs or FCoE VLAN IDs, change the VLAN ID to one that does not overlap with an existing VLAN.

Step 7 Click **OK**.
Cisco UCS Manager adds the primary VLAN to one of the following **VLANs** nodes:

- The **LAN Cloud** > **VLANs** node for a primary VLAN accessible to both fabric interconnects.
- The ***Fabric_Interconnect_Name*** > **VLANs** node for a primary VLAN accessible to only one fabric interconnect.

Viewing the VLAN Port Count

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects**.

Step 3 Click the fabric interconnect for which you want to view the VLAN port count.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **General** tab, click the down arrows on the **VLAN Port Count** bar to expand that area.
Cisco UCS Manager GUI displays the following details:

Name	Description
VLAN Port Limit field	The maximum number of VLAN ports allowed on this fabric interconnect.
Access VLAN Port Count field	The number of available VLAN access ports.
Border VLAN Port Count field	The number of available VLAN border ports.
Allocation Status field	The VLAN port allocation status.

VLAN Port Count Optimization

VLAN port count optimization enables mapping the state of multiple VLANs into a single internal state. When you enable the VLAN port count optimization, Cisco UCS Manager logically groups VLANs based on the port VLAN membership. This grouping increases the port VLAN count limit. VLAN port count optimization also compresses the VLAN state and reduces the CPU load on the fabric interconnect. This reduction in the CPU load enables you to deploy more VLANs over more vNICs. Optimizing VLAN port count does not change any of the existing VLAN configuration on the vNICs.

VLAN port count optimization is disabled by default. You can enable or disable the option based on your requirement.

Important

- Enabling VLAN port count optimization increases the number of available VLAN ports for use. If the port VLAN count exceeds the maximum number of VLANs in a non optimized state, you cannot disable the VLAN port count optimization.
- VLAN port count optimization is not supported in Cisco UCS 6100 Series fabric interconnect.

Enabling Port VLAN Count Optimization

The port VLAN count optimization is disabled by default. If you want to optimize the CPU usage and increase the port VLAN count, you can enable this feature.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Work** pane, click the **Global Policies** tab.

Step 4 In the **Port, VLAN Count Optimization** section, choose **Enabled**.

Step 5 Click **Save Changes**.

Step 6 If the **Port, VLAN Count Optimization** option is successfully enabled, you will see a confirmation message. Click **OK** to close the dialog box.

Disabling Port VLAN Count Optimization

The port VLAN count optimization is disabled by default. If you have enabled this feature to increase the port VLAN count and optimize CPU usage, you can disable this feature.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Work** pane, click the **Global Policies** tab.

Step 4 In the **Port, VLAN Count Optimization** section, choose **Disabled**.

Step 5 Click **Save Changes**.

Step 6 If the **Port, VLAN Count Optimization** option is successfully disabled, you will see a confirmation message. Click **OK** to close the dialog box.

Viewing VLAN Optimization Sets

VLAN port count optimization groups are automatically created by the system based on the VLAN IDs in the system. All the VLANs in the group will share the same IGMP policy. The following VLANs are not included in the VLAN port count optimization group:

- FCoE VLANs
- Primary PVLANs and secondary PVLANs
- VLANs that are specified as a SPAN source
- VLANs configured as a single allowed VLAN on an interface and port profiles with a single VLAN

Cisco UCS Manager GUI automatically groups the optimized VLANs.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Navigation** pane, click **Fabric A** or **Fabric B** to expand the list.

Step 4 Click **VLAN Optimization Sets**.
The **Work** pane displays the list of VLAN optimization groups with **Name** and **Size**.

VLAN Groups

VLAN groups allow you to group VLANs on Ethernet uplink ports, by function or by VLANs that belong to a specific network. You can define VLAN membership and apply the membership to multiple Ethernet uplink ports on the fabric interconnect.

After you assign a VLAN to a VLAN group, any changes made to the VLAN group will be applied to all Ethernet uplink ports that are configured with the VLAN group. The VLAN group also enables you to identify VLAN overlaps between disjoint VLANs.

You can configure uplink ports under a VLAN group. When you configure the uplink port for a VLAN group, that uplink port will only support all the VLANs in that group.

You can create VLAN groups from the LAN Cloud or from the LAN Uplinks Manager.

Creating a VLAN Group

You can create a **VLAN Group** from **LAN Cloud** or the **LAN Uplinks Manager**. This procedure explains creating a VLAN group from the **LAN Cloud**.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Right click on **LAN Cloud** and choose **Create VLAN Group** from the drop down options.
The **Create VLAN Group** wizard launches.

Step 4 In the **Select VLANs** pane, do the following and click **Next**:

Name	Description
Name	Enter a name for your VLAN Group. The VLAN Group name is case sensitive. 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 has been saved.

Name	Description
VLANs	Select the VLANs you want to add to the group from the displayed list. You can select one of the selected VLANs as a **Native VLAN**.
Create VLAN	Click **Create VLAN** to add a new VLAN to this group.

Step 5 (Optional) In **Add Uplink Ports** pane, select the **Uplink Ports** from the displayed list and add them to the **Selected Uplink Ports**.

Step 6 (Optional) In **Add Port Channels** pane, select the **Port Channels** and add them to the **Selected Port Channels**.

Step 7 (Optional) In the **Org Permissions** pane, select appropriate groups from the displayed list.
The VLANs that belong to the group you are creating here will have access only to the groups you select here.

Step 8 Click **Finish**.
This VLAN group is added to the list of **VLAN Groups** under **LAN** > **LAN Cloud** > **VLAN Groups**.

Editing the Members of a VLAN Group

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Navigation** pane, click **VLAN Groups** to expand the VLAN group list.

Step 4 From the displayed list of VLAN groups, choose the VLAN group name, in which you want to edit the group member VLANs.
You can use the Shift key or Ctrl key to select multiple entries.

Step 5 Right-click the highlighted VLAN group or VLAN groups and choose **Edit VLAN Group Members**.
The **Modify VLAN Group** *VLAN Group Name* dialog box opens.

Step 6 In the **Modify VLAN Group** *VLAN Group Name* dialog box, select the VLANs you want to remove or add from the displayed list and click Next.

Step 7 (Optional) In **Add Port Channels** pane, choose the **Port Channels** and add them to the **Selected Port Channels**.

Step 8 (Optional) In the **Org Permissions** pane, choose appropriate groups from the displayed list.
The VLANs that belong to the group you are creating here will have access only to the groups you select here.

Step 9 Click **Finish**.

Step 10 This VLAN group is modified based on your selections.

Modifying the Organization Access Permissions for a VLAN Group

When you modify the organization access permissions for a VLAN group, the change in permissions applies to all VLANs in that VLAN group.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud** > **VLAN Group**, select *VLAN group name*.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In **Actions**, click **Modify VLAN Groups Org Permissions**.
The **Modify VLAN Groups Org Permissions** dialog box opens.

Step 5 In **Org Permissions**, do the following:

- If you want to add organizations, select the organizations.
- If you want to remove access permission from an organization, click to remove the selection.

Step 6 Click **OK**.

Deleting a VLAN Group

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Navigation** pane, click **VLAN Groups** to expand the VLAN group list.

Step 4 From the displayed list of VLAN groups, choose the VLAN group name you want to delete.
You can use the Shift key or Ctrl key to select multiple entries.

Step 5 Right-click the highlighted VLAN group or VLAN groups and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

VLAN Permissions

VLAN permissions restricts access to VLANs based on specified organizations. Based on the service profile organizations the VLANs belong to, VLAN permissions also restrict the set of VLANs you can assign to service profile vNICs. VLAN permissions is an optional feature and is disabled by default. You can enable or disable the feature based on your requirements. If you disable the feature, all the VLANs are globally accessible to all organizations.

Note If you enable the org permission in **LAN** > **LAN Cloud** > **Global Policies** > **Org Permissions**, when you create a VLAN, you will see **Permitted Orgs for VLAN(s)** option in the **Create VLANs** dialog box. If you do not enable the **Org Permissions**, you will not see the **Permitted Orgs for VLAN(s)** option.

If you enable org permission, when creating a VLAN you will specify the organizations for the VLAN. When you specify the organizations, the VLAN will be available to that specific organization and all the sub organizations beneath the structure. Users from other organizations cannot have access to this VLAN. You can also modify the VLAN permission at any point, based on any changes in your VLAN access requirements.

Caution When you assign VLAN org permission to an organization at the root level, all sub organization can access the VLANs. After assigning org permission at root level, if you change the permission for a VLAN that belongs to a sub organization, that VLAN becomes unavailable to the root level organization.

Enabling VLAN Permissions

By default VLAN permissions is disabled. If you want to restrict VLAN access by creating permissions for different organizations, you must enable the org permission option.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Work** pane, click the **Global Policies** tab.

Step 4 In the **Org Permissions** section, choose **Enabled**.

Step 5 Click **Save Changes**.

Step 6 If the **Org Permissions** option is successfully enabled, you will see a confirmation message. Click **OK** to close the dialog box.

Disabling VLAN Permissions

By default VLAN permissions is disabled. If you had enabled the option, assigned VLAN permission to different network groups, and no longer want to use the option, you can disable the option globally. When the VLAN org permission feature is disabled, the permissions you assigned to the VLANs will still exist in the system, but they will not be enforced. If you want to use the org permissions later, you can enable the feature to use the assigned permissions.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 In the **Work** pane, click the **Global Policies** tab.

Step 4 In the **Org Permissions** section, choose **Disabled**.

Step 5 Click **Save Changes**.

Step 6 If the **Org Permissions** option is successfully disabled, you will see a confirmation message. Click **OK** to close the dialog box.

Adding or Modifying VLAN Permissions

You can add or delete the permitted organization for a VLAN.

Note When you add an organization as a permitted organizations for a VLAN, all the descendant organizations will have access to the VLAN. So, when you remove the permission to access a VLAN from an organization, all the descendant organizations will not be able to access the VLAN.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud** > **VLANs**, select *VLAN name*.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In **Actions**, click **Modify VLAN Org Permissions**.
The **Modify VLAN Org Permissions** dialog box opens.

Step 5 In **Permitted Orgs for VLAN(s)**,

- If you want to add organizations, select the organizations.
- If you want to remove access permission from an organization, click to remove the selection.

Step 6 Click **OK**.

CHAPTER 18

Configuring LAN Pin Groups

This chapter includes the following sections:

LAN Pin Groups

Cisco UCS uses LAN pin groups to pin Ethernet traffic from a vNIC on a server to an uplink Ethernet port or port channel on the fabric interconnect. You can use this pinning to manage the distribution of traffic from the servers.

To configure pinning for a server, you must include the LAN pin group in a vNIC policy. The vNIC policy is then included in the service profile assigned to that server. All traffic from the vNIC travels through the I/O module to the specified uplink Ethernet port.

Note If you do not assign a pin group to a server interface through a vNIC policy, Cisco UCS Manager chooses an uplink Ethernet port or port channel for traffic from that server interface dynamically. This choice is not permanent. A different uplink Ethernet port or port channel may be used for traffic from that server interface after an interface flap or a server reboot.

If an uplink is part of a LAN pin group, the uplink is not necessarily reserved for only that LAN pin group. Other vNIC's policies that do not specify a LAN pin group can use the uplink as a dynamic uplink.

Creating a LAN Pin Group

In a system with two fabric interconnects, you can associate the pin group with only one fabric interconnect or with both fabric interconnects.

Before You Begin

Configure the ports and port channels with which you want to configure the pin group. You can only include ports and port channels configured as uplink ports in a LAN pin group.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Right-click **LAN Pin Groups** and select **Create LAN Pin Group**.

Step 4 In the **Create LAN Pin Group** dialog box, enter a unique name and description for the pin group.

Step 5 To pin traffic for fabric interconnect A, do the following in the **Targets** area:

a) Check the **Fabric Interconnect A** check box.
b) Click the drop-down arrow on the **Interface** field and navigate through the tree-style browser to select the port or port channel you want to associate with the pin group.

Step 6 To pin traffic for fabric interconnect B, do the following in the **Targets** area:

a) Check the **Fabric Interconnect B** check box.
b) Click the drop-down arrow on the **Interface** field and navigate through the tree-style browser to select the port or port channel you want to associate with the pin group.

Step 7 Click **OK**.

What to Do Next

Include the pin group in a vNIC template.

Deleting a LAN Pin Group

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **LAN Cloud** > **LAN Pin Groups**.

Step 3 Right-click the LAN pin group you want to delete and select **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 19

Configuring MAC Pools

This chapter includes the following sections:

MAC Pools

A MAC pool is a collection of network identities, or MAC addresses, that are unique in their Layer 2 environment and are available to be assigned to vNICs on a server. If you use MAC pools in service profiles, you do not have to manually configure the MAC addresses to be used by the server associated with the service profile.

In a system that implements multitenancy, you can use the organizational hierarchy to ensure that MAC pools can be used only by specific applications or business services. Cisco UCS uses the name resolution policy to assign MAC addresses from the pool.

To assign a MAC address to a server, you must include the MAC pool in a vNIC policy. The vNIC policy is then included in the service profile assigned to that server.

You can specify your own MAC addresses or use a group of MAC addresses provided by Cisco.

Creating a MAC Pool

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools**.

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

Step 4 Right-click **MAC Pools** and select **Create MAC Pool**.

Step 5 In the **Define Name and Description** page of the **Create MAC Pool** wizard, complete the following fields:

Name	Description
Name field	The name of the MAC pool. 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 has been saved.
Description field	A description of the MAC pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Assignment Order field	This can be one of the following: • **Default—**Cisco UCS Manager selects a random identity from the pool. • **Sequential—**Cisco UCS Manager selects the lowest available identity from the pool.

Step 6 Click **Next**.

Step 7 In the **Add MAC Addresses** page of the **Create MAC Pool** wizard, click **Add**.

Step 8 In the **Create a Block of MAC Addresses** dialog box, complete the following fields:

Name	Description
First MAC Address field	The first MAC address in the block.
Size field	The number of MAC addresses in the block.

Step 9 Click **OK**.

Step 10 Click **Finish**.

What to Do Next

Include the MAC pool in a vNIC template.

Deleting a MAC Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **MAC Pools** node.

Step 4 Right-click the MAC pool you want to delete and select **Delete**.

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

CHAPTER 20

Configuring Quality of Service

This chapter includes the following sections:

Quality of Service

Cisco UCS provides the following methods to implement quality of service:

- System classes that specify the global configuration for certain types of traffic across the entire system
- QoS policies that assign system classes for individual vNICs
- Flow control policies that determine how uplink Ethernet ports handle pause frames

Configuring System Classes

System Classes

Cisco UCS uses Data Center Ethernet (DCE) to handle all traffic inside a Cisco UCS domain. This industry standard enhancement to Ethernet divides the bandwidth of the Ethernet pipe into eight virtual lanes. Two virtual lanes are reserved for internal system and management traffic. You can configure quality of service (Qos) for the other six virtual lanes. System classes determine how the DCE bandwidth in these six virtual lanes is allocated across the entire Cisco UCS domain.

Each system class reserves a specific segment of the bandwidth for a specific type of traffic, which provides a level of traffic management, even in an oversubscribed system. For example, you can configure the Fibre Channel Priority system class to determine the percentage of DCE bandwidth allocated to FCoE traffic.

The following table describes the system classes that you can configure.

Table 7: System Classes

System Class	Description
Platinum Gold Silver Bronze	A configurable set of system classes that you can include in the QoS policy for a service profile. Each system class manages one lane of traffic. All properties of these system classes are available for you to assign custom settings and policies.
Best Effort	A system class that sets the quality of service for the lane reserved for basic Ethernet traffic. Some properties of this system class are preset and cannot be modified. For example, this class has a drop policy that allows it to drop data packets if required. You cannot disable this system class.
Fibre Channel	A system class that sets the quality of service for the lane reserved for Fibre Channel over Ethernet traffic. Some properties of this system class are preset and cannot be modified. For example, this class has a no-drop policy that ensures it never drops data packets. You cannot disable this system class. **Note** FCoE traffic has a reserved QoS system class that should not be used by any other type of traffic. If any other type of traffic has a CoS value that is used by FCoE, the value is remarked to 0.

Configuring QoS System Classes

The type of adapter in a server may limit the maximum MTU supported. For example, network MTU above the maximums may cause the packet to be dropped for the following adapters:

- The Cisco UCS M71KR CNA adapter, which supports a maximum MTU of 9216.
- The Cisco UCS 82598KR-CI adapter, which supports a maximum MTU of 14000.

Important Use the same CoS values on UCS and N5K for all the no-drop policies. To insure that end-to-end PFC works correctly, have the same QoS policy configured on all intermediate switches.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Select the **QoS System Class** node.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 Update the following properties for the system class you want to configure to meet the traffic management needs of the system:

Note Some properties may not be configurable for all system classes.

Name	Description
Enabled check box	If checked, the associated QoS class is configured on the fabric interconnect and can be assigned to a QoS policy. If unchecked, the class is not configured on the fabric interconnect and any QoS policies associated with this class default to **Best Effort** or, if a system class is configured with a Cos of 0, to the Cos 0 system class. **Note** This field is always checked for **Best Effort** and **Fibre Channel**.
CoS field	The class of service. You can enter an integer value between 0 and 6, with 0 being the lowest priority and 6 being the highest priority. We recommend that you do not set the value to 0, unless you want that system class to be the default system class for traffic if the QoS policy is deleted or the assigned system class is disabled. **Note** This field is set to 7 for internal traffic and to **any** for **Best Effort**. Both of these values are reserved and cannot be assigned to any other priority.
Packet Drop check box	If checked, packet drop is allowed for this class. If unchecked, packets cannot be dropped during transmission. This field is always unchecked for the **Fibre Channel** class, which never allows dropped packets, and always checked for **Best Effort**, which always allows dropped packets.
Weight drop-down list	This can be one of the following: • An integer between 1 and 10. If you enter an integer, Cisco UCS determines the percentage of network bandwidth assigned to the priority level as described in the **Weight (%)** field. • **best-effort**. • **none**.
Weight (%) field	To determine the bandwidth allocated to a channel, Cisco UCS: **1** Adds the weights for all the channels **2** Divides the channel weight by the sum of all weights to get a percentage **3** Allocates that percentage of the bandwidth to the channel

Name	Description
MTU drop-down list	The maximum transmission unit for the channel. This can be one of the following: • An integer between 1500 and 9216. This value corresponds to the maximum packet size. • **fc—**A predefined packet size of 2240. • **normal—**A predefined packet size of 1500. **Note** This field is always set to **fc** for **Fibre Channel**.
Multicast Optimized check box	If checked, the class is optimized to send packets to multiple destinations simultaneously. **Note** This option is not applicable to the **Fibre Channel**.

Step 6 Click **Save Changes**.

Enabling a QoS System Class

The Best Effort or Fibre Channel system classes are enabled by default.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Select the **QoS System Class** node.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 Check the **Enabled** check box for the QoS system that you want to enable.

Step 6 Click **Save Changes**.

Disabling a QoS System Class

You cannot disable the Best Effort or Fibre Channel system classes.

All QoS policies that are associated with a disabled system class default to Best Effort or, if the disabled system class is configured with a Cos of 0, to the Cos 0 system class.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Select the **QoS System Class** node.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 Uncheck the **Enabled** check box for the QoS system that you want to disable.

Step 6 Click **Save Changes**.

Configuring Quality of Service Policies

Quality of Service Policy

A 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.

You must include a QoS policy in a vNIC policy or vHBA policy and then include that policy in a service profile to configure the vNIC or vHBA.

Creating a QoS Policy

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Policies**.

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

Step 4 Right-click **QoS Policy** and select **Create QoS Policy**.

Step 5 In the **Create QoS Policy** dialog box, complete the required fields.

Step 6 Click **OK**.

What to Do Next

Include the QoS policy in a vNIC or vHBA template.

Deleting a QoS Policy

If you delete a QoS policy that is in use or you disable a system class that is used in a QoS policy, any vNIC or vHBA that uses that QoS policy is assigned to the Best Effort system class or to the system class with a

CoS of 0. In a system that implements multi-tenancy, Cisco UCS Manager first attempts to find a matching QoS policy in the organization hierarchy.

Procedure

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

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

Step 3 Expand the **QoS Policies** node.

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

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

Configuring Flow Control Policies

Flow Control Policy

Flow control policies determine whether the uplink Ethernet ports in a Cisco UCS domain send and receive IEEE 802.3x pause frames when the receive buffer for a port fills. These pause frames request that the transmitting port stop sending data for a few milliseconds until the buffer clears.

For flow control to work between a LAN port and an uplink Ethernet port, you must enable the corresponding receive and send flow control parameters for both ports. For Cisco UCS, the flow control policies configure these parameters.

When you enable the send function, the uplink Ethernet port sends a pause request to the network port if the incoming packet rate becomes too high. The pause remains in effect for a few milliseconds before traffic is reset to normal levels. If you enable the receive function, the uplink Ethernet port honors all pause requests from the network port. All traffic is halted on that uplink port until the network port cancels the pause request.

Because you assign the flow control policy to the port, changes to the policy have an immediate effect on how the port reacts to a pause frame or a full receive buffer.

Creating a Flow Control Policy

Before You Begin

Configure the network port with the corresponding setting for the flow control that you need. For example, if you enable the send setting for flow-control pause frames in the policy, make sure that the receive parameter in the network port is set to on or desired. If you want the Cisco UCS port to receive flow-control frames, make sure that the network port has a send parameter set to on or desired. If you do not want to use flow control, you can set the send and receive parameters on the network port to off.

Procedure

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

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

Step 3 Expand the **root** node.
You can only create a flow control policy in the root organization. You cannot create a flow control policy in a sub-organization.

Step 4 Right-click the **Flow Control Policies** node and select **Create Flow Control Policy**.

Step 5 In the **Create Flow Control Policy** wizard, complete 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.
Priority field	This can be one of the following: • **Auto**—Cisco UCS and the network negotiate whether PPP is used on this fabric interconnect • **On**—PPP is enabled on this fabric interconnect
Receive field	This can be one of the following: • **Off**—Pause requests from the network are ignored and traffic flow continues as normal • **On**—Pause requests are honored and all traffic is halted on that uplink port until the network cancels the pause request
Send field	This can be one of the following: • **Off**—Traffic on the port flows normally regardless of the packet load. • **On**—Cisco UCS sends a pause request to the network if the incoming packet rate becomes too high. The pause remains in effect for a few milliseconds before traffic is reset to normal levels.

Step 6 Click **OK**.

What to Do Next

Associate the flow control policy with an uplink Ethernet port or port channel.

Deleting a Flow Control Policy

Procedure

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

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

Step 3 Expand the **Flow Control Policies** node.

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

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

CHAPTER 21

Configuring Network-Related Policies

This chapter includes the following sections:

Configuring vNIC Templates

vNIC Template

This policy defines how a vNIC on a server connects to the LAN. This policy is also referred to as a vNIC LAN connectivity policy.

Cisco UCS Manager does not automatically create a VM-FEX port profile with the correct settings when you create a vNIC template. If you want to create a VM-FEX port profile, you must configure the target of the vNIC template as a VM.

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

Note If your server has two Emulex or QLogic NICs (Cisco UCS CNA M71KR-E or Cisco UCS CNA M71KR-Q), you must configure vNIC policies for both adapters in your service profile to get a user-defined MAC address for both NICs. If you do not configure policies for both NICs, Windows still detects both of them in the PCI bus. Then because the second eth is not part of your service profile, Windows assigns it a hardware MAC address. If you then move the service profile to a different server, Windows sees additional NICs because one NIC did not have a user-defined MAC address.

Creating a vNIC Template

Before You Begin

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

- Named VLAN
- MAC pool
- QoS policy
- LAN pin group
- Statistics threshold policy

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **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 **vNIC Templates** node and choose **Create vNIC Template**.

Step 5 In the **Create vNIC Template** dialog box:

a) In the **General** area, complete the following fields:

Name	Description
Name field	The name of the vNIC 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Fabric ID field	The fabric interconnect associated with the component. If you want vNICs created from this template to be able to access the second fabric interconnect if the default one is unavailable, check the **Enable Failover** check box. **Note** Do not enable vNIC fabric failover under the following circumstances: • 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 to the other. • If you plan to 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. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.
Target list box	A list of the possible targets for vNICs created from this template. The target you choose determines whether or not Cisco UCS Manager automatically creates a VM-FEX port profile with the appropriate settings for the vNIC template. This can be one of the following: • **Adapter**—The vNICs apply to all adapters. No VM-FEX port profile is created if you choose this option. • **VM**—The vNICs apply to all virtual machines. A VM-FEX port profile is created if you choose this option.
Template Type field	This can be one of the following: • **Initial Template**—vNICs created from this template are not updated if the template changes. • **Updating Template**—vNICs created from this template are updated if the template changes.

b) In the **VLANs** area, use the table to select the VLAN to assign to vNICs created from this template. The table contains the following columns:

Name	Description
Select column	Check the check box in this column for each VLAN that you want to use. **Note** VLANs and PVLANs can not be assigned to the same vNIC.

Name	Description
Name column	The name of the VLAN.
Native VLAN column	To designate one of the VLANs as the native VLAN, click the radio button in this column.
Create VLAN link	Click this link if you want to create a VLAN.

c) In the **Policies** area, complete the following fields:

Name	Description
MTU field	The maximum transmission unit, or packet size, that vNICs created from this vNIC template should use. 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 may be dropped during data transmission.
MAC Pool drop-down list	The MAC address pool that vNICs created from this vNIC template should use.
QoS Policy drop-down list	The quality of service policy that vNICs created from this vNIC template should use.
Network Control Policy drop-down list	The network control policy that vNICs created from this vNIC template should use.
Pin Group drop-down list	The LAN pin group that vNICs created from this vNIC template should use.
Stats Threshold Policy drop-down list	The statistics collection policy that vNICs created from this vNIC template should use.
Dynamic vNIC Connection Policy drop-down list	The dynamic vNIC connection policy that vNICs created from this vNIC template should use.

Step 6 Click **OK**.

What to Do Next

Include the vNIC template in a service profile.

Binding a vNIC to a vNIC Template

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

Important If the vNIC 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 vNIC you want to bind.
If the system does not include multi-tenancy, expand the **root** node.

Step 4 Expand ***Service_Profile_Name*** > **vNICs**.

Step 5 Click the vNIC 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 vNIC Template** dialog box, do the following:

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

Unbinding a vNIC from a vNIC 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 vNIC you want to unbind.
If the system does not include multi-tenancy, expand the **root** node.

Step 4 Expand ***Service_Profile_Name*** > **vNICs**.

Step 5 Click the vNIC 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**.

Deleting a vNIC Template

Procedure

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

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

Step 3 Expand the **vNIC Templates** 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**.

Configuring Ethernet 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 an Ethernet 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 **Adapter Policies** and choose **Create Ethernet 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Owner field	This can be one of the following: • **Local**—This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global**—Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global**—This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

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

Name	Description
Transmit Queues field	The number of transmit queue resources to allocate. Enter an integer between 1 and 256.
Ring Size field	The number of descriptors in each transmit queue. Enter an integer between 64 and 4096.

Name	Description
Receive Queues field	The number of receive queue resources to allocate. Enter an integer between 1 and 256.
Ring Size field	The number of descriptors in each receive queue. Enter an integer between 64 and 4096.
Completion Queues field	The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 512.
Interrupts field	The number of interrupt resources to allocate. In general, this value should be equal to the number of completion queue resources. Enter an integer between 1 and 514.

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

Name	Description
Transmit Checksum Offload field	This can be one of the following: • **Disabled**—The CPU calculates all packet checksums. • **Enabled**—The CPU sends all packets to the hardware so that the checksum can be calculated. This option may reduce CPU overhead. **Note** This option affects only packets sent from the interface.
Receive Checksum Offload field	This can be one of the following: • **Disabled**—The CPU validates all packet checksums. • **Enabled**—The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. **Note** This option affects only packets received by the interface.

Name	Description
TCP Segmentation Offload field	This can be one of the following: • **Disabled—**The CPU segments large TCP packets. • **Enabled—**The CPU sends large TCP packets to the hardware to be segmented. This option may reduce CPU overhead and increase throughput rate. **Note** This option is also known as Large Send Offload (LSO) and affects only packets sent from the interface.
TCP Large Receive Offload field	This can be one of the following: • **Disabled—**The CPU processes all large packets. • **Enabled—**The hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput. **Note** This option affects only packets received by the interface.
Receive Side Scaling field	RSS distributes network receive processing across multiple CPUs in multiprocessor systems. This can be one of the following: • **Disabled—**Network receive processing is always handled by a single processor even if additional processors are available. • **Enabled—**Network receive processing is shared across processors whenever possible.
Failback Timeout field	After a vNIC has started using its secondary interface, this setting controls how long the primary interface must be available before the system resumes using the primary interface for the vNIC. Enter a number of seconds between 0 and 600.
Interrupt Mode field	The preferred driver interrupt mode. This can be one of the following: • **MSI X—**Message Signaled Interrupts (MSI) with the optional extension. This is the recommended option. • **MSI—**MSI only. • **INTx—**PCI INTx interrupts.

Name	Description
Interrupt Coalescing Type field	This can be one of the following: • **Min—**The system waits for the time specified in the **Interrupt Timer** field before sending another interrupt event. • **Idle—**The system does not send an interrupt until there is a period of no activity lasting as least as long as the time specified in the **Interrupt Timer** field.
Interrupt Timer field	The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent. Enter a value between 1 and 65535. To turn off interrupt coalescing, enter 0 (zero) in this field.

Step 8 Click **OK**.

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

Configuring an Ethernet Adapter Policy to Enable eNIC Support for MRQS on Linux Operating Systems

Cisco UCS Manager includes eNIC support for the Multiple Receive Queue Support (MRQS) feature on Red Hat Enterprise Linux Version 6.x and SUSE Linux Enterprise Server Version 11.x.

Procedure

Step 1 Create an Ethernet adapter policy.
Use the following parameters when creating the Ethernet adapter policy:

- Transmit Queues = 1
- Receive Queues = n (up to 8)
- Completion Queues = # of Transmit Queues + # of Receive Queues
- Interrupts = # Completion Queues + 2
- Receive Side Scaling (RSS) = Enabled
- Interrupt Mode = Msi-X

See Creating an Ethernet Adapter Policy, on page 263.

Step 2 Install an eNIC driver Version 2.1.1.35 or later.
See Cisco UCS Virtual Interface Card Drivers for Linux Installation Guide.

Step 3 Reboot the server

Deleting an Ethernet Adapter Policy

Procedure

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

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

Step 3 Expand the **Adapter Policies** node.

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

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

Configuring the Default vNIC Behavior Policy

Default vNIC Behavior Policy

Default vNIC behavior policy allow you to configure how vNICs are created for a service profile. You can choose to create vNICS manually, or you can allow them to be created automatically

You can configure the default vNIC behavior policy to define how vNICs are created. This can be one of the following:

- **None—**Cisco UCS Manager does not create default vNICs for a service profile. All vNICs must be explicitly created.
- **HW Inherit—**If a service profile requires vNICs and none have been explicitly defined, Cisco UCS Manager creates the required vNICs based on the adapter installed in the server associated with the service profile.

Note If you do not specify a default behavior policy for vNICs, **HW Inherit** is used by default.

Configuring a Default vNIC Behavior Policy

Procedure

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

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

Step 3 Expand the **root** node.

You can configure only the default vNIC behavior policy in the root organization. You cannot configure the default vNIC behavior policy in a sub-organization.

Step 4 Click **Default vNIC Behavior**.

Step 5 On the **General Tab**, in the **Properties** area, click one of the following radio buttons in the **Action** field:

- **None**—Cisco UCS Manager does not create default vNICs for a service profile. All vNICs must be explicitly created.
- **HW Inherit**—If a service profile requires vNICs and none have been explicitly defined, Cisco UCS Manager creates the required vNICs based on the adapter installed in the server associated with the service profile.

Step 6 Click **Save Changes**.

Configuring LAN Connectivity Policies

LAN and SAN Connectivity Policies

Connectivity policies determine the connections and the network communication resources between the server and the LAN or SAN on the network. These policies use pools to assign MAC addresses, WWNs, and WWPNs to servers and to identify the vNICs and vHBAs that the servers use to communicate with the network.

Note We do not recommend that you use static IDs in connectivity policies, because these policies are included in service profiles and service profile templates and can be used to configure multiple servers.

Privileges Required for LAN and SAN Connectivity Policies

Connectivity policies enable users without network or storage privileges to create and modify service profiles and service profile templates with network and storage connections. However, users must have the appropriate network and storage privileges to create connectivity policies.

Privileges Required to Create Connectivity Policies

Connectivity policies require the same privileges as other network and storage configurations. For example, you must have at least one of the following privileges to create connectivity policies:

- admin—Can create LAN and SAN connectivity policies
- ls-server—Can create LAN and SAN connectivity policies
- ls-network—Can create LAN connectivity policies
- ls-storage—Can create SAN connectivity policies

Privileges Required to Add Connectivity Policies to Service Profiles

After the connectivity policies have been created, a user with ls-compute privileges can include them in a service profile or service profile template. However, a user with only ls-compute privileges cannot create connectivity policies.

Interactions between Service Profiles and Connectivity Policies

You can configure the LAN and SAN connectivity for a service profile through either of the following methods:

- LAN and SAN connectivity policies that are referenced in the service profile
- Local vNICs and vHBAs that are created in the service profile
- Local vNICs and a SAN connectivity policy
- Local vHBAs and a LAN connectivity policy

Cisco UCS maintains mutual exclusivity between connectivity policies and local vNIC and vHBA configuration in the service profile. You cannot have a combination of connectivity policies and locally created vNICs or vHBAs. When you include a LAN connectivity policy in a service profile, all existing vNIC configuration is erased, and when you include a SAN connectivity policy, all existing vHBA configuration in that service profile is erased.

Creating a LAN Connectivity Policy

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **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 **LAN Connectivity Policies** and choose **Create LAN Connectivity Policy**.

Step 5 In the **Create LAN Connectivity Policy** dialog box, 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 6 Do one of the following:

- To add vNICs to the LAN connectivity policy, continue with Step 7.
- To add iSCSI vNICs to the LAN connectivity policy and use iSCSI boot with the server, continue with Step 8.

Step 7 To add vNICs, in the **vNIC Table** area, click **+** on the table icon bar and complete the following fields in the **Create vNIC** dialog box:

a) Complete the following fields to specify the identity information for the vNIC:

Name	Description
Name field	The user-defined name for this vNIC. 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.
Use vNIC Template check box	Check this check box if you want to use a template to create the vNIC. The Cisco UCS Manager GUI displays the **vNIC Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vNIC templates exist in the system.
Create vNIC Template link	Click this link if you want to create a vNIC template.
MAC Address Assignment drop-down list	If you want to: • Use the default MAC address pool, leave this field set to **Select (pool default used by default)**. • Use the MAC address assigned to the server by the manufacturer, select **Hardware Default**. • Use a specific MAC address, choose **02:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link. • Use a MAC address from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

b) Complete the following fields to specify the fabric connection information:

Name	Description
Fabric ID field	The fabric interconnect associated with the component. If you want this vNIC to be able to access the second fabric interconnect if the default one is unavailable, check the **Enable Failover** check box. **Note** Do not enable fabric failover for the vNIC under the following circumstances: • 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 to the other. • If you plan to associate this vNIC with a server that has an adapter which does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.
VLANs table	This table lists the VLANs that can be associated with this vNIC. The columns are: • **Select**—Check the check box in this column for each VLAN that you want to use. **Note** VLANs and PVLANs can not be assigned to the same vNIC. • **Name**—The name of the VLAN. • **Native VLAN**—To designate one of the VLANs as the native VLAN, click the radio button in this column.
Create VLAN link	Click this link if you want to create a VLAN.
MTU field	The maximum transmission unit, or packet size, that this vNIC accepts. Enter an integer between 1500 and 9216. **Note** If the vNIC 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 get dropped during data transmission.
Pin Group drop-down list	Choose the LAN pin group that you want associated with this vNIC.
Create LAN Pin Group link	Click this link if you want to create a LAN pin group.
Operational Parameters Section	

Name	Description
Stats Threshold Policy drop-down list	The statistics collection policy with which this vNIC is associated.

c) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list	The Ethernet adapter policy with which this vNIC is associated.
Create Ethernet Adapter Policy link	Click this link if you want to create an Ethernet adapter policy.
Dynamic vNIC Connection Policy drop-down list	The dynamic vNIC connection policy with which this vNIC is associated.
Create Dynamic vNIC Connection Policy link	Click this link if you want to create a dynamic vNIC connection policy.
QoS drop-down list	The quality of service policy with which this vNIC is associated.
Create QoS Policy link	Click this link if you want to create a quality of service policy.
Network Control Policy drop-down list	The network control policy with which this vNIC is associated.
Create Network Control Policy Policy link	Click this link if you want to create a network control policy.

d) Click **OK**.

Step 8 If you want to use iSCSI boot with the server, click the down arrows to expand the **Add iSCSI vNICs** bar and do the following:

a) Click + on the table icon bar.

b) In the **Create iSCSI vNIC** dialog box, complete the following fields:

Name	Description
Name field	The name of the iSCSI vNIC. 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.
Overlay vNIC drop-down list	The LAN vNIC associated with this iSCSI vNIC, if any.
iSCSI Adapter Policy drop-down list	The iSCSI adapter policy associated with this iSCSI vNIC, if any.

Name	Description
Create iSCSI Adapter Policy link	Click this link to create a new iSCSI adapter policy that will be available to all iSCSI vNICs.
VLAN drop-down list	The virtual LAN associated with this iSCSI vNIC. The default VLAN is **default**. **Note** For the Cisco UCS M81KR Virtual Interface Card and the Cisco UCS VIC-1240 Virtual Interface Card, the VLAN that you specify must be the same as the native VLAN on the overlay vNIC. For the Cisco UCS M51KR-B Broadcom BCM57711 Adapter, the VLAN that you specify can be any VLAN assigned to the overlay vNIC.

c) In the **MAC Address Assignment** drop-down list in the **iSCSI MAC Address** area, choose one of the following:

- Leave the MAC address unassigned, select **Select (None used by default)**. Select this option if the server that will be associated with this service profile contains a Cisco UCS M81KR Virtual Interface Card adapter or a Cisco UCS VIC-1240 Virtual Interface Card.

  Important If the server that will be associated with this service profile contains a Cisco UCS NIC M51KR-B adapter, you must specify a MAC address.

- A specific MAC address, select **00:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link.

- A MAC address from a pool, select the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

  If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.

d) (Optional) If you want to create a MAC pool that will be available to all service profiles, click **Create MAC Pool** and complete the fields in the **Create MAC Pool** wizard.
For more information, see Creating a MAC Pool, on page 245.

e) Click **OK**.

Step 9 After you have created all the vNICs or iSCSI vNICs you need for the policy, click **OK**.

What to Do Next

Include the policy in a service profile or service profile template.

Creating a vNIC for a LAN Connectivity Policy

Procedure

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

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

Step 3 Expand the **LAN Connectivity Policies** node.

Step 4 Choose the policy to which you want to add a vNIC.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 On the icon bar of the **vNICs** table, click **Add**.

Step 7 In the **Create vNIC** dialog box, complete the following fields:

a) Complete the following fields to specify the identity information for the vNIC:

Name	Description
Name field	The user-defined name for this vNIC. 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.
Use vNIC Template check box	Check this check box if you want to use a template to create the vNIC. The Cisco UCS Manager GUI displays the **vNIC Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vNIC templates exist in the system.
Create vNIC Template link	Click this link if you want to create a vNIC template.
MAC Address Assignment drop-down list	If you want to: • Use the default MAC address pool, leave this field set to **Select (pool default used by default)**. • Use the MAC address assigned to the server by the manufacturer, select **Hardware Default**. • Use a specific MAC address, choose **02:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link. • Use a MAC address from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

b) Complete the following fields to specify the fabric connection information:

Name	Description
Fabric ID field	The fabric interconnect associated with the component. If you want this vNIC to be able to access the second fabric interconnect if the default one is unavailable, check the **Enable Failover** check box. **Note** Do not enable fabric failover for the vNIC under the following circumstances: • 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 to the other. • If you plan to associate this vNIC with a server that has an adapter which does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.
VLANs table	This table lists the VLANs that can be associated with this vNIC. The columns are: • **Select**—Check the check box in this column for each VLAN that you want to use. **Note** VLANs and PVLANs can not be assigned to the same vNIC. • **Name**—The name of the VLAN. • **Native VLAN**—To designate one of the VLANs as the native VLAN, click the radio button in this column.
Create VLAN link	Click this link if you want to create a VLAN.
MTU field	The maximum transmission unit, or packet size, that this vNIC accepts. Enter an integer between 1500 and 9216. **Note** If the vNIC 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 get dropped during data transmission.
Pin Group drop-down list	Choose the LAN pin group that you want associated with this vNIC.

Name	Description
Create LAN Pin Group link	Click this link if you want to create a LAN pin group.
Operational Parameters Section	
Stats Threshold Policy drop-down list	The statistics collection policy with which this vNIC is associated.

c) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list	The Ethernet adapter policy with which this vNIC is associated.
Create Ethernet Adapter Policy link	Click this link if you want to create an Ethernet adapter policy.
Dynamic vNIC Connection Policy drop-down list	The dynamic vNIC connection policy with which this vNIC is associated.
Create Dynamic vNIC Connection Policy link	Click this link if you want to create a dynamic vNIC connection policy.
QoS drop-down list	The quality of service policy with which this vNIC is associated.
Create QoS Policy link	Click this link if you want to create a quality of service policy.
Network Control Policy drop-down list	The network control policy with which this vNIC is associated.
Create Network Control Policy Policy link	Click this link if you want to create a network control policy.

d) Click **OK**.

Step 8 Click **OK**.

Step 9 Click **Save Changes**.

Deleting a vNIC from a LAN Connectivity Policy

Procedure

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

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

Step 3 Expand the **LAN Connectivity Policies** node.

Step 4 Select the policy from which you want to delete the vNIC.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **vNICs** table, do the following:

a) Click the vNIC you want to delete.
b) On the icon bar, click **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **Save Changes**.

Creating an iSCSI vNIC for a LAN Connectivity Policy

Procedure

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

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

Step 3 Expand the **LAN Connectivity Policies** node.

Step 4 Choose the policy to which you want to add an iSCSI vNIC.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 On the icon bar of the **Add iSCSI vNICs** table, click **Add**.

Step 7 In the **Create iSCSI vNIC** dialog box, complete the following fields:

Name	Description
Name field	The name of the iSCSI vNIC. 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.
Overlay vNIC drop-down list	The LAN vNIC associated with this iSCSI vNIC, if any.
iSCSI Adapter Policy drop-down list	The iSCSI adapter policy associated with this iSCSI vNIC, if any.

Name	Description
Create iSCSI Adapter Policy link	Click this link to create a new iSCSI adapter policy that will be available to all iSCSI vNICs.
VLAN drop-down list	The virtual LAN associated with this iSCSI vNIC. The default VLAN is **default**. **Note** For the Cisco UCS M81KR Virtual Interface Card and the Cisco UCS VIC-1240 Virtual Interface Card, the VLAN that you specify must be the same as the native VLAN on the overlay vNIC. For the Cisco UCS M51KR-B Broadcom BCM57711 Adapter, the VLAN that you specify can be any VLAN assigned to the overlay vNIC.

Step 8 In the **MAC Address Assignment** drop-down list in the **iSCSI MAC Address** area, choose one of the following:

- Leave the MAC address unassigned, select **Select (None used by default)**. Select this option if the server that will be associated with this service profile contains a Cisco UCS M81KR Virtual Interface Card adapter or a Cisco UCS VIC-1240 Virtual Interface Card.

  Important If the server that will be associated with this service profile contains a Cisco UCS NIC M51KR-B adapter, you must specify a MAC address.

- A specific MAC address, select **00:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link.

- A MAC address from a pool, select the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

  If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.

Step 9 (Optional) If you want to create a MAC pool that will be available to all service profiles, click **Create MAC Pool** and complete the fields in the **Create MAC Pool** wizard.
For more information, see Creating a MAC Pool, on page 245.

Step 10 Click **OK**.

Step 11 Click **Save Changes**.

Deleting an iSCSI vNIC from a LAN Connectivity Policy

Procedure

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

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

Step 3 Expand the **LAN Connectivity Policies** node.

Step 4 Chose the policy from which you want to delete the iSCSI vNIC.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Add iSCSI vNICs** table, do the following:

a) Click the iSCSI vNIC that you want to delete.

b) On the icon bar, click **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **Save Changes**.

Deleting a LAN Connectivity Policy

If you delete a LAN connectivity policy that is included in a service profile, you will delete all vNICs and iSCSI vNICs from that service profile and disrupt LAN data traffic for the server associated with the service profile.

Procedure

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

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

Step 3 Expand the **LAN Connectivity Policies** node.

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

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

Configuring Network Control Policies

Network Control Policy

This policy configures the network control settings for the Cisco UCS domain, including the following:

- Whether the Cisco Discovery Protocol (CDP) is enabled or disabled
- How the virtual interface (VIF) behaves if no uplink port is available in end-host mode

- The action that Cisco UCS Manager takes on the remote Ethernet interface, vEthernet interface , or vFibre Channel interface when the associated border port fails
- Whether the server can use different MAC addresses when sending packets to the fabric interconnect
- Whether MAC registration occurs on a per-VNIC basis or for all VLANs

Action on Uplink Fail

By default, the **Action on Uplink Fail** property in the network control policy is configured with a value of link-down. For adapters such as the Cisco UCS M81KR Virtual Interface Card, this default behavior directs Cisco UCS Manager to bring the vEthernet or vFibre Channel interface down if the associated border port fails. For Cisco UCS systems using a non-VM-FEX capable converged network adapter that supports both Ethernet and FCoE traffic, such as Cisco UCS CNA M72KR-Q and the Cisco UCS CNA M72KR-E, this default behavior directs Cisco UCS Manager to bring the remote Ethernet interface down if the associated border port fails. In this scenario, any vFibre Channel interfaces that are bound to the remote Ethernet interface are brought down as well.

Note if your implementation includes those types of non-VM-FEX capable converged network adapters mentioned in this section and the adapter is expected to handle both Ethernet and FCoE traffic, we recommend that you configure the **Action on Uplink Fail** property with a value of warning. Note that this configuration might result in an Ethernet teaming driver not being able to detect a link failure when the border port goes down.

MAC Registration Mode

MAC addresses are installed only on the native VLAN by default, which maximizes the VLAN port count in most implementations.

Note If a trunking driver is being run on the host and the interface is in promiscuous mode, we recommend that you set the Mac Registration Mode to All VLANs.

Creating a Network Control Policy

MAC address-based port security for Emulex converged Network Adapters (N20-AE0102) is not supported. When MAC address-based port security is enabled, the fabric interconnect restricts traffic to packets that contain the MAC address that it first learns. This is either the source MAC address used in the FCoE Initialization Protocol packet, or the MAC address in an ethernet packet, whichever is sent first by the adaptor. This configuration can result in either FCoE or Ethernet packets being dropped.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **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 **Network Control Policies** node and select **Create Network Control Policy**.

Step 5 In the **Create Network Control Policy** dialog box, complete 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.
CDP field	This option determines whether Cisco Discovery Protocol (CDP) is enabled on servers associated with a service profile that includes this policy. This can be one of the following: • **Disabled** • **Enabled**
MAC Register Mode field	Whether adapter-registered MAC addresses are added only to the native VLAN associated with the interface or added to all VLANs associated with the interface. This can be one of the following: • **Only Native Vlan—**MAC addresses are only added to the native VLAN. This option is the default, and it maximizes the port+VLAN count. • **All Host Vlans—**MAC addresses are added to all VLANs with which they are associated. Select this option if your VLANs are configured to use trunking but are *not* running in Promiscuous mode.

Name	Description
Action on Uplink Fail field	This option determines how the VIF behaves if no uplink port is available when the fabric interconnect is in end-host mode. This can be one of the following: • **Link Down—** Changes the operational state of a vNIC to down when uplink connectivity is lost on the fabric interconnect, and enables fabric failover for vNICs. • **Warning—** Maintains server-to-server connectivity even when no uplink port is available, and disables fabric failover when uplink connectivity is lost on the fabric interconnect. The default is **Link Down**. **Note** if your implementation includes those types of non-VM-FEX capable converged network adapters mentioned in this section and the adapter is expected to handle both Ethernet and FCoE traffic, we recommend that you configure the **Action on Uplink Fail** property with a value of warning. Note that this configuration might result in an Ethernet teaming driver not being able to detect a link failure when the border port goes down.

Step 6 In the **MAC Security** area, do the following to determine whether the server can use different MAC addresses when sending packets to the fabric interconnect:

a) Click the **Expand** icon to expand the area and display the radio buttons.

b) Click one of the following radio buttons to determine whether forged MAC addresses are allowed or denied when packets are sent from the server to the fabric interconnect:

- **Allow—** All server packets are accepted by the fabric interconnect, regardless of the MAC address associated with the packets.
- **Deny—** After the first packet has been sent to the fabric interconnect, all other packets must use the same MAC address or they will be silently rejected by the fabric interconnect. In effect, this option enables port security for the associated vNIC.

If you plan to install VMware ESX on the associated server, you must configure the **MAC Security** to **allow** for the network control policy applied to the default vNIC. If you do not configure **MAC Security** for **allow**, the ESX installation may fail because the MAC security permits only one MAC address while the installation process requires more than one MAC address.

Step 7 Click **OK**.

Deleting a Network Control Policy

Procedure

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

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

Step 3 Expand the **Network Control Policies** node.

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

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

Configuring Multicast Policies

Multicast Policy

This policy is used to configure Internet Group Management Protocol (IGMP) snooping and IGMP querier. IGMP Snooping dynamically determines hosts in a VLAN that should be included in particular multicast transmissions. You can create, modify, and delete a multicast policy that can be associated to one or more VLANs. When a multicast policy is modified, all VLANs associated with that multicast policy are re-processed to apply the changes. By default, IGMP snooping is enabled and IGMP querier is disabled. In the case of a private VLANs, you can set a multicast policy for primary VLANs but not for their associated isolated VLANs due to a Cisco NX-OS forwarding implementation.

The following limitations apply to multicast policies on the Cisco UCS 6100 series fabric interconnect and the 6200 series fabric interconnect:

- If a Cisco UCS domain includes only 6100 series fabric interconnects, only the default multicast policy is allowed for local VLANs or global VLANs.
- If a Cisco UCS domain includes one 6100 series fabric interconnect and one 6200 series fabric interconnect:
    - Only the default multicast policy is allowed for a local VLAN on a 6100 series fabric interconnect.
    - On a 6200 series fabric interconnect, user-defined multicast policies can also be assigned along with the default multicast policy.
    - Only the default multicast policy is allowed for a global VLAN (as limited by one 6100 series fabric interconnect in the cluster.
- If a Cisco UCS domain includes only 6200 series fabric interconnects, any multicast policy can be assigned.

Creating a Multicast Policy

Procedure

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

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

Step 3 Expand the **root** node.

Step 4 Right-click the **Multicast Policies** node and select **Create Multicast Policy**.

Step 5 In the **Create Multicast Policy** dialog box, complete 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.
IGMP Snooping State field	Whether IGMP snooping examines IGMP protocol messages within a VLAN to discover which interfaces are connected to hosts or other devices interested in receiving multicast traffic. This can be one of the following: • **Enabled—**IGMP snooping is used for VLANs associated with this policy. • **Disabled—**IGMP snooping is not used for associated VLANs.
IGMP Snooping Querier State field	Whether IGMP snooping querier sends out periodic IGMP queries that trigger IGMP report messages from hosts that want to receive IP multicast traffic. This can be one of the following: • **Enabled—**Periodic IGMP queries are sent out. • **Disabled—**No IGMP queries are sent out.
IGMP Snooping Querier IPv4 Address field	The IPv4 address for the IGMP snooping querier interface.

Step 6 Click **OK**.

Modifying a Multicast Policy

This procedure describes how to change the IGMP snooping state and the IGMP snooping querier state of an existing multicast policy.

Note You cannot change the name of the multicast policy once it has been created.

Procedure

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

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

Step 3 Expand the **root** node.

Step 4 Click the policy that you want to modify.

Step 5 In the work pane, complete 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.
IGMP Snooping State field	Whether IGMP snooping examines IGMP protocol messages within a VLAN to discover which interfaces are connected to hosts or other devices interested in receiving multicast traffic. This can be one of the following: • **Enabled—**IGMP snooping is used for VLANs associated with this policy. • **Disabled—**IGMP snooping is not used for associated VLANs.
IGMP Snooping Querier State field	Whether IGMP snooping querier sends out periodic IGMP queries that trigger IGMP report messages from hosts that want to receive IP multicast traffic. This can be one of the following: • **Enabled—**Periodic IGMP queries are sent out. • **Disabled—**No IGMP queries are sent out.
IGMP Snooping Querier IPv4 Address field	The IPv4 address for the IGMP snooping querier interface.

Step 6 Click **Save Changes**.

Deleting a Multicast Policy

Note If you assigned a non-default (user-defined) multicast policy to a VLAN and then delete that multicast policy, the associated VLAN inherits the multicast policy settings from the default multicast policy until the deleted policy is re-created.

Procedure

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

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

Step 3 Expand the **root** node.

Step 4 Right-click the **Multicast Policies** node and select **Delete Multicast Policy**.

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

CHAPTER 22

Configuring Upstream Disjoint Layer-2 Networks

This chapter includes the following sections:

Upstream Disjoint Layer-2 Networks

Upstream disjoint layer-2 networks (disjoint L2 networks) are required if you have two or more Ethernet “clouds” that never connect, but must be accessed by servers or virtual machines located in the same Cisco UCS domain. For example, you could configure disjoint L2 networks if you require one of the following:

- Servers or virtual machines to access a public network and a backup network
- In a multi-tenant system, servers or virtual machines for more than one customer are located in the same Cisco UCS domain and need to access the L2 networks for both customers.

Note By default, data traffic in Cisco UCS works on a principle of mutual inclusion. All traffic for all VLANs and upstream networks travels along all uplink ports and port channels. If you have upgraded from a release that does not support upstream disjoint layer-2 networks, you must assign the appropriate uplink interfaces to your VLANs, or traffic for those VLANs continues to flow along all uplink ports and port channels.

The configuration for disjoint L2 networks works on a principle of selective exclusion. Traffic for a VLAN that is designated as part of a disjoint network can only travel along an uplink Ethernet port or port channel that is specifically assigned to that VLAN, and is selectively excluded from all other uplink ports and port channels. However, traffic for VLANs that are not specifically assigned to an uplink Ethernet port or port channel can still travel on all uplink ports or port channels, including those that carry traffic for the disjoint L2 networks.

In Cisco UCS, the VLAN represents the upstream disjoint L2 network. When you design your network topology for disjoint L2 networks, you must assign uplink interfaces to VLANs not the reverse.

For information about the maximum number of supported upstream disjoint L2 networks, see Cisco UCS 6100 and 6200 Series Configuration Limits for Cisco UCS Manager, Release 2.0.

Guidelines for Configuring Upstream Disjoint L2 Networks

When you plan your configuration for upstream disjoint L2 networks, consider the following:

Ethernet Switching Mode Must Be End-Host Mode

Cisco UCS only supports disjoint L2 networks when the Ethernet switching mode of the fabric interconnects is configured for end-host mode. You cannot connect to disjoint L2 networks if the Ethernet switching mode of the fabric interconnects is switch 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 VLANs.

VLAN Validity Criteria Are the Same for Uplink Ethernet Ports and Port Channels

The VLAN used for the disjoint L2 networks must be configured and assigned to an uplink Ethernet port or uplink Ethernet port channel. If the port or port channel does not include the VLAN, Cisco UCS Manager considers the VLAN invalid and does the following:

- Displays a configuration warning in the **Status Details** area for the server.
- Ignores the configuration for the port or port channel and drops all traffic for that VLAN.

Note The validity criteria are the same for uplink Ethernet ports and uplink Ethernet port channels. Cisco UCS Manager does not differentiate between the two.

Overlapping VLANs Are Not Supported

Cisco UCS does not support overlapping VLANs in disjoint L2 networks. You must ensure that each VLAN only connects to one upstream disjoint L2 domain.

Each vNIC Can Only Communicate with One Disjoint L2 Network

A vNIC can only communicate with one disjoint L2 network. If a server needs to communicate with multiple disjoint L2 networks, you must configure a vNIC for each of those networks.

To communicate with more than two disjoint L2 networks, a server must have a Cisco VIC adapter that supports more than two vNICs.

Appliance Port Must Be Configured with the Same VLAN as Uplink Ethernet Port or Port Channel

For an appliance port to communicate with a disjoint L2 network, you must ensure that at least one uplink Ethernet port or port channel is in the same network and is therefore assigned to the same VLANs that are used by the appliance port. If Cisco UCS Manager cannot identify an uplink Ethernet port or port channel that includes all VLANs that carry traffic for an appliance port, the appliance port experiences a pinning failure and goes down.

For example, a Cisco UCS domain includes a global VLAN named vlan500 with an ID of 500. vlan500 is created as a global VLAN on the uplink Ethernet port. However, Cisco UCS Manager does not propagate this VLAN to appliance ports. To configure an appliance port with vlan500, you must create another VLAN named vlan500 with an ID of 500 for the appliance port. You can create this duplicate VLAN in the **Appliances** node on the **LAN** tab of the Cisco UCS Manager GUI or the **eth-storage** scope in the Cisco UCS Manager CLI. If you are prompted to check for VLAN Overlap, accept the overlap and Cisco UCS Manager creates the duplicate VLAN for the appliance port.

Default VLAN 1 Cannot Be Configured Explicitly on an Uplink Ethernet Port or Port Channel

Cisco UCS Manager implicitly assigns default VLAN 1 to all uplink ports and port channels. Even if you do not configure any other VLANs, Cisco UCS uses default VLAN 1 to handle data traffic for all uplink ports and port channels.

Note After you configure VLANs in a Cisco UCS domain, default VLAN 1 remains implicitly on all uplink ports and port channels. You cannot explicitly assign default VLAN 1 to an uplink port or port channel, nor can you remove it from an uplink port or port channel.

If you attempt to assign default VLAN 1 to a specific port or port channel, Cisco UCS Manager raises an Update Failed fault.

Therefore, if you configure a Cisco UCS domain for disjoint L2 networks, do not configure any vNICs with default VLAN 1 unless you want all data traffic for that server to be carried on all uplink Ethernet ports and port channels and sent to all upstream networks.

VLANs for Both FIs Must be Concurrently Assigned

When you assign a port to a global VLAN, the VLAN is removed from all of the ports that are not explicitly assigned to the VLAN on both fabric interconnects. The ports on both FIs must be configured at the same time. If the ports are only configured on the first FI, traffic on the second FI will be disrupted.

Pinning Considerations for Upstream Disjoint L2 Networks

Communication with an upstream disjoint L2 network requires that you ensure that the pinning is properly configured. Whether you implement soft pinning or hard pinning, a VLAN membership mismatch causes traffic for one or more VLANs to be dropped.

Soft Pinning

Soft pinning is the default behavior in Cisco UCS. If you plan to implement soft pinning, you do not need to create LAN pin groups to specify a pin target for a vNIC. Instead, Cisco UCS Manager pins the vNIC to an uplink Ethernet port or port channel according to VLAN membership criteria.

With soft pinning, Cisco UCS Manager validates data traffic from a vNIC against the VLAN membership of all uplink Ethernet ports and port channels. If you have configured disjoint L2 networks, Cisco UCS Manager must be able to find an uplink Ethernet port or port channel that is assigned to all VLANS on the vNIC. If no uplink Ethernet port or port channel is configured with all VLANs on the vNIC, Cisco UCS Manager does the following:

- Brings the link down.
- Drops the traffic for all of the VLANs on the vNIC.
- Raises the following faults:
    - Link Down
    - VIF Down

Cisco UCS Manager does not raise a fault or warning about the VLAN configuration.

For example, a vNIC on a server is configured with VLANs 101, 102, and 103. Interface 1/3 is assigned only to VLAN 102. Interfaces 1/1 and 1/2 are not explicitly assigned to a VLAN, which makes them available for traffic on VLANs 101 and 103. As a result of this configuration, the Cisco UCS domain does not include a border port interface that can carry traffic for all three VLANS for which the vNIC is configured. As a result, Cisco UCS Manager brings down the vNIC, drops traffic for all three VLANs on the vNIC, and raises the Link Down and VIF Down faults.

Hard Pinning

Hard pinning occurs when you use LAN pin groups to specify the pinning target for the traffic intended for the disjoint L2 networks. In turn, the uplink Ethernet port or port channel that is the pinning target must be configured to communicate with the appropriate disjoint L2 network.

With hard pinning, Cisco UCS Manager validates data traffic from a vNIC against the VLAN membership of all uplink Ethernet ports and port channels, and validates the LAN pin group configuration to ensure it includes the VLAN and the uplink Ethernet port or port channel. If the validation fails at any point, Cisco UCS Manager does the following:

- Raises a Pinning VLAN Mismatch fault with a severity of Warning.
- Drops traffic for the VLAN.
- Does not bring the link down, so that traffic for other VLANs can continue to flow along it.

For example, if you want to configure hard pinning for an upstream disjoint L2 network that uses VLAN 177, do the following:

- Create a LAN pin group with the uplink Ethernet port or port channel that carries the traffic for the disjoint L2 network.
- Configure at least one vNIC in the service profile with VLAN 177 and the LAN pin group.
- Assign VLAN 177 to an uplink Ethernet port or port channel included in the LAN pin group

If the configuration fails at any of these three points, then Cisco UCS Manager warns for a VLAN mismatch for VLAN 177 and drops the traffic for that VLAN only.

Configuring Cisco UCS for Upstream Disjoint L2 Networks

When you configure a Cisco UCS domain to connect with upstream disjoint L2 networks, you need to ensure that you complete all of the following steps.

Before You Begin

Before you begin this configuration, ensure that the ports on the fabric interconnects are properly cabled to support your disjoint L2 networks configuration.

Procedure

	Command or Action	Purpose
Step 1	Configure Ethernet switching mode for both fabric interconnects in Ethernet End-Host Mode.	The Ethernet switching mode must be in End-Host Mode for Cisco UCS to be able to communicate with upstream disjoint L2 networks. See Configuring Ethernet Switching Mode.
Step 2	Configure the ports and port channels that you require to carry traffic for the disjoint L2 networks.	See Configuring Ports and Port Channels, on page 61.
Step 3	Configure the LAN pin groups required to pin the traffic for the appropriate uplink Ethernet ports or port channels.	(Optional) See Configuring LAN Pin Groups, on page 243.
Step 4	Create one or more VLANs.	These can be named VLANs or private VLANs. For a cluster configuration, we recommend that you create the VLANs in the VLAN Manager and use the Common/Global configuration to ensure they are accessible to both fabric interconnects. See Creating a VLAN for an Upstream Disjoint L2 Network, on page 294.
Step 5	Assign the desired ports or port channels to the VLANs for the disjoint L2 networks.	When this step is completed, traffic for those VLANs can only be sent through the trunks for the assigned ports and/or port channels. Assigning Ports and Port Channels to VLANs, on page 296
Step 6	Ensure that the service profiles for all servers that need to communicate with the disjoint L2 networks include the correct LAN connectivity configuration to ensure the vNICs send the traffic to the appropriate VLAN.	You can complete this configuration through one or more vNIC templates or when you configure the networking options for the service profile. See Configuring Service Profiles.

Creating a VLAN for an Upstream Disjoint L2 Network

For upstream disjoint L2 networks, we recommend that you create VLANs in the VLAN Manager.

Procedure

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

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

Step 3 In the **Work** pane, click the **LAN Uplinks Manager** link on the **LAN Uplinks** tab.
The LAN Uplinks Manager opens in a separate window.

Step 4 In the LAN Uplinks Manager, click **VLANs** > **VLAN Manager**.
You can create the VLAN on any of the subtabs. However, if you use the **All** subtab, you can see all configured VLANs 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 VLANs** dialog box, complete the following fields and then click **OK**:

Name	Description
VLAN Name/Prefix field	For a single VLAN, this is the VLAN name. For a range of VLANs, this is the prefix that the system uses for each VLAN name. The VLAN name is case sensitive. 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 has been saved.
Multicast Policy drop-down list	The multicast policy associated with this VLAN.
Create Multicast Policy link	Click this link to create a new multicast policy that will be available to all VLANs.
Configuration options	You can choose one of the following: • **Common/Global—**The VLANs apply to both fabrics and use the same configuration parameters in both cases • **Fabric A—**The VLANs only apply to fabric A. • **Fabric B—**The VLAN only apply to fabric B. • **Both Fabrics Configured Differently—**The VLANs apply to both fabrics but you can specify different VLAN IDs for each fabric. For upstream disjoint L2 networks, we recommend that you choose **Common/Global** to create VLANs that apply to both fabrics.

Name	Description
VLAN IDs field	To create one VLAN, enter a single numeric ID. To create multiple VLANs, enter individual IDs or ranges of IDs separated by commas. A VLAN ID can: • Be between 1 and 3967 • Be between 4048 and 4093 • Overlap with other VLAN IDs already defined on the system For example, to create six VLANs with the IDs 4, 22, 40, 41, 42, and 43, you would enter 4, 22, 40-43. **Important** You cannot create VLANs with IDs from 3968 to 4047. This range of VLAN IDs is reserved. VLANs in the LAN cloud and FCoE VLANs in the SAN cloud must have different IDs. Using the same ID for a VLAN and an FCoE VLAN in a VSAN results in a critical fault and traffic disruption for all vNICs and uplink ports using that VLAN. Ethernet traffic is dropped on any VLAN which has an ID that overlaps with an FCoE VLAN ID.
Sharing Type field	Whether this VLAN is subdivided into private or secondary VLANs. This can be one of the following: • **None**—This VLAN does not have any secondary or private VLANs. • **Primary**—This VLAN can have one or more secondary VLANs, as shown in the **Secondary VLANs** area. • **Isolated**—This is a private VLAN. The primary VLAN with which it is associated is shown in the **Primary VLAN** drop-down list.
Primary VLAN drop-down list	If the **Sharing Type** field is set to **Isolated**, this is the primary VLAN associated with this private VLAN.
Permitted Orgs for VLAN(s)	Select the organization from the displayed list for the VLAN. This VLAN will be available for the organizations you select here.
Check Overlap button	Click this button to determine whether the VLAN ID overlaps with any other IDs on the system.

Step 7 Repeat Steps 6 and 7 to create additional VLANs.

What to Do Next

Assign ports and port channels to the VLANs.

Assigning Ports and Port Channels to VLANs

Procedure

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

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

Step 3 In the **Work** pane, click the **LAN Uplinks Manager** link on the **LAN Uplinks** tab.
The LAN Uplinks Manager opens in a separate window.

Step 4 In the LAN Uplinks Manager, click **VLANs** > **VLAN Manager**.
You can create the VLAN on any of the subtabs. However, if you use the **All** subtab, you can see all configured VLANs in the table.

Step 5 Click one of the following subtabs to configure ports and port channels on that fabric interconnect:

Subtab	Description
Fabric A	Displays the ports, port channels, and VLANs that are accessible to fabric interconnect A.
Fabric B	Displays the ports, port channels, and VLANs that are accessible to fabric interconnect B.

Step 6 In the **Ports and Port Channels** table, do the following:

- To assign an Uplink Ethernet port channel to a VLAN, expand the **Port Channels** node and click the port channel you want to assign to the VLAN.
- To assign an Uplink Ethernet port to the VLAN, expand the **Uplink Interfaces** node and click the port you want to assign to the VLAN

You can hold down the Ctrl key and click multiple ports or port channels to assign to them to the same VLAN or set of VLANs .

Step 7 In the **VLANs** table, expand the appropriate node if necessary and click the VLAN to which you want to assign the port or port channel.
You can hold down the Ctrl key and click multiple VLANs if you want to assign the same set of ports and/or port channels to them.

Step 8 Click the **Add to VLAN/VLAN Group** button.

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

Step 10 To assign additional ports or port channels to VLANs on the same fabric, repeat Steps 6, 7, and 8.

Step 11 To assign additional ports or port channels to VLANs on a different fabric, repeat Steps 5 through 8.
If the Cisco UCS domain is configured for high availability with two fabric interconnects, we recommend that you create the same set of VLANs on both fabric interconnects.

Step 12 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 13 Click **Apply** if you want to continue to work in the VLAN Manager, or click **OK** to close the window.

After a port or port channel is assigned to one or more VLANs, it is removed from all other VLANs.

Removing Ports and Port Channels from VLANs

Procedure

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

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

Step 3 In the **Work** pane, click the **LAN Uplinks Manager** link on the **LAN Uplinks** tab.
The LAN Uplinks Manager opens in a separate window.

Step 4 In the LAN Uplinks Manager, click **VLANs** > **VLAN Manager**.
You can create the VLAN on any of the subtabs. However, if you use the **All** subtab, you can see all configured VLANs in the table.

Step 5 Click one of the following subtabs to configure ports and port channels on that fabric interconnect:

Subtab	Description
Fabric A	Displays the ports, port channels, and VLANs that are accessible to fabric interconnect A.
Fabric B	Displays the ports, port channels, and VLANs that are accessible to fabric interconnect B.

Step 6 In the **VLANs** table, expand the appropriate node and the VLAN from which you want to remove a port or port channel.

Step 7 Click the port or port channel that you want to remove from the VLAN.
Hold down the Ctrl key to click multiple ports or port channels.

Step 8 Click the **Remove from VLAN/VLAN Group** button.

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

Step 10 Click **Apply** if you want to continue to work in the VLAN Manager, or click **OK** to close the window.

Important If you remove all port or port channel interfaces from a VLAN, the VLAN returns to the default behavior and data traffic on that VLAN flows on all uplink ports and port channels. Depending upon the configuration in the Cisco UCS domain, this default behavior can cause Cisco UCS Manager to drop traffic for that VLAN. To avoid this occurrence, we recommend that you either assign at least one interface to the VLAN or delete the VLAN.

Viewing Ports and Port Channels Assigned to VLANs

Procedure

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

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

Step 3 In the **Work** pane, click the **LAN Uplinks Manager** link on the **LAN Uplinks** tab.
The LAN Uplinks Manager opens in a separate window.

Step 4 In the LAN Uplinks Manager, click **VLANs** > **VLAN Manager**.
You can create the VLAN on any of the subtabs. However, if you use the **All** subtab, you can see all configured VLANs in the table.

Step 5 Click one of the following subtabs to configure ports and port channels on that fabric interconnect:

Subtab	Description
Fabric A	Displays the ports, port channels, and VLANs that are accessible to fabric interconnect A.
Fabric B	Displays the ports, port channels, and VLANs that are accessible to fabric interconnect B.

Step 6 In the **VLANs** table, expand the appropriate node and the VLAN for which you want to view the assigned ports or port channels.

PART IV

Storage Configuration

CHAPTER 23

Configuring Named VSANs

This chapter includes the following sections:

Named VSANs

A named VSAN creates a connection to a specific external SAN. The VSAN isolates traffic to that external SAN, including broadcast traffic. The traffic on one named VSAN knows that the traffic on another named VSAN exists, but cannot read or access that traffic.

Like a named VLAN, the name that you assign to a VSAN ID adds a layer of abstraction that allows you to globally update all servers associated with service profiles that use the named VSAN. You do not need to reconfigure the servers individually to maintain communication with the external SAN. You can create more than one named VSAN with the same VSAN ID.

Named VSANs in Cluster Configurations

In a cluster configuration, a named VSAN can be configured to be accessible only to the Fibre Channel uplink ports on one fabric interconnect or to the Fibre Channel uplink ports on both fabric interconnects.

Named VSANs and the FCoE VLAN ID

You must configure each named VSAN with an FCoE VLAN ID. This property determines which VLAN is used for transporting the VSAN and its Fibre Channel packets.

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.

In the following sample configuration, a service profile with a vNIC and vHBA mapped to fabric A is associated with a server that has FIP capable, converged network adapters:

- The vNIC is configured to use VLAN 10.
- VLAN 10 is also designated as the native VLAN for the vNIC.
- The vHBA is configured to use VSAN 2.
- Therefore, VSAN 2 cannot be configured with VLAN 10 as the FCoE VLAN ID. VSAN 2 can be mapped to any other VLAN configured on fabric A.

Fibre Channel Uplink Trunking for Named VSANs

You can configure Fibre Channel uplink trunking for the named VSANs on each fabric interconnect. If you enable trunking on a fabric interconnect, all named VSANs in a Cisco UCS domain are allowed on all Fibre Channel uplink ports on that fabric interconnect.

Guidelines and Recommendations for VSANs

The following guidelines and recommendations apply to all named VSANs, including storage VSANs.

VSAN 4079 is a Reserved VSAN ID

Do not configure a VSAN as 4079. This VSAN is reserved and cannot be used in either FC switch mode or FC end-host mode.

If you create a named VSAN with ID 4079, Cisco UCS Manager marks that VSAN with an error and raises a fault.

Reserved VSAN Range for Named VSANs in FC Switch Mode

If you plan to use FC switch mode in a Cisco UCS domain, do not configure VSANs with an ID in the range from 3040 to 4078.

VSANs in that range are not operational if the fabric interconnects are configured to operate in FC switch mode. Cisco UCS Manager marks that VSAN with an error and raises a fault.

Reserved VSAN Range for Named VSANs in FC End-Host Mode

If you plan to use FC end-host mode in a Cisco UCS domain, do not configure VSANs with an ID in the range from 3840 to 4079.

VSANs in that range are not operational if the following conditions exist in a Cisco UCS domain:

- The fabric interconnects are configured to operate in FC end-host mode.
- The Cisco UCS domain is configured with Fibre Channel trunking or SAN port channels.

If these configurations exist, Cisco UCS Manager does the following:

1 Renders all VSANs with an ID in the range from 3840 to 4079 non-operational.

2 Raises a fault against the non-operational VSANs.

3 Transfers all non-operational VSANs to the default VSAN.

4 Transfers all vHBAs associated with the non-operational VSANs to the default VSAN.

If you disable Fibre Channel trunking and delete any existing SAN port channels, Cisco UCS Manager returns all VSANs in the range from 3840 to 4078 to an operational state and restores any associated vHBAs back to those VSANs.

Range Restrictions for Named VSAN IDs in FC Switch Mode

If you plan to use FC switch mode in a Cisco UCS domain, do not configure VSANs in the range from 3040 to 4078.

When a fabric interconnect operating in FC switch mode is connected to MDS as the upstream switch, VSANs configured in Cisco UCS Manager in the range from 3040 to 4078 and assigned as port VSANs cannot be created in MDS. This configuration results in a possible port VSAN mismatch.

Guidelines for FCoE VLAN IDs

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 which has an ID that overlaps with an FCoE VLAN ID.

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.

Creating a Named VSAN

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 which has an ID that overlaps with an FCoE VLAN ID.

Procedure

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

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

Step 3 In the **Work** pane, click the **VSANs** tab.

Step 4 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 5 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 has been 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 6 Click **OK**.
Cisco UCS Manager GUI adds the VSAN to one of the following **VSANs** nodes:

- The **SAN Cloud** > **VSANs** node for a storage VSAN accessible to both fabric interconnects.
- The **SAN Cloud** > ***Fabric_Name*** > **VSANs** node for a VSAN accessible to only one fabric interconnect.

Creating a Storage VSAN

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 which has an ID that overlaps with an FCoE VLAN ID.

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **Storage Cloud**.

Step 3 In the **Work** pane, click the **VSANs** tab.

Step 4 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 5 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 has been 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.

Name	Description
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.
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 6 Click **OK**.
Cisco UCS Manager GUI adds the VSAN to one of the following **VSANs** nodes:

- The **Storage Cloud** > **VSANs** node for a storage VSAN accessible to both fabric interconnects.
- The **Storage Cloud** > ***Fabric_Name*** > **VSANs** node for a VSAN accessible to only one fabric interconnect.

Deleting a VSAN

If Cisco UCS Manager includes a named VSAN with the same VSAN ID as the one you delete, the VSAN is not removed from the fabric interconnect configuration until all named VSANs with that ID are deleted.

Procedure

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

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

Step 3 In the **Work** pane, click the **VSANs** tab.

Step 4 Click one of the following subtabs, depending upon what type of VSAN you want to delete:

Subtab	Description
All	Displays all VSANs in the Cisco UCS domain.
Dual Mode	Displays the VSANs that are accessible to both fabric interconnects.
Switch A	Displays the VSANs that are accessible to only fabric interconnect A.
Switch B	Displays the VSANs that are accessible to only fabric interconnect B.

Step 5 In the table, click the VSAN you want to delete.
You can use the Shift key or Ctrl key to select multiple entries.

Step 6 Right-click the highlighted VSAN or VSANs and choose **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Changing the VLAN ID for the FCoE VLAN for a Storage VSAN

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 which has an ID that overlaps with an FCoE VLAN ID.

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **Storage Cloud** > **VSANs**.

Step 3 Choose the VSAN for which you want to modify the FCoE VLAN ID.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **FCoE VLAN** field, enter the desired VLAN ID.

Step 6 Click **Save Changes**.

Enabling Fibre Channel Uplink Trunking

Note If the fabric interconnects are configured for Fibre Channel end-host mode, enabling Fibre Channel uplink trunking renders all VSANs with an ID in the range from 3840 to 4079 non-operational.

Procedure

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

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

Step 3 Click the node for the fabric where you want to enable FC uplink trunking.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Enable FC Uplink Trunking**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Disabling Fibre Channel Uplink Trunking

Procedure

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

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

Step 3 Click the node for the fabric where you want to disable Fibre Channel uplink trunking.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Disable FC Uplink Trunking**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 24

Configuring SAN Pin Groups

This chapter includes the following sections:

SAN Pin Groups

Cisco UCS uses SAN pin groups to pin Fibre Channel traffic from a vHBA on a server to an uplink Fibre Channel port on the fabric interconnect. You can use this pinning to manage the distribution of traffic from the servers.

Note In Fibre Channel switch mode, SAN pin groups are irrelevant. Any existing SAN pin groups will be ignored.

To configure pinning for a server, you must include the SAN pin group in a vHBA policy. The vHBA policy is then included in the service profile assigned to that server. All traffic from the vHBA will travel through the I/O module to the specified uplink Fibre Channel port.

You can assign the same pin group to multiple vHBA policies. As a result, you do not need to manually pin the traffic for each vHBA.

Important Changing the target interface for an existing SAN pin group disrupts traffic for all vHBAs which use that pin group. The fabric interconnect performs a log in and log out for the Fibre Channel protocols to re-pin the traffic.

Creating a SAN Pin Group

In a system with two fabric interconnects, you can associate the pin group with only one fabric interconnect or with both fabric interconnects.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **SAN Cloud**.

Step 3 Right-click **SAN Pin Groups** and select **Create SAN Pin Group**.

Step 4 Enter a unique name and description for the pin group.

Step 5 To pin traffic for fabric interconnect A, do the following in the **Targets** area:

a) Check the **Fabric A** check box.
b) Click the drop-down arrow on the **Interface** field and navigate through the tree-style browser to select the uplink Fibre Channel port you want to associate with the pin group.

Step 6 To pin traffic for fabric interconnect B, do the following in the **Targets** area:

a) Check the **Fabric B** check box.
b) Click the drop-down arrow on the **Interface** field and navigate through the tree-style browser to select the uplink Fibre Channel port you want to associate with the pin group.

Step 7 Click **OK**.

What to Do Next

Include the pin group in a vHBA template.

Deleting a SAN Pin Group

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **SAN Cloud** > **SAN Pin Groups**.

Step 3 Right-click the SAN pin group you want to delete and select **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 25

Configuring WWN Pools

This chapter includes the following sections:

WWN Pools

A World Wide Name (WWN) pool is a collection of WWNs for use by the Fibre Channel vHBAs in a Cisco UCS domain. You create separate pools for the following:

- WW node names assigned to the vHBA
- WW port names assigned to the vHBA
- Both WW node names and WW port names

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

If you use WWN pools in service profiles, you do not have to manually configure the WWNs that will be used by the server associated with the service profile. In a system that implements multi-tenancy, you can use a WWN pool to control the WWNs used by each organization.

You assign WWNs to pools in blocks.

WWNN Pools

A WWNN pool is a WWN pool that contains only WW node names. If you include a pool of WWNNs in a service profile, the associated server is assigned a WWNN from that pool.

WWPN Pools

A WWPN pool is a WWN pool that contains only WW port names. If you include a pool of WWPNs in a service profile, the port on each vHBA of the associated server is assigned a WWPN from that pool.

WWxN Pools

A WWxN pool is a WWN pool that contains both WW node names and WW port names. You can specify how many ports per node are created with WWxN pools. The pool size must be a multiple of *ports-per-node* + 1. For example, if you specify 7 ports per node, the pool size must be a multiple of 8. If you specify 63 ports per node, the pool size must be a multiple of 64.

You can use a WWxN pool whenever you select a WWNN or WWPN pool. The WWxN pool must be created before it can be assigned.

- For WWNN pools, the WWxN pool is displayed as an option in the **WWNN Assignment** drop-down list.
- For WWPN pools, choose **Derived** in the **WWPN Assignment** drop-down list.

Configuring WWNN Pools

Creating a WWNN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools**.

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

Step 4 Right-click **WWNN Pools** and select **Create WWNN Pool**.

Step 5 In the **Define Name and Description** dialog box of the **Create WWNN Pool** wizard, complete the following fields:

Name	Description
Name field	The name of the World Wide Node Name pool. 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 has been saved.

Name	Description
Description field	A description of the pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Assignment Order field	This can be one of the following: • **Default**—Cisco UCS Manager selects a random identity from the pool. • **Sequential**—Cisco UCS Manager selects the lowest available identity from the pool.

Step 6 Click **Next**.

Step 7 In the **Add WWN Blocks** page of the **Create WWNN Pool** wizard, click **Add**.

Step 8 In the **Create WWN Block** dialog box, complete the following fields:

Name	Description
From field	The first WWN in the block.
Size field	The number of WWNs in the block. For WWxN pools, the pool size must be a multiple of *ports-per-node* + 1. For example, if there are 7 ports per node, the pool size must be a multiple of 8. If there are 63 ports per node, the pool size must be a multiple of 64.

Step 9 Click **OK**.

Step 10 Click **Finish**.

What to Do Next

Include the WWNN pool in a service profile and/or template.

Adding a WWN Block to a WWNN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWNN Pools** node.

Step 4 Right-click the WWNN pool to which you want to add a WWN block and select **Create WWN Block**.

Step 5 In the **Create WWN Block** dialog box, complete the following fields:

Name	Description
From field	The first WWN in the block.
Size field	The number of WWNs in the block. For WWxN pools, the pool size must be a multiple of *ports-per-node* + 1. For example, if there are 7 ports per node, the pool size must be a multiple of 8. If there are 63 ports per node, the pool size must be a multiple of 64.

Step 6 Click **OK**.

Deleting a WWN Block from a WWNN Pool

If you delete an address block from a pool, Cisco UCS Manager does not reallocate any addresses in that block that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted block remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** > **WWNN Pools** > ***WWNN_Pool_Name*** .

Step 3 Right-click the WWN block that you want to delete and select **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Adding a WWNN Initiator to a WWNN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWNN Pools** node.

Step 4 Right-click the WWNN pool to which you want to add a WWNN initiator and select **Create WWNN Initiiator**.

Step 5 In the **Create WWNN Initiator** dialog box, complete the following fields:

Name	Description
World Wide Name field	The WWN.
Name field	The name of the WWNN initiator. 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 WWNN initiator. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 6 Click **OK**.

Deleting a WWNN Initiator from a WWNN Pool

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWPN Pools** node.

Step 4 Choose the WWNN pool from which you want to delete a WWNN initiator.

Step 5 In the **Work** pane, click the **Initiators** tab.

Step 6 Right-click the initiator that you want to delete and choose **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a WWNN Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWNN Pools** node.

Step 4 Right-click the WWNN pool you want to delete and select **Delete**.

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

Configuring WWPN Pools

Creating a WWPN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools**.

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

Step 4 Right-click **WWPN Pools** and select **Create WWPN Pool**.

Step 5 In the **Define Name and Description** page of the **Create WWPN Pool** wizard, complete the following fields:

Name	Description
Name field	The name of the World Wide Port Name pool. 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 has been saved.
Description field	A description of the pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Assignment Order field	This can be one of the following: • **Default—**Cisco UCS Manager selects a random identity from the pool. • **Sequential—**Cisco UCS Manager selects the lowest available identity from the pool.

Step 6 Click **Next**.

Step 7 In the **Add WWN Blocks** page of the **Create WWPN Pool** wizard, click **Add**.

Step 8 In the **Create WWN Block** dialog box, complete the following fields:

Name	Description
From field	The first WWN in the block.
Size field	The number of WWNs in the block. For WWxN pools, the pool size must be a multiple of *ports-per-node* + 1. For example, if there are 7 ports per node, the pool size must be a multiple of 8. If there are 63 ports per node, the pool size must be a multiple of 64.

Step 9 Click **OK**.

Step 10 Click **Finish**.

What to Do Next

Include the WWPN pool in a vHBA template.

Adding a WWN Block to a WWPN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWPN Pools** node.

Step 4 Right-click the WWPN pool to which you want to add a WWN block and select **Create WWN Block**.

Step 5 In the **Create WWN Block** dialog box, complete the following fields:

Name	Description
From field	The first WWN in the block.

Name	Description
Size field	The number of WWNs in the block. For WWxN pools, the pool size must be a multiple of *ports-per-node* + 1. For example, if there are 7 ports per node, the pool size must be a multiple of 8. If there are 63 ports per node, the pool size must be a multiple of 64.

Step 6 Click **OK**.

Deleting a WWN Block from a WWPN Pool

If you delete an address block from a pool, Cisco UCS Manager does not reallocate any addresses in that block that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted block remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** > **WWPN Pools** > ***WWPN_Pool_Name*** .

Step 3 Right-click the WWN block that you want to delete and select **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Adding a WWPN Initiator to a WWPN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWPN Pools** node.

Step 4 Right-click the WWPN pool to which you want to add a WWPN initiator and select **Create WWPN Initiator**.

Step 5 In the **Create WWPN Initiator** dialog box, complete the following fields:

Name	Description
World Wide Name field	The WWN.
Name field	The name of the WWPN initiator. 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 WWPN initiator. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 6 If you want to add a SAN boot target, expand the **Boot Target** area and complete the following fields:

Name	Description
Boot Target WWPN field	The WWPN that corresponds to the location of the boot image.
Boot Target LUN field	The LUN that corresponds to the location of the boot image.

Step 7 Click **OK**.

Deleting a WWPN Initiator from a WWPN Pool

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWPN Pools** node.

Step 4 Choose the WWPN pool from which you want to delete a WWPN initiator.

Step 5 In the **Work** pane, click the **Initiators** tab.

Step 6 Right-click the initiator that you want to delete and choose **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a WWPN Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWPN Pools** node.

Step 4 Right-click the WWPN pool you want to delete and select **Delete**.

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

Configuring WWxN Pools

Creating a WWxN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools**.

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

Step 4 Right-click **WWxN Pools** and select **Create WWxN Pool**.

Step 5 In the **Define Name and Description** page of the **Create WWxN Pool** wizard, complete the following fields:

Name	Description
Name field	The name of the World Wide Port Name pool. 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 has been saved.
Description field	A description of the pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Max Ports per Node field	The maximum number of ports that can be assigned to each node name in this pool. You cannot change this value once the object has been saved.
Assignment Order field	This can be one of the following: • **Default—**Cisco UCS Manager selects a random identity from the pool. • **Sequential—**Cisco UCS Manager selects the lowest available identity from the pool.

Step 6 Click **Next**.

Step 7 In the **Add WWN Blocks** page of the **Create WWxN Pool** wizard, click **Add**.

Step 8 In the **Create WWN Block** dialog box, complete the following fields:

Name	Description
From field	The first WWN in the block.
Size field	The number of WWNs in the block. For WWxN pools, the pool size must be a multiple of *ports-per-node* + 1. For example, if there are 7 ports per node, the pool size must be a multiple of 8. If there are 63 ports per node, the pool size must be a multiple of 64.

Step 9 Click **OK**.

Step 10 Click **Finish**.

What to Do Next

Include the WWxN pool in a service profile and/or template.

Adding a WWN Block to a WWxN Pool

Important A WWN pool can include only WWNNs or WWPNs in the ranges from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. All other WWN ranges are reserved. To ensure the uniqueness of the Cisco UCS WWNNs and WWPNs in the SAN fabric, we recommend that you use the following WWN prefix for all blocks in a pool: 20:00:00:25:B5:XX:XX:XX

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWxN Pools** node.

Step 4 Right-click the WWxN pool to which you want to add a WWN block and select **Create WWN Block**.

Step 5 In the **Create WWN Block** dialog box, complete the following fields:

Name	Description
From field	The first WWN in the block.

Name	Description
Size field	The number of WWNs in the block. For WWxN pools, the pool size must be a multiple of *ports-per-node* + 1. For example, if there are 7 ports per node, the pool size must be a multiple of 8. If there are 63 ports per node, the pool size must be a multiple of 64.

Step 6 Click **OK**.

Deleting a WWN Block from a WWxN Pool

If you delete an address block from a pool, Cisco UCS Manager does not reallocate any addresses in that block that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted block remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** > **WWxN Pools** > ***WWxN_Pool_Name*** .

Step 3 Right-click the WWN block that you want to delete and select **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a WWxN Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **SAN** tab, expand **SAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **WWxN Pools** node.

Step 4 Right-click the WWxN pool you want to delete and select **Delete**.

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

CHAPTER 26

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 must 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
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.
WWPN Pool drop-down list	The WWPN pool that a vHBA created from this template uses to derive its WWPN address.
QoS Policy drop-down list	The QoS policy that is associated with vHBAs created from this template.

Name	Description
Pin Group drop-down list	The SAN 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.

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**.

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**.

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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Owner field	This can be one of the following: • **Local—**This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global—**Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global—**This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

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.

Name	Description
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.
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.

Name	Description
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.
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.

Name	Description
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.
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.

Name	Description
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.
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**.

Configuring the Default vHBA Behavior Policy

Default vHBA Behavior Policy

Default vHBA behavior policy allow you to configure how vHBAs are created for a service profile. You can choose to create vHBAs manually, or you can allow them to be created automatically.

You can configure the default vHBA behavior policy to define how vHBAs are created. This can be one of the following:

- **None**—Cisco UCS Manager does not create default vHBAs for a service profile. All vHBAs must be explicitly created.
- **HW Inherit**—If a service profile requires vHBAs and none have been explicitly defined, Cisco UCS Manager creates the required vHBAs based on the adapter installed in the server associated with the service profile.

Note If you do not specify a default behavior policy for vHBAs, **none** is used by default.

Configuring a Default vHBA Behavior 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 **root** node.
You can configure only the default vHBA behavior policy in the root organization. You cannot configure the default vHBA behavior policy in a sub-organization.

Step 4 Click **Default vHBA Behavior**.

Step 5 On the **General Tab**, in the **Properties** area, click one of the following radio buttons in the **Action** field:

- **None**—Cisco UCS Manager does not create default vHBAs for a service profile. All vHBAs must be explicitly created.
- **HW Inherit**—If a service profile requires vHBAs and none have been explicitly defined, Cisco UCS Manager creates the required vHBAs based on the adapter installed in the server associated with the service profile.

Step 6 Click **Save Changes**.

Configuring SAN Connectivity Policies

LAN and SAN Connectivity Policies

Connectivity policies determine the connections and the network communication resources between the server and the LAN or SAN on the network. These policies use pools to assign MAC addresses, WWNs, and WWPNs to servers and to identify the vNICs and vHBAs that the servers use to communicate with the network.

Note We do not recommend that you use static IDs in connectivity policies, because these policies are included in service profiles and service profile templates and can be used to configure multiple servers.

Privileges Required for LAN and SAN Connectivity Policies

Connectivity policies enable users without network or storage privileges to create and modify service profiles and service profile templates with network and storage connections. However, users must have the appropriate network and storage privileges to create connectivity policies.

Privileges Required to Create Connectivity Policies

Connectivity policies require the same privileges as other network and storage configurations. For example, you must have at least one of the following privileges to create connectivity policies:

- admin—Can create LAN and SAN connectivity policies
- ls-server—Can create LAN and SAN connectivity policies
- ls-network—Can create LAN connectivity policies
- ls-storage—Can create SAN connectivity policies

Privileges Required to Add Connectivity Policies to Service Profiles

After the connectivity policies have been created, a user with ls-compute privileges can include them in a service profile or service profile template. However, a user with only ls-compute privileges cannot create connectivity policies.

Interactions between Service Profiles and Connectivity Policies

You can configure the LAN and SAN connectivity for a service profile through either of the following methods:

- LAN and SAN connectivity policies that are referenced in the service profile
- Local vNICs and vHBAs that are created in the service profile
- Local vNICs and a SAN connectivity policy
- Local vHBAs and a LAN connectivity policy

Cisco UCS maintains mutual exclusivity between connectivity policies and local vNIC and vHBA configuration in the service profile. You cannot have a combination of connectivity policies and locally created vNICs or vHBAs. When you include a LAN connectivity policy in a service profile, all existing vNIC configuration is erased, and when you include a SAN connectivity policy, all existing vHBA configuration in that service profile is erased.

Creating a SAN Connectivity 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 **SAN Connectivity Policies** and choose **Create SAN Connectivity Policy**.

Step 5 In the **Create SAN Connectivity Policy** dialog box, 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Owner field	This can be one of the following: • **Local—**This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global—**Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global—**This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

Step 6 From the **WWNN Assignment** drop-down list in the **World Wide Node Name** area, choose one of the following:

- Choose **Select (pool default used by default)** to use the default WWN pool.
- Choose one of the options listed under **Manual Using OUI** and then enter the WWN in the **World Wide Node Name** field.

  You can specify a WWNN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. You can click the **here** link to verify that the WWNN you specified is available.
- Choose a WWN pool name from the list to have a WWN assigned from the specified pool. Each pool name is followed by two numbers in parentheses that show the number of WWNs still available in the pool and the total number of WWNs in the pool.

Step 7 In the **vHBAs** table, click + on the table icon bar and complete the following fields in the **Create vHBA** dialog box:

a) Complete the following fields to specify the identity information for the vHBA:

Name	Description
Name field	The name of this vHBA. 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.
Use vHBA Template check box	Check this check box if you want to use a template to create the vHBA. The Cisco UCS Manager GUI displays the **vHBA Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vHBA templates exist in the system.
Create vHBA Template link	Click this link if you want to create a vHBA template.

Name	Description
WWPN Assignment drop-down list	How Cisco UCS assigns the World Wide Port Node to the vHBA. If you want Cisco UCS to: • Use the default WWPN pool, leave this field set to **Select (pool default used by default)**. • Use the WWPN assigned to the server by the manufacturer, select **Derived**. • Use a specific WWPN, select **20:00:00:25:B5:00:00:00**, **20:XX:XX:XX:XX:XX:XX:XX**, or **5X:XX:XX:XX:XX:XX:XX:XX** and enter the WWPN in the **WWPN** field. If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template **20:00:00:25:B5:XX:XX:XX**. • Use a WWPN from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available addresses in the pool and the second is the total number of addresses in the pool. If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.
Create WWPN Pool link	Click this link if you want to create a new WWPN pool that will be available to all objects in the Cisco UCS domain.
WWPN field	The manually-assigned WWPN if the **WWPN Assignment** drop-down list is set to one of the manual templates. You can specify a WWPN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. To make sure the WWPN is available, click the corresponding link.

b) In the **VSAN** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component.
Select VSAN drop-down list box	The VSAN with which this vHBA is associated.
Create VSAN link	Click this link if you want to create a VSAN.
Pin Group drop-down list box	The SAN pin group with which this vHBA is associated.

Name	Description
Create SAN Pin Group link	Click this link if you want to create a pin group.
Persistent Binding field	This can be one of the following: - **Disabled** - **Enabled**
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.
Operational Parameters Section	
Stats Threshold Policy drop-down list box	The statistics threshold policy with which this vHBA is associated.

c) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list box	The Fibre Channel adapter policy with which this vHBA is associated.
Create Fibre Channel Adapter Policy link	Click this link if you want to create a Fibre Channel adapter policy.
QoS drop-down list box	The quality of service policy with which this vHBA is associated.
Create QoS Policy link	Click this link if you want to create a QoS policy.

d) Click **OK**.

Step 8 After you have created all the vHBAs you need for the policy, click **OK**.

What to Do Next

Include the policy in a service profile or service profile template.

Creating a vHBA for a SAN Connectivity 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 Choose the policy for which you want to create a vHBA.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the table icon bar, click the **+** button.

Step 6 In the **Create vHBA** dialog box, do the following:

a) Complete the following fields to specify the identity information for the vHBA:

Name	Description
Name field	The name of this vHBA. 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.
Use vHBA Template check box	Check this check box if you want to use a template to create the vHBA. The Cisco UCS Manager GUI displays the **vHBA Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vHBA templates exist in the system.
Create vHBA Template link	Click this link if you want to create a vHBA template.

Name	Description
WWPN Assignment drop-down list	How Cisco UCS assigns the World Wide Port Node to the vHBA. If you want Cisco UCS to: • Use the default WWPN pool, leave this field set to **Select (pool default used by default)**. • Use the WWPN assigned to the server by the manufacturer, select **Derived**. • Use a specific WWPN, select **20:00:00:25:B5:00:00:00**, **20:XX:XX:XX:XX:XX:XX:XX**, or **5X:XX:XX:XX:XX:XX:XX:XX** and enter the WWPN in the **WWPN** field. If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template **20:00:00:25:B5:XX:XX:XX**. • Use a WWPN from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available addresses in the pool and the second is the total number of addresses in the pool. If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.
Create WWPN Pool link	Click this link if you want to create a new WWPN pool that will be available to all objects in the Cisco UCS domain.
WWPN field	The manually-assigned WWPN if the **WWPN Assignment** drop-down list is set to one of the manual templates. You can specify a WWPN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. To make sure the WWPN is available, click the corresponding link.

b) In the **VSAN** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component.
Select VSAN drop-down list box	The VSAN with which this vHBA is associated.
Create VSAN link	Click this link if you want to create a VSAN.
Pin Group drop-down list box	The SAN pin group with which this vHBA is associated.

Name	Description
Create SAN Pin Group link	Click this link if you want to create a pin group.
Persistent Binding field	This can be one of the following: • **Disabled** • **Enabled**
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.
Operational Parameters Section	
Stats Threshold Policy drop-down list box	The statistics threshold policy with which this vHBA is associated.

c) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list box	The Fibre Channel adapter policy with which this vHBA is associated.
Create Fibre Channel Adapter Policy link	Click this link if you want to create a Fibre Channel adapter policy.
QoS drop-down list box	The quality of service policy with which this vHBA is associated.
Create QoS Policy link	Click this link if you want to create a QoS policy.

d) Click **OK**.

Step 7 Click **Save Changes**.

Deleting a vHBA from a SAN Connectivity 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 Choose the policy from which you want to delete the vHBA.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **vHBAs** table, do the following:

a) Click the vHBA that you want to delete.

b) On the icon bar, click **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Creating an Initiator Group for a SAN Connectivity 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 Choose the policy for which you want to create an initiator group.

Step 4 In the **Work** pane, click the **vHBA Initiator Groups** tab.

Step 5 In the table icon bar, click the **+** button.

Step 6 In the **Create vHBA Initiator Group** dialog box, complete the following fields:

Name	Description
Name field	The name of the vHBA initiator group. 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 group. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Select vHBA Initiators table	Check the check box in the **Select** column for each vHBA that you want to use.

Name	Description
Storage Connection Policy drop-down list	The storage connection policy associated with this vHBA initiator group. If you want to: • Use an existing storage connection policy, then choose that policy from the drop-down list. The Cisco UCS Manager GUI displays information about the policy and its FC target endpoints in the **Global Storage Connection Policy** area. Create a new storage connection policy that will be globally available, then click the **Create Storage Connection Policy** link. • Create a local storage connection policy that is available only to this vHBA initiator group, then choose the **Specific Storage Connection Policy** option. The Cisco UCS Manager GUI displays the **Specific Storage Connection Policy** area that allows you to configure the local storage connection policy.
Create Storage Connection Policy link	Click this link to create a new storage connection policy that will be available to all service profiles and service profile templates.

Step 7 Click **OK**.

Deleting an Initiator Group from a SAN Connectivity 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 Choose the policy from which you want to delete the initiator group

Step 4 In the **Work** pane, click the **vHBA Initiator Groups** tab.

Step 5 In the table, do the following:

a) Click the initiator group that you want to delete.
b) On the icon bar, click **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a SAN Connectivity Policy

If you delete a SAN connectivity policy that is included in a service profile, you will delete all vHBAs from that service profile and disrupt SAN data traffic for the server associated with the service profile.

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 **SAN Connectivity Policies** node.

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

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

CHAPTER 27

Configuring Fibre Channel Zoning

This chapter includes the following sections:

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.
- 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:

- No 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 underneath 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 in Cisco UCS

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.
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.

	Command or Action	Purpose
		See Configuring Fibre Channel Switching Mode, on page 57.
Step 4	Configure the Fibre Channel and FCoE storage ports that you require to carry traffic for the Fibre Channel zones.	See Configuring Ports and Port Channels, on page 61.
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 355.
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 Fibre Channel Storage Connection Policy, on page 358.
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. • Configure one or more vHBA initiator groups. See Configuring Service Profiles.

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 which has an ID that overlaps with an FCoE VLAN ID.

Procedure

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

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 see all 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 has been 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.

Name	Description
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.
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**.

Configuring Fibre Channel Storage Connection Policies

Creating a Fibre Channel Storage Connection 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 **Storage Connection Policies** node and choose **Create Storage Connection Policy**.

Step 5 In the **Create Storage Connection Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 6 In the **Zoning Type** field, click one of the following radio buttons:

- **None**—Cisco UCS Manager does not configure Fibre Channel 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.

Step 7 In the **FC Target Endpoints** table, click + on the icon bar to the right of the table.

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

Step 8 In the **Create FC Target Endpoint** dialog box, complete the following fields and then click **OK**:

Name	Description
WWPN field	The WWPN (WWN) assigned to the physical target port on the Fibre Channel or FCoE storage array that the server uses to access the LUNs configured on the storage array.
Description field	A description of the target endpoint. We recommend that you include information about the port, LUNs, or storage array to which the target endpoint connects. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Path field	The fabric interconnect used for communications with the target endpoint.
Select VSAN drop-down list	The VSAN used for communications with the target endpoint.
Create VSAN link	Click this link if you want to create a VSAN.

Repeat this step until you have created all desired target endpoints for the policy.

Step 9 After you have created all desired target endpoints for the policy, click **OK**.

Deleting a Fibre Channel Storage Connection 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 **Storage Connection Policies** node.

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

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

CHAPTER 28

Configuring FlexFlash SD Card Support

This chapter includes the following sections:

FlexFlash Secure Digital Card Support

Overview

FlexFlash is the Secure Digital (SD)-based local flash storage support Cisco has introduced in its newer Cisco UCS blade and rack servers. The FlexFlash controller has two SD card slots, only one of which can be used at a time. If both slots are populated, both cards should be the same size, but only the card in slot 1 will be usable.

Note The only supported SD card size is 16GB.

Important Cisco UCS Manager does not support the use of an SD card from a rack server in a blade server, or the use of an SD card from a blade server in a rack server. Switching SD cards from one server type to the other might result in data loss from the SD card.

FlexFlash in Supported B-Series and C-Series Servers

The FlexFlash SD cards shipped with supported B-series servers only have an HV partition. Those shipped with supported C-series rack servers have four partitions; HV, HUU, SCU, and Drivers. When the FlexFlash controller is enabled for either a B-series or C-series server, Cisco UCS Manager will show only the HV partition, as a USB drive, to both the BIOS and the host operating system.

In order to manually boot from the HV partition, Local Disk should be present in the boot policy used in the Service Profile, and be launched from the BIOS boot menu (F6).

FlexFlash in Disk Policies and Service Profiles

FlexFlash is disabled by default in Cisco UCS servers. It can be enabled in a local disk policy used in a service profile. When FlexFlash is enabled in a local disk policy, and a server is capable of supporting SD cards, the FlexFlash controller will be enabled during service profile deployment. If a server is not capable of supporting SD cards or has an older CIMC version, the service profile association will fail.

If you disable the FlexFlash option in a supported server, a host reboot will be triggered and a reboot warning message displayed. The FlexFlash controller will also be disabled as part of a related service profile disassociation.

Limitations Related to FlexFlash

The following are the known limitations related to FlexFlash SD cards in this release of Cisco UCS Manager:

- If FlexFlash is enabled and the boot policy contains Local Disk, SAN Boot, or iSCSI Boot, then the boot order cannot be determined. You should disable FlexFlash before using any of these boot options, and enable it after bootup is complete.
- Cisco UCS hardware information and inventory data about the controller and SD cards is not collected.
- Monitoring of the controller and SD card status or health is not supported. In the case of a failure of a FlexFlash controller or SD card, no faults or errors will be displayed in Cisco UCS Manager.
- Formatting of the SD cards is not supported.
- Booting from SD cards using the Cisco UCS Manager Boot Policy is not supported.
- After you update and activate the CIMC firmware, you must power cycle the server to update the FlexFlash controller firmware.

Enabling FlexFlash SD Card Support

This procedure describes how to enable the FlexFlash SD card support in a local disk policy.

Procedure

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

Step 2 Select **Policies** from the **Filter** dropdown list.

Step 3 Expand the **Local Disk Config Policies** tree.

Step 4 Highlight the policy for which you want to enable FlexFlash.

Step 5 Click the **Events** tab of the task pane, select the **Enable** radio button next to **FlexFlash State**.

Step 6 Click **Save Changes**.

PART V

Server Configuration

CHAPTER 29

Configuring Server-Related Pools

This chapter includes the following sections:

Configuring Server Pools

Server Pools

A server pool contains a set of servers. These servers typically share the same characteristics. Those characteristics can be their location in the chassis, or an attribute such as server type, amount of memory, local storage, type of CPU, or local drive configuration. You can manually assign a server to a server pool, or use server pool policies and server pool policy qualifications to automate the assignment.

If your system implements multitenancy through organizations, you can designate one or more server pools to be used by a specific organization. For example, a pool that includes all servers with two CPUs could be assigned to the Marketing organization, while all servers with 64 GB memory could be assigned to the Finance organization.

A server pool can include servers from any chassis in the system. A given server can belong to multiple server pools.

Creating a Server Pool

Procedure

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

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

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

Step 4 Right-click the **Server Pools** node and select **Create Server Pool**.

Step 5 On the **Set Name and Description** page of the **Create Server Pool** wizard, complete the following fields:

Name	Description
Name field	The name of the server pool. 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 has been saved.
Description field	A user-defined description of the server pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 6 Click **Next**.

Step 7 On the **Add Servers** page of the **Create Server Pool** wizard:

a) Select one or more servers from the **Available Servers** table.

b) Click the **>>** button to add the servers to the server pool.

c) When you have added all desired servers to the pool, click **Finish**.

Deleting a Server Pool

Procedure

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

Step 2 On the **Servers** tab, expand **Servers** > **Pools** > ***Organization_Name***.

Step 3 Expand the **Server Pools** node.

Step 4 Right-click the pool you want to delete and select **Delete**.

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

Adding Servers to a Server Pool

Procedure

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

Step 2 On the **Servers** tab, expand **Servers** > **Pools** > ***Organization_Name***.

Step 3 Right-click the pool to which you want to add one or more servers and select **Add Servers to Server Pool**.

Step 4 In the **Add Servers to Server Pool** dialog box, do the following:

a) In the **Servers** table, select the servers that you want to add to the server pool.
You can use the Shift key or Ctrl key to select multiple entries.

b) Click the **>>** button to move those servers to the **Pooled Servers** table and add them to the server pool.

c) Click **OK**.

Removing Servers from a Server Pool

Procedure

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

Step 2 On the **Servers** tab, expand **Servers** > **Pools** > ***Organization_Name***.

Step 3 Right-click the pool from which you want to remove one or more servers and select **Add Servers to Server Pool**.

Step 4 In the **Add Servers to Server Pool** dialog box, do the following:

a) In the **Pooled Servers** table, select the servers that you want to remove from the server pool.
You can use the Shift key or Ctrl key to select multiple entries.

b) Click the **<<** button to move those servers to the **Servers** table and remove them from the server pool.

c) Click **OK**.

Configuring UUID Suffix Pools

UUID Suffix Pools

A UUID suffix pool is a collection of SMBIOS UUIDs that are available to be assigned to servers. The first number of digits that constitute the prefix of the UUID are fixed. The remaining digits, the UUID suffix, are variable. A UUID suffix pool ensures that these variable values are unique for each server associated with a service profile which uses that particular pool to avoid conflicts.

If you use UUID suffix pools in service profiles, you do not have to manually configure the UUID of the server associated with the service profile.

Creating a UUID Suffix Pool

Procedure

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

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

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

Step 4 Right-click **UUID Suffix Pools** and select **Create UUID Suffix Pool**.

Step 5 In the **Define Name and Description** page of the **Create UUID Suffix Pool** wizard, complete the following fields:

Name	Description
Name field	The name of the UUID pool. 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 has been saved.
Description field	The user-defined description of the pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Prefix field	This can be one of the following: • **Derived—**The system creates the suffix. • **other—**You specify the desired suffix. If you select this option, Cisco UCS Manager GUI displays a text field where you can enter the desired suffix, in the format *XXXXXXXX-XXXX-XXXX*.
Assignment Order field	This can be one of the following: • **Default—**Cisco UCS Manager selects a random identity from the pool. • **Sequential—**Cisco UCS Manager selects the lowest available identity from the pool.

Step 6 Click **Next**.

Step 7 In the **Add UUID Blocks** page of the **Create UUID Suffix Pool** wizard, click **Add**.

Step 8 In the **Create a Block of UUID Suffixes** dialog box, complete the following fields:

Name	Description
From field	The first UUID in the block.
Size field	The number of UUIDs in the block.

Step 9 Click **OK**.

Step 10 Click **Finish** to complete the wizard.

What to Do Next

Include the UUID suffix pool in a service profile and/or template.

Deleting a UUID Suffix Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 On the **Servers** tab, expand **Servers** > **Pools** > ***Organization_Name***.

Step 3 Expand the **UUID Suffix Pools** node.

Step 4 Right-click the pool you want to delete and select **Delete**.

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

Configuring IP Pools

IP Pools

IP pools are a collection of IP addresses that do not have a default purpose. You can create IP pools in Cisco UCS Manager to do the following:

- Replace the default iSCSI boot IP pool **iscsi-initiator-pool**. Cisco UCS Manager reserves each block of IP addresses in the IP pool that you specify.

- Replace the default management IP pool **ext-mgmt** for servers that have an associated service profile. Cisco UCS Manager reserves each block of IP addresses in the IP pool for external access that terminates in the Cisco Integrated Management Controller (CIMC) on a server. If there is no associated service profile, you must use the **ext-mgmt** IP pool for the CIMC to get an IP address.
- Replace both the management IP address and iSCSI boot IP addresses.

Note The IP pool must not contain any IP addresses that have been assigned as static IP addresses for a server or service profile.

Creating an IP Pool

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > ***Organization_Name*** .

Step 3 Right-click **IP Pools** and select **Create IP Pool**.

Step 4 In the **Define Name and Description** page of the **Create IP Pool** wizard, fill in the following fields:

Name	Description
Name field	The name of the IP address pool. 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 has been saved.
Description field	The user-defined description of the IP address pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Assignment Order field	This can be one of the following: • **Default—**Cisco UCS Manager selects a random identity from the pool. • **Sequential—**Cisco UCS Manager selects the lowest available identity from the pool.

Step 5 Click **Next**.

Step 6 In the **Add IP Blocks** page of the **Create IP Pool** wizard, click **Add**.

Step 7 In the **Create a Block of IP Addresses** dialog box, fill in the following fields:

Name	Description
From field	The first IP address in the block.
Size field	The number of IP addresses in the pool.
Subnet Mask field	The subnet mask associated with the IP addresses in the block.
Default Gateway field	The default gateway associated with the IP addresses in the block.
Primary DNS field	The primary DNS server that this block of IP addresses should access.
Secondary DNS field	The secondary DNS server that this block of IP addresses should access.

Step 8 Click **OK**.

Step 9 Click **Finish** to complete the wizard.

What to Do Next

Include the IP pool in a service profile and/or template.

Adding a Block to an IP Pool

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **IP Pools** node.

Step 4 Right-click the desired IP pool and select **Create Block of IP Addresses**.

Step 5 In the **Create a Block of IP Addresses** dialog box, complete the following fields:

Name	Description
From field	The first IP address in the block.
Size field	The number of IP addresses in the pool.
Subnet Mask field	The subnet mask associated with the IP addresses in the block.
Default Gateway field	The default gateway associated with the IP addresses in the block.
Primary DNS field	The primary DNS server that this block of IP addresses should access.
Secondary DNS field	The secondary DNS server that this block of IP addresses should access.

Step 6 Click **OK**.

Deleting a Block from an IP Pool

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > **Root** .

Step 3 Expand the **IP Pools** node.

Step 4 Expand the pool for which you want to delete a block of IP addresses.

Step 5 Right-click the IP address block that you want to delete and select **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting an IP Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **IP Pools** node.

Step 4 Right-click the IP pool you want to delete and select **Delete**.

Note You cannot delete the default pools **ext-mgmt** and **iscsi-initiator-pool**.

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

CHAPTER 30

Setting the Management IP Address

This chapter includes the following sections:

Management IP Address

Each server in a Cisco UCS domain must have a management IP address assigned to its Cisco Integrated Management Controller (CIMC) or to the service profile associated with the server. Cisco UCS Manager uses this IP address for external access that terminates in the CIMC. This external access can be through one of the following:

- KVM console
- Serial over LAN
- An IPMI tool

The management IP address used to access the CIMC on a server can be one of the following:

- A static IPv4 address assigned directly to the server.
- A static IPv4 address assigned to a service profile. You cannot configure a service profile template with a static IP address.
- An IP address drawn from the management IP address pool and assigned to a service profile or service profile template.

You can assign a management IP address to each CIMC on the server and to the service profile associated with the server. If you do so, you must use different IP addresses for each of them.

Note You cannot assign a static IP address to a server or service profile if that IP address has already been assigned to a server or service profile in the Cisco UCS domain. If you attempt to do so, Cisco UCS Manager warns you that the IP address is already in use and rejects the configuration.

A management IP address that is assigned to a service profile moves with the service profile. If a KVM or SoL session is active when you migrate the service profile to another server, Cisco UCS Manager terminates that session and does not restart it after the migration is completed. You configure this IP address when you create or modify a service profile.

Configuring the Management IP Address on a Blade Server

Configuring a Blade Server to Use a Static IP Address

If this action is greyed out, the server has already been assigned a static IP address.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to configure an IP address.

Step 4 In the **Work** pane, click the **Inventory** tab.

Step 5 Click the **CIMC** subtab.

Step 6 In the **Actions** area, click **Modify Static Management IP**.

Step 7 In the **Modify Static Management IP** dialog box, complete the following fields:

Field	Description
IP Address	The static IPv4 address to be assigned to the server.
Subnet Mask	The subnet mask for the IP address.
Default Gateway	The default gateway that the IP address should use.

Step 8 Click **OK**.

Configuring a Blade Server to Use the Management IP Pool

If this action is greyed out, the server is already configured to use the management IP pool.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server that you want to configure to use the management IP pool.

Step 4 In the **Work** pane, click the **Inventory** tab.

Step 5 Click the **CIMC** subtab.

Step 6 In the **Actions** area, click **Use Pooled Management IP**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **OK**.

Configuring the Management IP Address on a Rack Server

Configuring a Rack Server to Use a Static IP Address

If this action is greyed out, the server has already been assigned a static IP address.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server for which you want to configure an IP address.

Step 4 In the **Work** pane, click the **Inventory** tab.

Step 5 Click the **CIMC** subtab.

Step 6 In the **Actions** area, click **Modify Static Management IP**.

Step 7 In the **Modify Static Management IP** dialog box, complete the following fields:

Field	Description
IP Address	The static IPv4 address to be assigned to the server.
Subnet Mask	The subnet mask for the IP address.
Default Gateway	The default gateway that the IP address should use.

Step 8 Click **OK**.

Configuring a Rack Server to Use the Management IP Pool

If this action is greyed out, the server is already configured to use the management IP pool.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server that you want to configure to use the management IP pool.

Step 4 In the **Work** pane, click the **Inventory** tab.

Step 5 Click the **CIMC** subtab.

Step 6 In the **Actions** area, click **Use Pooled Management IP**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **OK**.

Setting the Management IP Address on a 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 contains the service profile for which you want to set the management IP address.
If the system does not include multitenancy, expand the **root** node.

Step 4 Click the service profile for which you want to set the management IP address.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Change Management IP Address**.

Step 7 In the **Change Management IP Address** dialog box, select one of the following:

- **None**—No management IP address is assigned to the server through the service profile. The management IP address is based on the CIMC management IP address defined on the server.
- **Static**—The service profile assigns a static management IP address to the associated server. If the service profile is migrated to a new server, the management IPv4 address moves with the service profile.

  Cisco UCS Manager GUI displays the **Static IP Address** area that lets you define the static IP address.
- ***IP-pool-name***—The service profile assigns a management IP address from the selected IP pool to the associated server.

  Click **Create IP Pool** to create a global pool of IP addresses that can be used by all service profiles and service profile templates.

Step 8 If you selected **Static**, complete the following fields:

Name	Description
IP Address field	The management IP address assigned to the server through the service profile.
Subnet Mask field	The subnet mask for the management IP address.
Default Gateway field	The default gateway for the management IP address.

Step 9 Click **Save Changes**.

Setting the Management IP Address on a Service Profile Template

Procedure

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

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

Step 3 Expand the node for the organization that contains the service profile template for which you want to set the management IP address.
If the system does not include multitenancy, expand the **root** node.

Step 4 Click the service profile template for which you want to set the management IP address.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 Expand the **Management IP Address** area.

Step 7 In the **Management IP Address Policy** field, click one of the following radio buttons:

- **None—**No management IP address is assigned to the server through the service profile. The management IP address is based on the CIMC management IP address defined on the server.
- **Pooled—**The service profile assigns a management IP address from the pool shown in **Pool Name** to the associated server. If the service profile is migrated to a new server, the management IP address moves with the service profile.

Step 8 Click **Save Changes**.

Configuring the Management IP Pool

Management IP Pool

The default management IP pool **ext-mgmt** is a collection of external IP addresses. Cisco UCS Manager reserves each block of IP addresses in the management IP pool for external access that terminates in the CIMC on a server.

You can configure service profiles and service profile templates to use IP addresses from the management IP pool. You cannot configure servers to use the management IP pool.

All IP addresses in the management IP pool must be in the same IPv4 subnet, or have the same IPv6 network prefix as the IP address of the fabric interconnect.

Note The management IP pool must not contain any IP addresses that have been assigned as static IP addresses for a server or service profile.

Creating an IP Address Block in the Management IP Pool

The management IP pool must not contain any IP addresses that have been assigned as static IP addresses for a server or service profile.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **IP Pools** node.

Step 4 Right-click **IP Pool ext-mgmt** and select **Create Block of IP Addresses**.

Step 5 In the **Create a Block of IP Addresses** dialog box, complete the following fields:

Name	Description
From field	The first IP address in the block.
Size field	The number of IP addresses in the pool.
Subnet Mask field	The subnet mask associated with the IP addresses in the block.
Default Gateway field	The default gateway associated with the IP addresses in the block.
Primary DNS field	The primary DNS server that this block of IP addresses should access.
Secondary DNS field	The secondary DNS server that this block of IP addresses should access.

Step 6 Click **OK**.

What to Do Next

Configure one or more service profiles or service profile templates to obtain the CIMC IP address from the management IP pool.

Deleting an IP Address Block from the Management IP Pool

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools** > ***Organization_Name*** .

Step 3 Expand the **IP Pools** node.

Step 4 Select **IP Pool ext-mgmt**.

Step 5 Right-click the IP address block that you want to delete and select **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 31

Configuring Server-Related Policies

This chapter includes the following sections:

Configuring BIOS Settings

Server BIOS Settings

Cisco UCS provides two methods for making global modifications to the BIOS settings on servers in an Cisco UCS domain. You can create one or more BIOS policies that include a specific grouping of BIOS settings that match the needs of a server or set of servers, or you can use the default BIOS settings for a specific server platform.

Both the BIOS policy and the default BIOS settings for a server platform enable you to fine tune the BIOS settings for a server managed by Cisco UCS Manager.

Depending upon the needs of the data center, you can configure BIOS policies for some service profiles and use the BIOS defaults in other service profiles in the same Cisco UCS domain, or you can use only one of them. You can also use Cisco UCS Manager to view the actual BIOS settings on a server and determine whether they are meeting current needs.

Note Cisco UCS Manager pushes BIOS configuration changes through a BIOS policy or default BIOS settings to the Cisco Integrated Management Controller (CIMC) buffer. These changes remain in the buffer and do not take effect until the server is rebooted.

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

Main BIOS Settings

The following table lists the main server BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Reboot on BIOS Settings Change	When the server is rebooted after you change one or more BIOS settings. If you enable this setting, the server is rebooted according to the maintenance policy in the server's service profile. For example, if the maintenance policy requires user acknowledgment, the server is not rebooted and the BIOS changes are not applied until a user acknowledges the pending activity. If you do not enable this setting, the BIOS changes are not applied until the next time the server is rebooted, whether as a result of another server configuration change or a manual reboot.
Quiet Boot	What the BIOS displays during Power On Self-Test (POST). This can be one of the following: • **disabled—**The BIOS displays all messages and Option ROM information during boot. • **enabled—**The BIOS displays the logo screen, but does not display any messages or Option ROM information during boot. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Post Error Pause	What happens when the server encounters a critical error during POST. This can be one of the following: • **disabled**—The BIOS continues to attempt to boot the server. • **enabled**—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Resume Ac On Power Loss	How the server behaves when power is restored after an unexpected power loss. This can be one of the following: • **stay-off**—The server remains off until manually powered on. • **last-state**—The server is powered on and the system attempts to restore its last state. • **reset**—The server is powered on and automatically reset. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Front Panel Lockout	Whether the power and reset buttons on the front panel are ignored by the server. This can be one of the following: • **disabled**—The power and reset buttons on the front panel are active and can be used to affect the server. • **enabled**—The power and reset buttons are locked out. The server can only be reset or powered on or off from the CIMC GUI. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Processor BIOS Settings

The following table lists the processor BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Turbo Boost	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: • **disabled—**The processor does not increase its frequency automatically. • **enabled—**The processor uses Turbo Boost Technology if required. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Enhanced Intel Speedstep	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **disabled—**The processor never dynamically adjusts its voltage or frequency. • **enabled—**The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. We recommend that you contact your operating system vendor to make sure your operating system supports this feature.
Hyper Threading	Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **disabled—**The processor does not permit hyperthreading. • **enabled—**The processor allows for the parallel execution of multiple threads. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
Core Multi Processing	Sets the state of logical processor cores per CPU in a package. If you disable this setting, Intel Hyper Threading technology is also disabled. This can be one of the following: • **all—**Enables multiprocessing on all logical processor cores. • **1** through ***n*—**Specifies the number of logical processor cores per CPU that can run on the server. To disable multiprocessing and have only one logical processor core per CPU running on the server, choose 1. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. We recommend that you contact your operating system vendor to make sure your operating system supports this feature.
Execute Disabled Bit	Classifies memory areas on the server to specify where the application code can execute. As a result of this classification, the processor disables code execution if a malicious worm attempts to insert code in the buffer. This setting helps to prevent damage, worm propagation, and certain classes of malicious buffer overflow attacks. This can be one of the following: • **disabled—**The processor does not classify memory areas. • **enabled—**The processor classifies memory areas. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. We recommend that you contact your operating system vendor to make sure your operating system supports this feature.
Virtualization Technology (VT)	Whether the processor uses Intel Virtualization Technology, which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **disabled—**The processor does not permit virtualization. • **enabled—**The processor allows multiple operating systems in independent partitions. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** If you change this option, you must power cycle the server before the setting takes effect.

Name	Description
Hardware Pre-fetcher	Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following: • **Disabled—**The hardware prefetcher is not used. • **Enabled—**The processor uses the hardware prefetcher when cache issues are detected. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** **CPU Performance** must be set to **Custom** in order to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.
Adjacent Cache Line Pre-fetcher	Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following: • **Disabled—**The processor only fetches the required line. • **Enabled—**The processor fetches both the required line and its paired line. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** **CPU Performance** must be set to **Custom** in order to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.
DCU Streamer Pre-fetch	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled—**The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • **Enabled—**The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
DCU IP Pre-fetcher	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled—**The processor does not preload any cache data. • **Enabled—**The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Direct Cache Access	Allows processors to increase I/O performance by placing data from I/O devices directly into the processor cache. This setting helps to reduce cache misses. This can be one of the following: • **disabled—**Data from I/O devices is not placed directly into the processor cache. • **enabled—**Data from I/O devices is placed directly into the processor cache. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Processor C State	Whether the system can enter a power savings mode during idle periods. This can be one of the following: • **disabled—**The system remains in a high-performance state even when idle. • **enabled—**The system can reduce power to system components such as the DIMMs and CPUs. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. We recommend that you contact your operating system vendor to make sure your operating system supports this feature.

Name	Description
Processor C1E	Allows the processor to transition to its minimum frequency upon entering C1. This setting does not take effect until after you have rebooted the server. This can be one of the following: • **disabled—**The CPU continues to run at its maximum frequency in the C1 state. • **enabled—**The CPU transitions to its minimum frequency. This option saves the maximum amount of power in the C1 state. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Processor C3 Report	Whether the processor sends the C3 report to the operating system. This can be one of the following: • **disabled—**The processor does not send the C3 report. • **acpi-c2—**The processor sends the C3 report using the advanced configuration and power interface (ACPI) C2 format. • **acpi-c3—**The processor sends the C3 report using the ACPI C3 format. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. On the Cisco UCS B440 Server, the BIOS Setup menu uses enabled and disabled for these options. If you specify acpi-c2 or acpi-c2, the server sets the BIOS value for that option to enabled.
Processor C6 Report	Whether the processor sends the C6 report to the operating system. This can be one of the following: • **disabled—**The processor does not send the C6 report. • **enabled—**The processor sends the C6 report. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Processor C7 Report	Whether the processor sends the C7 report to the operating system. This can be one of the following: • **disabled—**The processor does not send the C7 report. • **enabled—**The processor sends the C7 report. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
CPU Performance	Sets the CPU performance profile for the server. This can be one of the following: • **enterprise—**For M3 servers, all prefetchers and data reuse are enabled. For M1 and M2 servers, data reuse and the DCU IP prefetcher are enabled, and all other prefetchers are disabled. • **high-throughput—**Data reuse and the DCU IP prefetcher are enabled, and all other prefetchers are disabled. • **hpc—**All prefetchers are enabled and data reuse is disabled. This setting is also known as high-performance computing.
Max Variable MTRR Setting	Allows you to select the number of mean time to repair (MTRR) variables. This can be one of the following: • **auto-max—**BIOS uses the default value for the processor. • **8—**BIOS uses the number specified for the variable MTRR. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Local X2 APIC	Allows you to set the type of Application Policy Infrastructure Controller (APIC) architecture. This can be one of the following: • **xapic—**Uses the standard xAPIC architecture. • **x2apic—**Uses the enhanced x2APIC architecture to support 32 bit addressability of processors. • **auto—**Automatically uses the xAPIC architecture that is detected. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Power Technology	Enables you to configure the CPU power management settings for the following options: • Enhanced Intel Speedstep Technology • Intel Turbo Boost Technology • Processor Power State C6 Power Technology can be one of the following: • **Disabled—**The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored. • **Energy Efficient—**The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters. • **Performance—**The server automatically optimizes the performance for the BIOS parameters mentioned above. • **Custom—**The server uses the individual settings for the BIOS parameters mentioned above. You must select this option if you want to change any of these BIOS parameters. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Energy Performance	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • **performance** • **balanced-performance** • **balanced-energy** • **energy-efficient** • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** **Power Technology** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
Frequency Floor Override	Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following: • **Disabled—** The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance. • **Enabled—** The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
P-STATE Coordination	Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification. • **HW_ALL—**The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package). • **SW_ALL—**The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors. • **SW_ANY—**The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** **Power Technology** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
DRAM Clock Throttling	Allows you to tune the system settings between the memory bandwidth and power consumption. This can be one of the following: • **Balanced—** DRAM clock throttling is reduced, providing a balance between performance and power. • **Performance—**DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power. • **Energy Efficient—**DRAM clock throttling is increased to improve energy efficiency. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Channel Interleaving	Whether the CPU divides memory blocks and spreads contiguous portions of data across interleaved channels to enable simultaneous read operations. This can be one of the following: • **Auto—**The CPU determines what interleaving is done. • **1-way—**Some channel interleaving is used. • **2-way** • **3-way** • **4-way—**The maximum amount of channel interleaving is used. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Rank Interleaving	Whether the CPU interleaves physical ranks of memory so that one rank can be accessed while another is being refreshed. This can be one of the following: • **Auto—**The CPU determines what interleaving is done. • **1-way—**Some rank interleaving is used. • **2-way** • **4-way** • **8-way—**The maximum amount of rank interleaving is used. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Demand Scrub	Whether the system corrects single bit memory errors encountered when the CPU or I/O makes a demand read. This can be one of the following: • **Disabled—** Single bit memory errors are not corrected. • **Enabled—** Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Patrol Scrub	Whether the system actively searches for, and corrects, single bit memory errors even in unused portions of the memory on the server. This can be one of the following: • **Disabled—**The system checks for memory ECC errors only when the CPU reads or writes a memory address. • **Enabled—**The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Altitude	This can be one of the following: • **—** • **—** • **—**

Name	Description
Altitude	The approximate number of meters above sea level at which the physical server is installed. This can be one of the following: • **Auto—**The CPU determines the physical elevation. • **300 M—**The server is approximately 300 meters above sea level. • **900 M—**The server is approximately 900 meters above sea level. • **1500 M—**The server is approximately 1500 meters above sea level. • **3000 M—**The server is approximately 3000 meters above sea level. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Package C State Limit **set PackageCStateLimit**	The amount of power available to the server components when they are idle. This can be one of the following: • **No Limit—**The server may enter any available C state. • **C0 state—**The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • **C1 state—**When the CPU is idle, the system slightly reduces the power consumption. This option requires less power than C0 and allows the server to return quickly to high performance mode. • **C3 state—**When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • **C6 state—**When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • **C2 state—**When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • **C7 state—**When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves the maximum amount of power but it also requires the longest time for the server to return to high performance mode. • **C7s state—**When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves more power than C7, but it also requires the longest time for the server to return to high performance mode. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Intel Directed I/O BIOS Settings

The following table lists the Intel Directed I/O BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
VT for Directed IO	Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following: • **disabled—**The processor does not use virtualization technology. • **enabled—**The processor uses virtualization technology. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** This option must be enabled if you want to change any of the other Intel Directed I/O BIOS settings.
Interrupt Remap	Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following: • **disabled—**The processor does not support remapping. • **enabled—**The processor uses VT-d Interrupt Remapping as required. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Coherency Support	Whether the processor supports Intel VT-d Coherency. This can be one of the following: • **disabled—**The processor does not support coherency. • **enabled—**The processor uses VT-d Coherency as required. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
ATS Support	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: • **disabled—**The processor does not support ATS. • **enabled—**The processor uses VT-d ATS as required. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Pass Through DMA Support	Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following: • **disabled—**The processor does not support pass-through DMA. • **enabled—**The processor uses VT-d Pass-through DMA as required. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

RAS Memory BIOS Settings

The following table lists the RAS memory BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Memory RAS Config	How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: • **maximum performance—**System performance is optimized. • **mirroring—**System reliability is optimized by using half the system memory as backup. • **lockstep—**If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. Lockstep is enabled by default for B440 servers. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
NUMA	Whether the BIOS supports NUMA. This can be one of the following: • **disabled—**The BIOS does not support NUMA. • **enabled—**The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Mirroring Mode	Memory mirroring enhances system reliability by keeping two identical data images in memory. This option is only available if you choose the **mirroring** option for **Memory RAS Config**. It can be one of the following: • **inter-socket—**Memory is mirrored between two Integrated Memory Controllers (IMCs) across CPU sockets. • **intra-socket—**One IMC is mirrored with another IMC in the same socket. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Sparing Mode	Sparing optimizes reliability by holding memory in reserve so that it can be used in case other DIMMs fail. This option provides some memory redundancy, but does not provide as much redundancy as mirroring. The available sparing modes depend on the current memory population. This option is only available if you choose **sparing** option for **Memory RAS Config**. It can be one of the following: • **dimm-sparing—**One DIMM is held in reserve. If a DIMM fails, the contents of a failing DIMM are transferred to the spare DIMM. • **rank-sparing—**A spare rank of DIMMs is held in reserve. If a rank of DIMMs fails, the contents of the failing rank are transferred to the spare rank. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
LV DDR Mode	Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following: • **power-saving-mode—**The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low. • **performance-mode—**The system prioritizes high frequency operations over low voltage operations. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
DRAM Refresh Rate	This option controls the refresh interval rate for internal memory.

Serial Port BIOS Settings

The following table lists the serial port BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Serial Port A	Whether serial port A is enabled or disabled. This can be one of the following: • **disabled—**The serial port is disabled. • **enabled—**The serial port is enabled. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

USB BIOS Settings

The following table lists the USB BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Make Device Non Bootable	Whether the server can boot from a USB device. This can be one of the following: • **disabled**—The server can boot from a USB device. • **enabled**—The server cannot boot from a USB device. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
USB System Idle Power Optimizing Setting	Whether the USB System Idle Power Optimizing setting is used to reduce USB EHCI idle power consumption. Depending upon the value you choose, this setting can have an impact on performance. This can be one of the following: • **high-performance**—The USB System Idle Power Optimizing setting is disabled, because optimal performance is preferred over power savings. Selecting this option can significantly improve performance. We recommend you select this option unless your site has server power restrictions. • **lower-idle-power**—The USB System Idle Power Optimizing setting is enabled, because power savings are preferred over optimal performance. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
USB Front Panel Access Lock	USB front panel lock is configured to enable or disable the front panel access to USB ports. This can be one of the following: • **disabled** • **enabled** • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

PCI Configuration BIOS Settings

The following table lists the PCI configuration BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Max Memory Below 4G	Whether the BIOS maximizes memory usage below 4GB for an operating system without PAE support, depending on the system configuration. This can be one of the following: • **disabled—**Does not maximize memory usage. Choose this option for all operating systems with PAE support. • **enabled—**Maximizes memory usage below 4GB for an operating system without PAE support. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Memory Mapped IO Above 4Gb Config	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **disabled—**Does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **enabled—**Maps I/O of 64-bit PCI devices to 4GB or greater address space. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Boot Options BIOS Settings

The following table lists the boot options BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
Boot Option Retry	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: • **disabled—**Waits for user input before retrying NON-EFI based boot options. • **enabled—**Continually retries NON-EFI based boot options without waiting for user input. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Intel Entry SAS RAID	Whether the Intel SAS Entry RAID Module is enabled. This can be one of the following: • **disabled**—The Intel SAS Entry RAID Module is disabled. • **enabled**—The Intel SAS Entry RAID Module is enabled. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Intel Entry SAS RAID Module	How the Intel SAS Entry RAID Module is configured. This can be one of the following: • **it-ir-raid**—Configures the RAID module to use Intel IT/IR RAID. • **intel-esrtii**—Configures the RAID module to use Intel Embedded Server RAID Technology II. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Onboard SCU Storage Support	Whether the onboard software RAID controller is available to the server. This can be one of the following: • **disabled**—The software RAID controller is not available. • **enabled**—The software RAID controller is available. • **Platform Default**—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Server Management BIOS Settings

The following tables list the server management BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

General Settings

Name	Description
Assert Nmi on Serr	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: • **disabled—**The BIOS does not generate an NMI or log an error when a SERR occurs. • **enabled—**The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable **Assert Nmi on Perr**. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Assert Nmi on Perr	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: • **disabled—**The BIOS does not generate an NMI or log an error when a PERR occurs. • **enabled—**The BIOS generates an NMI and logs an error when a PERR occurs. You must enable **Assert Nmi on Serr** to use this setting. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
OS Boot Watchdog Timer	Whether the BIOS programs the watchdog timer with a predefined timeout value. If the operating system does not complete booting before the timer expires, the CIMC resets the system and an error is logged. This can be one of the following: • **disabled—**The watchdog timer is not used to track how long the server takes to boot. • **enabled—**The watchdog timer tracks how long the server takes to boot. If the server does not boot within the predefined length of time, the CIMC resets the system and logs an error. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. This feature requires either operating system support or Intel Management software.

Name	Description
OS Boot Watchdog Timer Timeout Policy	What action the system takes if the watchdog timer expires. This can be one of the following: • **power-off—**The server is powered off if the watchdog timer expires during OS boot. • **reset—**The server is reset if the watchdog timer expires during OS boot. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. This option is only available if you enable the OS Boot Watchdog Timer.
OS Boot Watchdog Timer Timeout	What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following: • **5-minutes—**The watchdog timer expires 5 minutes after the OS begins to boot. • **10-minutes—**The watchdog timer expires 10 minutes after the OS begins to boot. • **15-minutes—**The watchdog timer expires 15 minutes after the OS begins to boot. • **20-minutes—**The watchdog timer expires 20 minutes after the OS begins to boot. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. This option is only available if you enable the OS Boot Watchdog Timer.

Console Redirection Settings

Name	Description
Console Redirection	Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following: • **disabled—**No console redirection occurs during POST. • **serial-port-a—**Enables serial port A for console redirection during POST. This option is valid for blade servers and rack-mount servers. • **serial-port-b—**Enables serial port B for console redirection and allows it to perform server management tasks. This option is only valid for rack-mount servers. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.
Flow Control	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **none—**No flow control is used. • **rts-cts—**RTS/CTS is used for flow control. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** This setting must match the setting on the remote terminal application.

Name	Description
BAUD Rate	What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following: • **9600—**A 9600 BAUD rate is used. • **19200—**A 19200 BAUD rate is used. • **38400—**A 38400 BAUD rate is used. • **57600—**A 57600 BAUD rate is used. • **115200—**A 115200 BAUD rate is used. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** This setting must match the setting on the remote terminal application.
Terminal Type	What type of character formatting is used for console redirection. This can be one of the following: • **pc-ansi—**The PC-ANSI terminal font is used. • **vt100—**A supported vt100 video terminal and its character set are used. • **vt100-plus—**A supported vt100-plus video terminal and its character set are used. • **vt-utf8—**A video terminal with the UTF-8 character set is used. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. **Note** This setting must match the setting on the remote terminal application.
Legacy OS Redirect	Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following: • **disabled—**The serial port enabled for console redirection is hidden from the legacy operating system. • **enabled—** The serial port enabled for console redirection is visible to the legacy operating system. • **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

BIOS Policy

The BIOS policy is a policy that automates the configuration of BIOS settings for a server or group of servers. You can create global BIOS policies available to all servers in the root organization, or you can create BIOS policies in sub-organizations that are only available to that hierarchy.

To use a BIOS policy, do the following:

1. Create the BIOS policy in Cisco UCS Manager.
2. Assign the BIOS policy to one or more service profiles.
3. Associate the service profile with a server.

During service profile association, Cisco UCS Manager modifies the BIOS settings on the server to match the configuration in the BIOS policy. If you do not create and assign a BIOS policy to a service profile, the server uses the default BIOS settings for that server platform.

Default BIOS Settings

Cisco UCS Manager includes a set of default BIOS settings for each type of server supported by Cisco UCS. The default BIOS settings are available only in the root organization and are global. Only one set of default BIOS settings can exist for each server platform supported by Cisco UCS. You can modify the default BIOS settings, but you cannot create an additional set of default BIOS settings.

Each set of default BIOS settings are designed for a particular type of supported server and are applied to all servers of that specific type which do not have a BIOS policy included in their service profiles.

Unless a Cisco UCS implementation has specific needs that are not met by the server-specific settings, we recommend that you use the default BIOS settings that are designed for each type of server in the Cisco UCS domain.

Cisco UCS Manager applies these server platform-specific BIOS settings as follows:

- The service profile associated with a server does not include a BIOS policy.
- The BIOS policy is configured with the platform-default option for a specific setting.

You can modify the default BIOS settings provided by Cisco UCS Manager. However, any changes to the default BIOS settings apply to all servers of that particular type or platform. If you want to modify the BIOS settings for only certain servers, we recommend that you use a BIOS policy.

Creating a BIOS Policy

Note Cisco UCS Manager pushes BIOS configuration changes through a BIOS policy or default BIOS settings to the Cisco Integrated Management Controller (CIMC) buffer. These changes remain in the buffer and do not take effect until the server is rebooted.

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

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 **BIOS Policies** and select **Create BIOS Policy**.

Step 5 On the **Main** page of the **Create BIOS Policy** wizard, enter a name for the BIOS policy in the **Name** field.
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.

Step 6 In the **Create BIOS Policy** wizard, do the following to configure the BIOS settings:

a) If you want to change a BIOS setting, click the desired radio button or make the appropriate choice from the drop-down list.
For descriptions and information about the options for each BIOS setting, see the following topics:

- **Main** page: Main BIOS Settings, on page 382
- **Processor** page: Processor BIOS Settings, on page 383
- **Intel Directed IO** page: Intel Directed I/O BIOS Settings, on page 395
- **RAS Memory** page: RAS Memory BIOS Settings, on page 397
- **Serial Port** page: Serial Port BIOS Settings, on page 399
- **USB** page: USB BIOS Settings, on page 399
- **PCI Configuration** page: PCI Configuration BIOS Settings, on page 400
- **Boot Options** page: Boot Options BIOS Settings, on page 401
- **Server Management** page: Server Management BIOS Settings, on page 402

b) Click **Next** after each page to move to the

Step 7 After you have configured all of the BIOS settings for the policy, click **Finish**.

Modifying the BIOS Defaults

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

Unless a Cisco UCS implementation has specific needs that are not met by the server-specific settings, we recommend that you use the default BIOS settings that are designed for each type of server in the Cisco UCS domain.

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 Expand **BIOS Defaults** and select the server model number for which you want to modify the default BIOS settings.

Step 5 In the **Work** pane, click the appropriate tab and then click the desired radio button or make a choice from the drop-down list to modify the default BIOS settings:
For descriptions and information about the options for each BIOS setting, see the following topics. Not all BIOS settings are available for each type of server.

- **Main** tab: Main BIOS Settings, on page 382
- **Advanced** tab:
  - **Processor** subtab: Processor BIOS Settings, on page 383
  - **Intel Directed IO** subtab: Intel Directed I/O BIOS Settings, on page 395
  - **RAS Memory** subtab: RAS Memory BIOS Settings, on page 397
  - **Serial Port** subtab: Serial Port BIOS Settings, on page 399
  - **USB** subtab: USB BIOS Settings, on page 399
  - **PCI Configuration** subtab: PCI Configuration BIOS Settings, on page 400
- **Boot Options** tab: Boot Options BIOS Settings, on page 401
- **Server Management** tab: Server Management BIOS Settings, on page 402

Step 6 Click **Save Changes**.

Viewing the Actual BIOS Settings for a Server

Follow this procedure to see the actual BIOS settings on a server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to view the actual BIOS settings.

Step 4 On the **Work** pane, click the **Inventory** tab.

Step 5 Click the **Motherboard** subtab.

Step 6 In the **BIOS Settings** area, click the **Expand** icon to the right of the heading to open that area.

Each tab in the **BIOS Settings** area displays the settings for that server platform. Some of the tabs contain subtabs with additional information.

Configuring IPMI Access Profiles

IPMI Access Profile

This policy allows you to determine whether IPMI commands can be sent directly to the server, using the IP address. For example, you can send commands to retrieve sensor data from the CIMC. This policy defines the IPMI access, including a username and password that can be authenticated locally on the server, and whether the access is read-only or read-write.

You must include this policy in a service profile and that service profile must be associated with a server for it to take effect.

Creating an IPMI Access Profile

Before You Begin

An IPMI profile requires that one or more of the following resources already exist in the system:

- Username with appropriate permissions that can be authenticated by the operating system of the server
- Password for the username
- Permissions associated with the username

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 **IPMI Profiles** and select **Create IPMI Profiles**.

Step 5 In the **Create IPMI Profile** dialog box:

a) Enter a unique name and description for the profile.
b) Click **OK**.

Step 6 In the **IPMI Profile Users** area of the navigator, click **+**.

Step 7 In the **User Properties** dialog box:

a) Complete the following fields:

Name	Description
Name field	The username to associate with this IPMI profile. Enter 1 to 16 alphanumeric characters. You can also use @ (at sign), _ (underscore), and - (hyphen). You cannot change this name once the profile has been saved.
Password field	The password associated with this username. Enter 1 to 20 standard ASCII characters, except for = (equal sign), $ (dollar sign), and | (vertical bar).
Confirm Password field	The password a second time for confirmation purposes.
Role field	The user role. This can be one of the following: • **Admin** • **Read Only**

b) Click **OK**.

Step 8 Repeat Steps 6 and 7 to add another user.

Step 9 Click **OK** to return to the IPMI profiles in the **Work** pane.

What to Do Next

Include the IPMI profile in a service profile and/or template.

Deleting an IPMI Access Profile

Procedure

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

Step 2 In the **Servers** tab, expand **Servers** > **Policies** > ***Organization_Name***

Step 3 Expand the **IPMI Profiles** node.

Step 4 Right-click the profile you want to delete and select **Delete**.

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

Configuring Local Disk Configuration Policies

Local Disk Configuration Policy

This policy configures any optional SAS local drives that have been installed on a server through the onboard RAID controller of the local drive. This policy enables you to set a local disk mode for all servers that are associated with a service profile that includes the local disk configuration policy.

The local disk modes include the following:

- **No Local Storage—**For a diskless server or a SAN only configuration. If you select this option, you cannot associate any service profile which uses this policy with a server that has a local disk.
- **RAID 0 Striped—**Data is striped across all disks in the array, providing fast throughput. There is no data redundancy, and all data is lost if any disk fails.
- **RAID 1 Mirrored—**Data is written to two disks, providing complete data redundancy if one disk fails. The maximum array size is equal to the available space on the smaller of the two drives.
- **Any Configuration—**For a server configuration that carries forward the local disk configuration without any changes.
- **No RAID—**For a server configuration that removes the RAID and leaves the disk MBR and payload unaltered.

  If you choose **No RAID** and you apply this policy to a server that already has an operating system with RAID storage configured, the system does not remove the disk contents. Therefore, there may be no visible differences on the server after you apply the **No RAID** mode. This can lead to a mismatch between the RAID configuration in the policy and the actual disk configuration shown in the **Inventory** > **Storage** tab for the server.

  To make sure that any previous RAID configuration information is removed from a disk, apply a scrub policy that removes all disk information after you apply the **No RAID** configuration mode.
- **RAID 5 Striped Parity—**Data is striped across all disks in the array. Part of the capacity of each disk stores parity information that can be used to reconstruct data if a disk fails. RAID 5 provides good data throughput for applications with high read request rates.
- **RAID 6 Striped Dual Parity—**Data is striped across all disks in the array and two parity disks are used to provide protection against the failure of up to two physical disks. In each row of data blocks, two sets of parity data are stored.
- **RAID10 Mirrored and Striped—** RAID 10 uses mirrored pairs of disks to provide complete data redundancy and high throughput rates.

You must include this policy in a service profile and that service profile must be associated with a server for the policy to take effect.

Guidelines for all Local Disk Configuration Policies

Before you create a local disk configuration policy, consider the following guidelines:

No Mixed HDDs and SSDs

Do not include HDDs and SSDs in a single server or RAID configuration.

Do Not Assign a Service Profile with the Default Local Disk Configuration Policy from a B200 M1 or M2 to a B200 M3

Due to the differences in the RAID/JBOD support provided by the storage controllers of B200 M1 and M2 servers and those of the B200 M3 server, you cannot assign or re-assign a service profile that includes the default local disk configuration policy from a B200M1 or M2 server to a B200 M3 server. The default local disk configuration policy includes those with Any Configuration or JBOD configuration.

JBOD Mode Support

Note Only B200 M1, B200 M2, B200 M3, B250 M1, B250 M2 and B22 M3 blade servers support the JBOD mode for local disks.

Guidelines for Local Disk Configuration Policies Configured for RAID

Do Not Use the Any Configuration Mode on Servers with MegaRAID Storage Controllers

If a blade server or rack-mount server in a Cisco UCS domain includes a MegaRAID storage controller, do not configure the local disk configuration policy in the service profile for that server with the **Any Configuration** mode. If you use this mode for servers with a MegaRAID storage controller, the installer for the operating system cannot detect any local storage on the server.

If you want to install an operating system on local storage on a server with a MegaRAID storage controller, you must configure the local disk configuration policy with a mode that creates a RAID LUN (RAID volume) on the server.

Server May Not Boot After RAID1 Cluster Migration if Any Configuration Mode Specified in Service Profile

After RAID1 clusters are migrated, you need to associate a service profile with the server. If the local disk configuration policy in the service profile is configured with **Any Configuration** mode rather than **RAID1**, the RAID LUN remains in "inactive" state during and after association. As a result, the server cannot boot.

To avoid this issue, ensure that the service profile you associate with the server contains the identical local disk configuration policy as the original service profile before the migration and does not include the **Any Configuration** mode.

Configure RAID Settings in Local Disk Configuration Policy for Servers with MegaRAID Storage Controllers

If a blade server or integrated rack-mount server has a MegaRAID controller, you must configure RAID settings for the drives in the Local Disk Configuration policy included in the service profile for that server.

If you do not configure your RAID LUNs before installing the OS, disk discovery failures might occur during the installation and you might see error messages such as “No Device Found.”

Do Not Use JBOD Mode on Servers with MegaRAID Storage Controllers

Do not configure or use JBOD mode or JBOD operations on any blade server or integrated rack-mount server with a MegaRAID storage controllers. JBOD mode and operations are not intended for nor are they fully functional on these servers.

Maximum of One RAID Volume and One RAID Controller in Integrated Rack-Mount Servers

A rack-mount server that has been integrated with Cisco UCS Manager can have a maximum of one RAID volume irrespective of how many hard drives are present on the server.

All the local hard drives in an integrated rack-mount server must be connected to only one RAID Controller. Integration with Cisco UCS Manager does not support the connection of local hard drives to multiple RAID Controllers in a single rack-mount server. We therefore recommend that you request a single RAID Controller configuration when you order rack-mount servers to be integrated with Cisco UCS Manager.

In addition, do not use third party tools to create multiple RAID LUNs on rack-mount servers. Cisco UCS Manager does not support that configuration.

Maximum of One RAID Volume and One RAID Controller in Blade Servers

A blade server can have a maximum of one RAID volume irrespective of how many drives are present in the server. All the local hard drives must be connected to only one RAID controller. For example, a B200 M3 server has an LSI controller and an Intel Patsburg controller, but only the LSI controller can be used as a RAID controller.

In addition, do not use third party tools to create multiple RAID LUNs on blade servers. Cisco UCS Manager does not support that configuration.

Number of Disks Selected in Mirrored RAID Should Not Exceed Two

If the number of disks selected in the Mirrored RAID exceed two, RAID 1 is created as a RAID 10 LUN. This issue can occur with the Cisco UCS B440 M1 and B440 M2 servers.

License Required for Certain RAID Configuration Options on Some Servers

Some Cisco UCS servers require a license for certain RAID configuration options. When Cisco UCS Manager associates a service profile containing this local disk policy with a server, Cisco UCS Manager verifies that the selected RAID option is properly licensed. If there are issues, Cisco UCS Manager displays a configuration error during the service profile association.

For RAID license information for a specific Cisco UCS server, see the *Hardware Installation Guide* for that server.

B420 M3 Server Does Not Support All Configuration Modes

The B420 M3 server does not support the following configuration modes in a local disk configuration policy:

- No RAID
- RAID 6 Striped Dual Parity

In addition, the B420 M3 does not support JBOD modes or operations.

Single-Disk RAID 0 Configurations Not Supported on Some Blade Servers

A single-disk RAID 0 configuration is not supported in the following blade servers:

- Cisco UCS B200 M1
- Cisco UCS B200 M2
- Cisco UCS B250 M1
- Cisco UCS B250 M2

Creating a Local Disk Configuration Policy

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 **Local Disk Config Policies** and choose **Create Local Disk Configuration Policy**.

Step 5 In the **Create Local Disk Configuration Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Owner field	This can be one of the following: • **Local**—This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global**—Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global**—This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

Name	Description
Mode drop-down list	

Name	Description
	This can be one of the following local disk policy modes: • **No Local Storage—**For a diskless server or a SAN only configuration. If you select this option, you cannot associate any service profile which uses this policy with a server that has a local disk. • **RAID 0 Striped—**Data is striped across all disks in the array, providing fast throughput. There is no data redundancy, and all data is lost if any disk fails. • **RAID 1 Mirrored—**Data is written to two disks, providing complete data redundancy if one disk fails. The maximum array size is equal to the available space on the smaller of the two drives. • **Any Configuration—**For a server configuration that carries forward the local disk configuration without any changes. • **No RAID—**For a server configuration that removes the RAID and leaves the disk MBR and payload unaltered. If you choose **No RAID** and you apply this policy to a server that already has an operating system with RAID storage configured, the system does not remove the disk contents. Therefore, there may be no visible differences on the server after you apply the **No RAID** mode. This can lead to a mismatch between the RAID configuration in the policy and the actual disk configuration shown in the **Inventory** > **Storage** tab for the server. To make sure that any previous RAID configuration information is removed from a disk, apply a scrub policy that removes all disk information after you apply the **No RAID** configuration mode. • **RAID 5 Striped Parity—**Data is striped across all disks in the array. Part of the capacity of each disk stores parity information that can be used to reconstruct data if a disk fails. RAID 5 provides good data throughput for applications with high read request rates. • **RAID 6 Striped Dual Parity—**Data is striped across all disks in the array and two parity disks are used to provide protection against the failure of up to two physical disks. In each row of data blocks, two sets of parity data are stored. • **RAID10 Mirrored and Striped—** RAID 10 uses mirrored pairs of disks to provide complete data redundancy and high throughput rates. **Note** Some Cisco UCS servers require a license for certain RAID configuration options. When Cisco UCS Manager associates a service profile containing this local disk policy with a server, Cisco UCS Manager verifies that the selected RAID option is properly licensed. If there are issues, Cisco UCS Manager displays a configuration error during the service profile association.

Name	Description
	For RAID license information for a specific Cisco UCS server, see the *Hardware Installation Guide* for that server.
Protect Configuration check box	If checked, the server retains the configuration in the local disk configuration policy even if the server is disassociated from the service profile. **Caution** Protect Configuration becomes non-functional if one or more disks in the server are defective or faulty. This property is checked by default. When a service profile is disassociated from a server and a new service profile associated, the setting for the Protect Configuration property in the new service profile takes precedence and overwrites the setting in the previous service profile. **Note** If you disassociate the server from a service profile with this option enabled and then associate it with a new service profile that includes a local disk configuration policy with different properties, the server returns a configuration mismatch error and the association fails.
Flex Flash State radio button	To enable or disable the SD card module click the appropriate button. **Note** This parameter only applies to a server with an SD card module.

Step 6 Click **OK**.

Changing a Local Disk Configuration Policy

This procedure describes how to change a local disk configuration policy from an associated service profile. You can also change a local disk configuration policy from the **Policies** node of the **Servers** tab.

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 organization that includes the service profile with the local disk configuration policy you want to change.
If the system does not include multitenancy, expand the **root** node.

Step 4 Click the service profile that contains the local disk configuration policy you want to change.

Step 5 In the **Work** pane, click the **Storage** tab.

Step 6 In the **Actions** area, click **Change Local Disk Configuration Policy**.

Step 7 In the **Change Local Disk Configuration Policy** dialog box, choose one of the following options from the **Select the Local Disk Configuration Policy** drop-down list.

Option	Description
Use a Disk Policy	Select an existing local disk configuration policy from the list below this option. Cisco UCS Manager assigns this policy to the service profile.
Create a Local Disk Policy	Enables you to create a local disk configuration policy that can only be accessed by the selected service profile.
No Disk Policy	Does not use a local disk configuration policy for the selected service profile.

Step 8 Click **OK**.

Step 9 (Optional) Expand the **Local Disk Configuration Policy** area to confirm that the change has been made.

Deleting a Local Disk Configuration Policy

Procedure

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

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

Step 3 Expand the **Local Disk Config Policies** node.

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

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

Configuring Scrub Policies

Scrub Policy

This policy determines what happens to local data and to the BIOS settings on a server during the discovery process and when the server is disassociated from a service profile.

Note Local disk scrub policies only apply to hard drives that are managed by Cisco UCS Manager and do not apply to other devices such as USB drives.

Depending upon how you configure a scrub policy, the following can occur at those times:

Disk Scrub

One of the following occurs to the data on any local drives on disassociation:

- If enabled, destroys all data on any local drives
- If disabled, preserves all data on any local drives, including local storage configuration

BIOS Settings Scrub

One of the following occurs to the BIOS settings when a service profile containing the scrub policy is disassociated from a server:

- If enabled, erases all BIOS settings for the server and resets them to the BIOS defaults for that server type and vendor
- If disabled, preserves the existing BIOS settings on the server

Creating a Scrub Policy

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 **Scrub Policies** and select **Create Scrub Policy**.

Step 5 In the **Create Scrub Policy** wizard, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Owner field	This can be one of the following: • **Local**—This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global**—Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global**—This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.
Disk Scrub field	If this field is set to **Yes**, when a service profile containing this scrub policy is disassociated from a server, all data on the server local drives is completely erased. If this field is set to **No**, the data on the local drives is preserved, including all local storage configuration.
BIOS Settings Scrub field	If the field is set to **Yes**, when a service profile containing this scrub policy is disassociated from a server, the BIOS settings for that server are erased and reset to the defaults for that server type and vendor. If this field is set to **No**, the BIOS settings are preserved.

Step 6 Click **OK**.

Deleting a Scrub Policy

Procedure

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

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

Step 3 Expand the **Scrub Policies** node.

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

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

Configuring Serial over LAN Policies

Serial over LAN Policy

This policy sets the configuration for the serial over LAN connection for all servers associated with service profiles that use the policy. By default, the serial over LAN connection is disabled.

If you implement a serial over LAN policy, we recommend that you also create an IPMI profile.

You must include this policy in a service profile and that service profile must be associated with a server for it to take effect.

Creating a Serial over LAN Policy

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 **Serial over LAN Policies** and select **Create Serial over LAN Policy**.

Step 5 In the **Create Serial over LAN Policy** wizard, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Owner field	This can be one of the following: • **Local—**This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global—**Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global—**This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.
Serial over LAN State field	This can be one of the following: • **Disable—**Serial over LAN access is blocked. • **Enable—**Serial over LAN access is permitted.
Speed drop-down list	This can be one of the following: • **9600** • **19200** • **38400** • **57600** • **115200**

Step 6 Click **OK**.

Deleting a Serial over LAN Policy

Procedure

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

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

Step 3 Expand the **Serial over LAN Policies** node.

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

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

Configuring Server Autoconfiguration Policies

Server Autoconfiguration Policy

Cisco UCS Manager uses this policy to determine how to configure a new server. If you create a server autoconfiguration policy, the following occurs when a new server starts:

1. The qualification in the server autoconfiguration policy is executed against the server.
2. If the server meets the required qualifications, the server is associated with a service profile created from the service profile template configured in the server autoconfiguration policy. The name of that service profile is based on the name given to the server by Cisco UCS Manager.
3. The service profile is assigned to the organization configured in the server autoconfiguration policy.

Creating an Autoconfiguration Policy

Before You Begin

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

- Server pool policy qualifications
- Service profile template
- Organizations, if a system implements multi-tenancy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Autoconfig Policies** subtab.

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 Autoconfiguration Policy** dialog box, complete 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.

Name	Description
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 \` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Qualification drop-down list	The server pool policy qualification associated with this auto-configuration policy. If a new server is discovered that matches the criteria specified in the server pool policy qualification, Cisco UCS automatically creates a service profile based on the service profile template selected in the **Service Profile Template Name** drop-down list and associates the newly created service profile with the server.
Org drop-down list	The organization associated with this autoconfiguration policy. If Cisco UCS automatically creates a service profile to associate with a server, it places the service profile under the organization selected in this field.
Service Profile Template Name drop-down list	The service profile template associated with this policy.

Step 7 Click **OK**.

Deleting an Autoconfiguration Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Autoconfig Policies** subtab.

Step 5 Right-click the autoconfiguration policy that you want to delete and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Server Discovery Policies

Server Discovery Policy

This discovery policy determines how the system reacts when you add a new server. If you create a server discovery policy, you can control whether the system conducts a deep discovery when a server is added to a chassis, or whether a user must first acknowledge the new server. By default, the system conducts a full discovery.

If you create a server discovery policy, the following occurs when a new server starts:

1. The qualification in the server discovery policy is executed against the server.
2. If the server meets the required qualifications, Cisco UCS Manager applies the following to the server:
    - Depending upon the option selected for the action, either discovers the new server immediately or waits for a user to acknowledge the new server
    - Applies the scrub policy to the server

Creating a Server Discovery Policy

Before You Begin

If you plan to associate this policy with a server pool, create server pool policy qualifications.

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Server Discovery Policies** subtab.

Step 5 Click the + icon on the table icon bar to open the **Create Server Discovery Policy** dialog box.

Step 6 In the **Description** field, enter a description for the discovery policy.

Step 7 In the **Action** field, select one of the following options:

- **Immediate—**Cisco UCS Manager attempts to discover new servers automatically
- **User Acknowledged—**Cisco UCS Manager waits until the user tells it to search for new servers

Step 8 (Optional) To associate this policy with a server pool, select server pool policy qualifications from the **Qualification** drop-down list.

Step 9 (Optional) To include a scrub policy, select a policy from the **Scrub Policy** drop-down list.

Step 10 Click **OK**.

What to Do Next

Include the server discovery policy in a service profile and/or template.

Deleting a Server Discovery Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Server Discovery Policies** subtab.

Step 5 Right-click the server discover policy that you want to delete and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Server Inheritance Policies

Server Inheritance Policy

This policy is invoked during the server discovery process to create a service profile for the server. All service profiles created from this policy use the values burned into the blade at manufacture. The policy performs the following:

- Analyzes the inventory of the server
- If configured, assigns the server to the selected organization
- Creates a service profile for the server with the identity burned into the server at manufacture

You cannot migrate a service profile created with this policy to another server.

Creating a Server Inheritance Policy

A blade server or rack-mount server with a VIC adapter, such as the Cisco UCS M81KR Virtual Interface Card, does not have server identity values burned into the server hardware at manufacture. As a result, the identity of the adapter must be derived from default pools. If the default pools do not include sufficient entries for one to be assigned to the server, service profile association fails with a configuration error.

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Server Inheritance Policies** subtab.

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 Server Inheritance Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Qualification drop-down list	If you want to associate this policy with one or more specific server pools, choose the server pool qualification policy that identifies these pools from the drop-down list.
Org drop-down list	If you want to associate an organization with this policy, or if you want to change the current association, choose the desired organization from the drop-down list.

Step 7 Click **OK**.

Deleting a Server Inheritance Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Server Inheritance Policies** subtab.

Step 5 Right-click the server inheritance policy that you want to delete and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Server Pool Policies

Server Pool Policy

This policy is invoked during the server discovery process. It determines what happens if server pool policy qualifications match a server to the target pool specified in the policy.

If a server qualifies for more than one pool and those pools have server pool policies, the server is added to all those pools.

Creating a Server Pool Policy

Before You Begin

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

- A minimum of one server pool
- Server pool policy qualifications, if you choose to have servers automatically added to pools

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 **Server Pool Policies** and select **Create Server Pool Policy**.

Step 5 In the **Create Server Pool Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Target Pool drop-down list	If you want to associate this policy with a server pool, select that pool from the drop-down list.
Qualification drop-down list	If you want to associate this policy with one or more specific server pools, choose the server pool qualification policy that identifies these pools from the drop-down list.

Step 6 Click **OK**.

Deleting a Server Pool Policy

Procedure

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

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

Step 3 Expand the **Server Pool Policies** node.

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

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

Configuring Server Pool Policy Qualifications

Server Pool Policy Qualifications

This policy qualifies servers based on the inventory of a server conducted during the discovery process. The qualifications are individual rules that you configure in the policy to determine whether a server meets the selection criteria. For example, you can create a rule that specifies the minimum memory capacity for servers in a data center pool.

Qualifications are used in other policies to place servers, not just by the server pool policies. For example, if a server meets the criteria in a qualification policy, it can be added to one or more server pools or have a service profile automatically associated with it.

You can use the server pool policy qualifications to qualify servers according to the following criteria:

- Adapter type
- Chassis location
- Memory type and configuration
- Power group
- CPU cores, type, and configuration
- Storage configuration and capacity
- Server model

Depending upon the implementation, you might need to configure several policies with server pool policy qualifications including the following:

- Autoconfiguration policy
- Chassis discovery policy
- Server discovery policy
- Server inheritance policy
- Server pool policy

Creating Server Pool Policy Qualifications

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 the **Server Pool Policy Qualifications** node and select **Create Server Pool Policy Qualification**.

Step 5 In the **Create Server Pool Policy Qualification** dialog box, enter a unique name and description for the policy.

Step 6 (Optional) To use this policy to qualify servers according to their adapter configuration, do the following:

a) Click **Create Adapter Qualifications**.
b) In the **Create Adapter Qualifications** dialog box, complete the following fields:

Name	Description
Type drop-down list	The adapter type. Once you save the adapter qualification, this type cannot be changed.
PID field	A regular expression that the adapter PID must match.
Maximum Capacity field	The maximum capacity for the selected type. To specify a capacity, choose **select** and enter the desired maximum capacity. You can enter an integer between 1 and 65535.

c) Click **OK**.

Step 7 (Optional) To use this policy to qualify servers according to the chassis in which they physically reside, do the following:

a) Click **Create Chassis/Server Qualifications**.

b) In the **Chassis Qualifications** area of the **Create Chassis and Server Qualifications** dialog box, complete the following fields to specify the range of chassis you want to use:

- **First Chassis ID** field—The first chassis ID from which server pools associated with this policy can draw.
- **Number of Chassis** field—The total number of chassis to include in the pool, starting with the chassis identified in the **First Chassis ID** field.

Example:

For example, if you want to use chassis 5, 6, 7, and 8, enter 5 in the **First Chassis ID** field and 4 in the **Number of Chassis** field. If you want to use only chassis 3, enter 3 in the **First Chassis ID** field and 1 in the **Number of Chassis** field.

Tip If you want to use chassis 5, 6, and 9, create a chassis/server qualification for the range 5-6 and another qualification for chassis 9. You can add as many chassis/server qualifications as needed.

c) Click **Finish**.

Step 8 (Optional) To use this policy to qualify servers according to both the chassis and slot in which they physically reside, do the following:

a) Click **Create Chassis/Server Qualifications**.

b) In the **Chassis Qualifications** area of the **Create Chassis and Server Qualifications** dialog box, complete the following fields to specify the range of chassis you want to use:

- **First Chassis ID** field—The first chassis ID from which server pools associated with this policy can draw.
- **Number of Chassis** field—The total number of chassis to include in the pool, starting with the chassis identified in the **First Chassis ID** field.

c) In the **Server Qualifications** table, click **Add**.

d) In the **Create Server Qualifications** dialog box, complete the following fields to specify the range of server locations you want to use:

- **First Slot ID** field—The first slot ID from which server pools associated with this policy can draw.
- **Number of Slots** field—The total number of slots from which server pools associated with this policy can draw.

e) Click **Finish Stage**.

f) To add another range of slots, click **Add** and repeat steps d and e.

g) When you have finished specifying the slot ranges, click **Finish**.

Step 9 (Optional) To use this policy to qualify servers according to their memory configuration, do the following:

a) Click **Create Memory Qualifications**.

b) In the **Create Memory Qualifications** dialog box, complete the following fields:

Name	Description
Clock field	The minimum clock speed required, in megahertz.
Latency field	The maximum latency allowed, in nanoseconds.
Min Cap field	The minimum memory capacity required, in megabytes.
Max Cap field	The maximum memory capacity allowed, in megabytes.
Width field	The minimum width of the data bus.
Units field	The unit of measure to associate with the value in the **Width** field.

c) Click **OK**.

Step 10 (Optional) To use this policy to qualify servers according to their CPU/Cores configuration, do the following:

a) Click **Create CPU/Cores Qualifications**.

b) In the **Create CPU/Cores Qualifications** dialog box, complete the following fields:

Name	Description
Processor Architecture drop-down list	The CPU architecture to which this policy applies.
PID field	A regular expression that the processor PID must match.
Min Number of Cores field	The minimum number of CPU cores required. To specify a capacity, choose **select** and enter an integer between 1 and 65535 in the associated text field.
Max Number of Cores field	The maximum number of CPU cores allowed. To specify a capacity, choose **select** and enter an integer between 1 and 65535 in the associated text field.

Name	Description
Min Number of Threads field	The minimum number of CPU threads required. To specify a capacity, choose **select** and enter an integer between 1 and 65535 in the associated text field.
Max Number of Threads field	The maximum number of CPU threads allowed. To specify a capacity, choose **select** and enter an integer between 1 and 65535 in the associated text field.
CPU Speed field	The minimum CPU speed required. To specify a capacity, choose **select** and enter the minimum CPU speed.
CPU Stepping field	The minimum CPU version required. To specify a capacity, choose **select** and enter the maximum CPU speed.

c) Click **OK**.

Step 11 (Optional) To use this policy to qualify servers according to their storage configuration and capacity, do the following:

a) Click **Create Storage Qualifications**.

b) In the **Create Storage Qualifications** dialog box, complete the following fields:

Name	Description
Diskless field	Whether the available storage must be diskless. This can be one of the following: • **Unspecified—**Either storage type is acceptable. • **Yes—**The storage must be diskless. • **No—**The storage cannot be diskless.
Number of Blocks field	The minimum number of blocks required. To specify a capacity, choose **select** and enter the number of blocks.
Block Size field	The minimum block size required, in bytes. To specify a capacity, choose **select** and enter the block size.
Min Cap field	The minimum storage capacity across all disks in the server, in megabytes. To specify a capacity, choose **select** and enter the minimum storage capacity.

Name	Description
Max Cap field	The maximum storage capacity allowed, in megabytes. To specify a capacity, choose **select** and enter the maximum storage capacity.
Per Disk Cap field	The minimum storage capacity per disk required, in gigabytes. To specify a capacity, choose **select** and enter the minimum capacity on each disk.
Units field	The number of units. To specify a capacity, choose **select** and enter the desired units.

c) Click **OK**.

Step 12 (Optional) To use this policy to qualify servers according to the model of the server, do the following:

a) Click **Create Server Model Qualifications**.
b) In the **Create Server Model Qualifications** dialog box, enter a regular expression that the server model must match in the **Model** field.
c) Click **OK**.

Step 13 (Optional) To use this policy to qualify servers according to power group, do the following:

a) Click **Create Power Group Qualifications**.
b) In the **Create Power Group Qualifications** dialog box, choose a power group from the **Power Group** drop-down list.
c) Click **OK**.

Step 14 (Optional) To use this policy to qualify the rack-mount servers that can be added to the associated server pool, do the following:

a) Click **Create Rack Qualifications**.
b) In the **Create Rack Qualifications** dialog box, complete the following fields:

Name	Description
First Slot ID field	The first rack-mount server slot ID from which server pools associated with this policy can draw.
Number of Slots field	The total number of rack-mount server slots from which server pools associated with this policy can draw.

Step 15 Verify the qualifications in the table and correct if necessary.

Step 16 Click **OK**.

Deleting Server Pool Policy Qualifications

Procedure

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

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

Step 3 Expand the **Server Pool Policy Qualifications** node.

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

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

Deleting Qualifications from Server Pool Policy Qualifications

Use this procedure to modify Server Pool Policy Qualifications by deleting one or more sets of qualifications.

Procedure

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

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

Step 3 Expand the **Server Pool Policy Qualifications** node.

Step 4 Choose the policy you want to modify.

Step 5 In the **Work** pane, choose the **Qualifications** tab.

Step 6 To delete a set of qualifications:

a) In the table, choose the row that represents the set of qualifications.
b) Right-click the row and select **Delete**.

Step 7 Click **Save Changes**.

Configuring vNIC/vHBA Placement Policies

vNIC/vHBA Placement Policies

vNIC/vHBA placement policies are used to determine the following:

- How the virtual network interface connections (vCons) are mapped to the physical adapters on a server.
- What types of vNICs or vHBAs can be assigned to each vCon.

Each vNIC/vHBA placement policy contains four vCons that are virtual representations of the physical adapters. When a vNIC/vHBA placement policy is assigned to a service profile, and the service profile is associated with a server, the vCons in the vNIC/vHBA placement policy are assigned to the physical adapters and the vNICs and vHBAs are assigned to those vCons.

For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4.

For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the type of server and the selected virtual slot mapping scheme, which can be **Round Robin** or **Linear Ordered**. For details about the available mapping schemes, see vCon to Adapter Placement, on page 437.

After Cisco UCS assigns the vCons, it assigns the vNICs and vHBAs based on the **Selection Preference** for each vCon. This can be one of the following:

- **All—**All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **Assigned Only—**vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **Exclude Dynamic—**Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.
- **Exclude Unassigned—**Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **Exclude usNIC—**Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.

Note An SRIOV usNIC that is explicitly assigned to a vCon set to **Exclude usNIC** will remain assigned to that vCon.

If you do not include a vNIC/vHBA placement policy in the service profile, Cisco UCS Manager defaults to the **Round Robin** vCon mapping scheme and the **All** vNIC/vHBA selection preference, distributing the vNICs and vHBAs between the adapters based on the capabilities and relative capacities of each adapter.

vCon to Adapter Placement

Cisco UCS maps every vCon in a service profile to a physical adapter on the server. How that mapping occurs and how the vCons are assigned to a specific adapter in a server depends on the following:

- The type of server. N20-B6620-2 and N20-B6625-2 blade servers with two adapter cards use a different mapping scheme than other supported rack or blade servers.
- The number of adapters in the server.
- The setting of the virtual slot mapping scheme in the vNIC/vHBA placement policy, if applicable.

You must consider this placement when you configure the vNIC/vHBA selection preference to assign vNICs and vHBAs to vCons.

Note vCon to adapter placement is not dependent upon the PCIE slot number of the adapter. The adapter numbers used for the purpose of vCon placement are not the PCIE slot numbers of the adapters, but the ID assigned to them during server discovery.

vCon to Adapter Placement for N20-B6620-2 and N20-B6625-2 Blade Servers

In N20-B6620-2 and N20-B6625-2 blade servers, the two adapters are numbered left to right while vCons are numbered right to left. If one of these blade servers has a single adapter, Cisco UCS assigns all vCons to that adapter. If the server has two adapters, the vCon assignment depends upon the virtual slot mapping scheme:

- **Round Robin—**Cisco UCS assigns vCon2 and vCon4 to Adapter1 and vCon1 and vCon3 to Adapter2. This is the default.
- **Linear Ordered—**Cisco UCS assigns vCon3 and vCon4 to Adapter1 and vCon1 and vCon2 to Adapter2.

vCon to Adapter Placement for All Other Supported Servers

For all other servers supported by Cisco UCS besides the N20-B6620-2 and N20-B6625-2 blade servers, the vCon assignment depends on the number of adapters in the server and the virtual slot mapping scheme.

For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4.

For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the selected virtual slot mapping scheme: **Round Robin** or **Linear Ordered**.

Table 8: vCon to Adapter Placement Using the Round Robin Mapping Scheme

Number of Adapters	vCon1 Assignment	vCon2 Assignment	vCon3 Assignment	vCon4 Assignment
1	Adapter1	Adapter1	Adapter1	Adapter1
2	Adapter1	Adapter2	Adapter1	Adapter2
3	Adapter1	Adapter2	Adapter3	Adapter2
4	Adapter1	Adapter2	Adapter3	Adapter4

Round Robin is the default mapping scheme.

Table 9: vCon to Adapter Placement Using the Linear Ordered Mapping Scheme

Number of Adapters	vCon1 Assignment	vCon2 Assignment	vCon3 Assignment	vCon4 Assignment
1	Adapter1	Adapter1	Adapter1	Adapter1

Number of Adapters	vCon1 Assignment	vCon2 Assignment	vCon3 Assignment	vCon4 Assignment
2	Adapter1	Adapter1	Adapter2	Adapter2
3	Adapter1	Adapter2	Adapter3	Adapter3
4	Adapter1	Adapter2	Adapter3	Adapter4

Note If you are using a vCon policy with two adapters in the B440, please be aware of the following mapping.

- vCon 2 to adapter 1 maps first
- vCon 1 to adapter 2 maps second

vNIC/vHBA to vCon Assignment

Cisco UCS Manager provides two options for assigning vNICs and vHBAs to vCons through the vNIC/vHBA placement policy: explicit assignment and implicit assignment.

Explicit Assignment of vNICs and vHBAs

With explicit assignment, you specify the vCon and, therefore, the adapter to which a vNIC or vHBA is assigned. Use this assignment option when you need to determine how the vNICs and vHBAs are distributed between the adapters on a server.

To configure a vCon and the associated vNICs and vHBAs for explicit assignment, do the following:

- Set the vCon configuration to any of the available options. You can configure the vCons through a vNIC/vHBA placement policy or in the service profile associated with the server. If a vCon is configured for **All**, you can still explicitly assign a vNIC or vHBA to that vCon.
- Assign the vNICs and vHBAs to a vCon. You can make this assignment through the virtual host interface placement properties of the vNIC or vHBA or in the service profile associated with the server.

If you attempt to assign a vNIC or vHBA to a vCon that is not configured for that type of vNIC or vHBA, Cisco UCS Manager displays a message advising you of the configuration error.

During service profile association, Cisco UCS Manager validates the configured placement of the vNICs and vHBAs against the number and capabilities of the physical adapters in the server before assigning the vNICs and vHBAs according to the configuration in the policy. Load distribution is based upon the explicit assignments to the vCons and adapters configured in this policy.

If the adapters do not support the assignment of one or more vNICs or vHBAs, Cisco UCS Manager raises a fault against the service profile.

Implicit Assignment of vNICs and vHBAs

With implicit assignment, Cisco UCS Manager determines the vCon and, therefore, the adapter to which a vNIC or vHBA is assigned according to the capability of the adapters and their relative capacity. Use this assignment option if the adapter to which a vNIC or vHBA is assigned is not important to your system configuration.

To configure a vCon for implicit assignment, do the following:

- Set the vCon configuration to **All**, **Exclude Dynamic**, or **Exclude Unassigned**. You can configure the vCons through a vNIC/vHBA placement policy or in the service profile associated with the server.
- Do not set the vCon configuration to **Assigned Only**. Implicit assignment cannot be performed with this setting.
- Do not assign any vNICs or vHBAs to a vCon.

During service profile association, Cisco UCS Manager verifies the number and capabilities of the physical adapters in the server and assigns the vNICs and vHBAs accordingly. Load distribution is based upon the capabilities of the adapters, and placement of the vNICs and vHBAs is performed according to the actual order determined by the system. For example, if one adapter can accommodate more vNICs than another, that adapter is assigned more vNICs.

If the adapters cannot support the number of vNICs and vHBAs configured for that server, Cisco UCS Manager raises a fault against the service profile.

Implicit Assignment of vNICs in a Dual Adapter Environment

When you use implicit vNIC assignment for a dual slot server with an adapter card in each slot, Cisco UCS Manager typically assigns the vNICs/vHBAs as follows:

- If the server has the same adapter in both slots, Cisco UCS Manager assigns half the vNICs and half the vHBAs to each adapter.
- If the server has one non-VIC adapter and one VIC adapter, Cisco UCS Manager assigns two vNICs and two vHBAs to the non-VIC adapter and the remaining vNICs and vHBAs to the VIC adapter.
- If the server has two different VIC adapters, Cisco UCS Manager assigns the vNICs and vHBAs proportionally, based on the relative capabilities of the two adapters.

The following examples show how Cisco UCS Manager would typically assign the vNICs and vHBAs with different combinations of supported adapter cards:

- If you want to configure four vNICs and the server contains two Cisco UCS M51KR-B Broadcom BCM57711 adapters (with two vNICs each), Cisco UCS Manager assigns two vNICs to each adapter.
- If you want to configure 50 vNICs and the server contains a Cisco UCS CNA M72KR-E adapter (2 vNICs) and a Cisco UCS M81KR Virtual Interface Card adapter (128 vNICs), Cisco UCS Manager assigns two vNICs to the Cisco UCS CNA M72KR-E adapter and 48 vNICs to the Cisco UCS M81KR Virtual Interface Card adapter.
- If you want to configure 150 vNICs and the server contains a Cisco UCS M81KR Virtual Interface Card adapter (128 vNICs) and a Cisco UCS VIC-1240 Virtual Interface Card adapter (256 vNICs), Cisco UCS Manager assigns 50 vNICs to the Cisco UCS M81KR Virtual Interface Card adapter and 100 vNICs to the Cisco UCS VIC-1240 Virtual Interface Card adapter.

Note Exceptions to this implicit assignment occur if you configure the vNICs for fabric failover and if you configure dynamic vNICs for the server.

For a configuration that includes vNIC fabric failover where one adapter does not support vNIC failover, Cisco UCS Manager implicitly assigns all vNICs that have fabric failover enabled to the adapter that supports them. If the configuration includes only vNICs that are configured for fabric failover, no vNICs are implicitly assigned to the adapter that does not support them. If some vNICs are configured for fabric failover and some are not, Cisco UCS Manager assigns all failover vNICs to the adapter that supports them and a minimum of one nonfailover vNIC to the adapter that does not support them, according to the ratio above.

For a configuration that includes dynamic vNICs, the same implicit assignment would occur. Cisco UCS Manager assigns all dynamic vNICs to the adapter that supports them. However, with a combination of dynamic vNICs and static vNICs, at least one static vNIC is assigned to the adapter that does not support dynamic vNICs.

Creating a vNIC/vHBA Placement Policy

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 **vNIC/vHBA Placement Policies** and choose **Create Placement Policy**.

Step 5 In the **Create Placement Policy** dialog box, do the following:

a) Complete the following fields:

Name	Description
Name field	The name for this placement 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.

Name	Description
Virtual Slot Mapping Scheme field	Cisco UCS assigns virtual network interface connections (vCons) to the PCIe adapter cards in the server. Each vCon is a virtual representation of a physical adapter that can be assigned vNICs and vHBAs. For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4. For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the selected virtual slot mapping scheme. This can be one of the following: • **Round Robin—** In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon3 to Adapter1, then assigns vCon2 and vCon4 to Adapter2. In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1, vCon2 and vCon4 to Adapter2, and vCon3 to Adapter3. This is the default scheme. • **Linear Ordered—** In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon2 to Adapter1, then assigns vCon3 and vCon4 to Adapter2. In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1 and vCon2 to Adapter2, then assigns vCon3 and vCon4 to Adapter3. **Note** In N20-B6620-2 and N20-B6625-2 blade servers, the two adapters are numbered left to right while vCons are numbered right to left. If one of these blade servers has a single adapter, Cisco UCS assigns all vCons to that adapter. If the server has two adapters, the vCon assignment depends upon the virtual slot mapping scheme: • **Round Robin—**Cisco UCS assigns vCon2 and vCon4 to Adapter1 and vCon1 and vCon3 to Adapter2. This is the default. • **Linear Ordered—**Cisco UCS assigns vCon3 and vCon4 to Adapter1 and vCon1 and vCon2 to Adapter2. After Cisco UCS assigns the vCons, it assigns the vNICs and vHBAs based on the **Selection Preference** for each vCon.

b) In the **Selection Preference** column for each **Virtual Slot**, choose one of the following from the drop-down list:

- **All—**All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **Assigned Only—**vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **Exclude Dynamic—**Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.
- **Exclude Unassigned—**Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **Exclude usNIC—**Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.

  Note An SRIOV usNIC that is explicitly assigned to a vCon set to **Exclude usNIC** will remain assigned to that vCon.

c) Click **OK**.

Deleting a vNIC/vHBA Placement Policy

Procedure

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

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

Step 3 Expand the **vNIC/vHBA Placement 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**.

Explicitly Assigning a vNIC to a vCon

Before You Begin

Configure the vCons through a vNIC/vHBA placement policy or in the service profile with one of the following values:

- **Assigned Only**
- **Exclude Dynamic**
- **Exclude Unassigned**

If a vCon is configured for **All**, you can still explicitly assign a vNIC or vHBA to that vCon. However, you have less control with this configuration.

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 which contains the service profile whose vNICs you want to explicitly assign to a vCon.
If the system does not include multitenancy, expand the **root** node.

Step 4 Expand ***Service_Profile_Name*** > **vNICs**.

Step 5 Click on the vNIC that you want to explicitly assign to a vCon.

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

Step 7 In the **Virtual Host Interface Placement** section, complete the following fields:

Name	Description
Desired Placement drop-down list	The user-specified virtual network interface connection (vCon) placement for the vNIC. This can be one of the following: • **Any—**Allows Cisco UCS Manager to determine the vCon to which the vNIC is assigned. • **1—**Explicitly assigns the vNIC to vCon1. • **2—**Explicitly assigns the vNIC to vCon2. • **3—**Explicitly assigns the vNIC to vCon3. • **4—**Explicitly assigns the vNIC to vCon4.
Actual Assignment field	The actual vCon assignment of the vNIC on the server.

If you attempt to assign a vNIC to a vCon that is not configured for that type of vNIC, Cisco UCS Manager displays a message box to advise you of the configuration error. You must either assign the vNIC to another vCon or change the vCon configuration in the service profile.

Step 8 In the **Order** section, complete the following fields:

Name	Description
Desired Order field	The user-specified PCI order for the vNIC. Enter an integer between 0 and 128. You cannot create more than 128 vNICs for a server.
Actual Order field	The actual PCI order of the vNIC on the server.

Step 9 Click **Save Changes**.

Explicitly Assigning a vHBA to a vCon

Before You Begin

Configure the vCons through a vNIC/vHBA placement policy or in the service profile with one of the following values:

- **Assigned Only**
- **Exclude Dynamic**
- **Exclude Unassigned**

If a vCon is configured for **All**, you can still explicitly assign a vNIC or vHBA to that vCon. However, you have less control with this configuration.

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 which contains the service profile whose vHBAs you want to explicitly assign to a vCon.
If the system does not include multitenancy, expand the **root** node.

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

Step 5 Click on the vHBA that you want to explicitly assign to a vCon.

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

Step 7 In the **Virtual Host Interface Placement** section, complete the following fields:

Name	Description
Desired Placement field	The user-specified virtual network interface connection (vCon) placement for the vHBA. This can be one of the following: • **Any—**Allows Cisco UCS Manager to determine the vCon to which the vHBA is assigned. • **1—**Explicitly assigns the vHBA to vCon1. • **2—**Explicitly assigns the vHBA to vCon2. • **3—**Explicitly assigns the vHBA to vCon3. • **4—**Explicitly assigns the vHBA to vCon4.
Actual Assignment field	The actual vCon assignment of the vHBA on the server.

If you attempt to assign a vHBA to a vCon that is not configured for that type of vHBA, Cisco UCS Manager displays a message box to advise you of the configuration error. You must either assign the vHBA to another vCon or change the vCon configuration in the service profile.

Step 8 In the **Order** section, complete the following fields:

Name	Description
Desired Order field	The user-specified PCI order for the vHBA. Enter an integer between 0 and 128. You cannot create more than 128 vHBAs for a server.
Actual Order field	The actual PCI order of the vHBA on the server.

Step 9 Click **Save Changes**.

Placing Static vNICs Before Dynamic vNICs

For optimal performance, static vNICs and vHBAs should be placed before dynamic vNICs on the PCIe bus. Static vNICs refer to both static vNICs and vHBAs. Cisco UCS Manager Release 2.1 provides the following functionality regarding the order of static and dynamic vNICs:

- After upgrading to Cisco UCS Manager Release 2.1, if no change is made to existing service profiles (profiles that are defined in releases prior to Cisco UCS Manager Release 2.1), the vNIC order does not change.
- After an upgrade to Cisco UCS Manager Release 2.1, any vNIC-related change would reorder the vNIC map. As a result, all dynamic vNICs would be placed after the static vNICs.
- For newly created service profiles in Cisco UCS Manager Release 2.1, static vNICs are always ordered before dynamic vNICs.
- The above behavior is independent of the sequence of creating or deleting static or dynamic vNICs.
- For SRIOV-enabled service profiles, UCSM places the vNIC Physical Function(PF) before the corresponding Virtual Functions (VFs). This scheme guarantees that the VFs are placed close to the parent PF vNIC on the PCIe bus and BDFs are in successive incremental order for the VFs.

Example

Beginning Device Order in Cisco UCS Manager Release 2.0:

```
dyn-vNIC-1 1
dyn-vNIC-2 2
```

New Device Order in Cisco UCS Manager Release 2.0 (Add 2 static vNICs):

```
dyn-vNIC-1 1
dyn-vNIC-2 2
eth-vNIC-1 3
eth-vNIC-2 4
```

After upgrading to Cisco UCS Manager Release 2.1, (Before any vNIC-related change is made to the service profile.)

```
dyn-vNIC-1 1
dyn-vNIC-2 2
eth-vNIC-1 3
eth-vNIC-2 4
```

New Device Order in Cisco UCS Manager Release 2.1 (Add 2 dynamic vNICs by changing the policy count from 2 to 4.)

```
dyn-vNIC-1 3
dyn-vNIC-2 4
eth-vNIC-1 1
eth-vNIC-2 2
dyn-vNIC-3 5
dyn-vNIC-4 6
```

Dynamic vNICs as Multifunction PCIe Devices

Cisco UCS Manager Version 2.1 provisions static vNICs as 0-function devices (new BUS for every static vNIC). Multifunction dynamic vNICs are placed from the new Bus-slot after the last static vNIC/vHBA.

Note Cisco UCS Manager Version 2.1 supports the new StaticZero mode.

Table 10: Version Compatibility

Cisco UCS Manager		
Version 1.4 **Scheme: ZeroFunction**	**Version 2.0** **Scheme: ZeroFunction / MultiFunction**	**Version 2.1** **Scheme: ZeroFunction / MultiFunction / StaticZero**
Static and Dynamic vNICs are all on Bus [0-57], Function [0] < ZeroFunction Mode >	Static vNICs and Dynamic vNICs are on Bus [0-57], Function [0-7]. Bus 0, Function 0 Bus 0, Function 7 Bus 1, Function 0 < MultiFunction Mode >	Static vNICs or PFs will be on Bus [0-57], Function [0]. SRIOV: Corresponding VFs will be on the same Bus and Functions [1-255] No-SRIOV: Dynamic vNICs are on Bus [0-57], Function [0-7] < StaticZero Mode >
	Upgrade from Balboa will not renumber BDFs (remain in ZeroFunction mode) until Bus <= 57. Once devices exceed 58, switch to MultiFunction mode.	Upgrade from Balboa will not renumber BDFs (remain in ZeroFunction mode) until Bus <=57. Once devices exceed 58 or Platform specific maximum PCIe Bus number or change to SRIOV configuration, switch to StaticZero mode.

Cisco UCS Manager		
Version 1.4 **Scheme: ZeroFunction**	**Version 2.0** **Scheme: ZeroFunction / MultiFunction**	**Version 2.1** **Scheme: ZeroFunction / MultiFunction / StaticZero**
		Upgrade from Cisco UCS Manager Version 2.0 will not renumber BDFs (remain in ZeroFunction / MultiFunction mode). Once devices exceed 58 or Platfor specific maximum PCIe Bus number OR Change to SRIOV configuration, switch to StaticZero mode.

CHAPTER 32

Configuring Server Boot

This chapter includes the following sections:

Boot Policy

The boot policy determines the following:

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

For example, you can choose to have associated servers boot from a local device, such as a local disk or CD-ROM (VMedia), or you can select a SAN boot or a LAN (PXE) boot.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect. If you do not include a boot policy in a service profile, the server uses the default settings in the BIOS to determine the boot order.

Note Changes to a boot policy might be propagated to all servers created with an updating service profile template that includes that boot policy. Reassociation of the service profile with the server to rewrite the boot order information in the BIOS is automatically triggered.

Creating a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, we recommend that you create a global boot policy that can be included in multiple service profiles or service profile templates.

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 **Boot Policies** and select **Create Boot Policy**.
The **Create Boot Policy** wizard displays.

Step 5 Enter a unique name and description for 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.

Step 6 (Optional) To reboot all servers that use this boot policy after you make changes to the boot order, check the **Reboot on Boot Order Change** check box.
In the Cisco UCS Manager GUI, if the **Reboot on Boot Order Change** check box is checked for a boot policy, and if CD-ROM or Floppy is the last device in the boot order, deleting or adding the device does not directly affect the boot order and the server does not reboot.

Step 7 (Optional) If desired, check the **Enforce vNIC/vHBA/iSCSI Name** check box.

- If checked, Cisco UCS Manager displays a configuration error and reports whether one or more of the vNICs, vHBAs, or iSCSI vNICs listed in the **Boot Order** table match the server configuration in the service profile.
- If not checked, Cisco UCS Manager uses the vNICs, vHBAs, or iSCSI vNICs (as appropriate for the boot option) from the server configuration in the service profile. It does not report whether the vNICs, vHBAs, or iSCSI vNICs specified in the boot policy match the server configuration in the service profile.

Step 8 Configure one or more of the following boot options for the boot policy and set their boot order:

- SAN Boot—To boot from an operating system image on the SAN, continue with Configuring a SAN Boot for a Boot Policy, on page 451.

  You can specify a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.
- iSCSI Boot—To boot from an iSCSI LUN, continue with Creating an iSCSI Boot Policy, on page 462.
- LAN Boot—To boot from a centralized provisioning server, continue with Configuring a LAN Boot for a Boot Policy, on page 477.
- Local Disk boot—To boot from the local disk on the server, continue with Configuring a Local Disk Boot for a Boot Policy, on page 478.

- Virtual Media Boot —To boot from virtual media that mimics the insertion of a physical CD or floppy drive into a server, continue with Configuring a Virtual Media Boot for a Boot Policy, on page 479.

What to Do Next

Include the boot policy in a service profile and/or template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.

SAN Boot

You can configure a boot policy to boot one or more servers from an operating system image on the SAN. The boot policy can include a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.

We recommend that you use a SAN boot, because it offers the most service profile mobility within the system. If you boot from the SAN when you move a service profile from one server to another, the new server boots from the exact same operating system image. Therefore, the new server appears to be the exact same server to the network.

To use a SAN boot, ensure that the following is configured:

- The Cisco UCS domain must be able to communicate with the SAN storage device that hosts the operating system image.
- A boot target LUN on the device where the operating system image is located.

Configuring a SAN Boot for a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, we recommend that you create a global boot policy that can be included in multiple service profiles or service profile templates.

Tip

If you configure a local disk and a SAN LUN for the boot order storage type and the operating system or logical volume manager (LVM) is configured incorrectly, the server might boot from the local disk rather than the SAN LUN.

For example, on a server with Red Hat Linux installed, where the LVM is configured with default LV names and the boot order is configured with a SAN LUN and a local disk, Linux reports that there are two LVs with the same name and boots from the LV with the lowest SCSI ID, which could be the local disk.

This procedure continues directly from Creating a Boot Policy, on page 450.

Before You Begin

Note If you are creating a boot policy that boots the server from a SAN LUN and you require reliable SAN boot operations, we recommend that you first remove all local disks from servers associated with a service profile that includes the boot policy.

Procedure

Step 1 Click the down arrows to expand the **vHBAs** area.

Step 2 Click the **Add SAN Boot** link.

Step 3 In the **Add SAN Boot** dialog box, complete the following fields, and click **OK**:

Name	Description
vHBA field	Enter the name of the vHBA you want to use for the SAN boot.
Type field	This can be one of the following: • **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

Step 4 If this vHBA points to a bootable SAN image, click the **Add SAN Boot Target** link and, in the **Add SAN Boot Target** dialog box, complete the following fields, then click **OK**:

Name	Description
Boot Target LUN field	The LUN that corresponds to the location of the boot image.
Boot Target WWPN field	The WWPN that corresponds to the location of the boot image.

Name	Description
Type field	This can be one of the following: • **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

Step 5 Do one of the following:

- Add another boot device to the **Boot Order** table.
- Click **OK** to finish.

What to Do Next

Include the boot policy in a service profile and/or template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.

iSCSI Boot

iSCSI boot enables a server to boot its operating system from an iSCSI target machine located remotely over a network.

iSCSI boot is supported on the following Cisco UCS hardware:

- Cisco UCS server blades that have the Cisco UCS M51KR-B Broadcom BCM57711 network adapter and use the default MAC address provided by Broadcom.
- Cisco UCS M81KR Virtual Interface Card
- Cisco UCS VIC-1240 Virtual Interface Card
- Cisco UCS VIC-1280 Virtual Interface Card

There are prerequisites that must be met before you configure iSCSI boot. For a list of these prerequisites, see iSCSI Boot Guidelines and Prerequisites, on page 454.

For a high-level procedure for implementing iSCSI boot, see Configuring iSCSI Boot, on page 457.

iSCSI Boot Process

Cisco UCS Manager uses the iSCSI vNIC and iSCSI boot information created for the service profile in the association process to program the adapter, located on the server. After the adapter is programmed, the server reboots with the latest service profile values. After the power on self-test (POST), the adapter attempts to initialize using these service profile values. If the adapter can use the values and log in to its specified target, the adapter initializes and posts an iSCSI Boot Firmware Table (iBFT) to the host memory and a valid bootable LUN to the system BIOS. The iBFT that is posted to the host memory contains the initiator and target configuration that is programmed on the primary iSCSI VNIC.

Note Previously, the host would see only one of the boot paths configured, depending on which path completed the LUN discovery first, and would boot from that path. Now, when there are two iSCSI boot vNICs configured, the host will see both of the boot paths. So for multipath configurations, a single IQN needs to be configured on both the boot vNICs If there are different IQNs configured on the boot vNICs on a host, the host will boot with the IQN that is configured on the boot vNIC with the lower PCI order.

The next step, which is the installation of the operating system (OS), requires an OS that is iBFT capable. During installation of the OS, the OS installer scans the host memory for the iBFT table and uses the information in the iBFT to discover the boot device and create an iSCSI path to the target LUN. In some OS's a NIC driver is required to complete this path. If this step is successful, the OS installer finds the iSCSI target LUN on which to install the OS.

Note The iBFT works at the OS installation software level and might not work with HBA mode (also known as TCP offload). Whether iBFT works with HBA mode depends on the OS capabilities during installation. Also, for a server that includes a Cisco UCS M51KR-B Broadcom BCM57711 adapter, the iBFT normally works at a maximum transmission unit (MTU) size of 1500, regardless of the MTU jumbo configuration. If the OS supports HBA mode, you might need to set HBA mode, dual-fabric support, and jumbo MTU size after the iSCSI installation process.

iSCSI Boot Guidelines and Prerequisites

These guidelines and prerequisites must be met before configuring iSCSI boot:

- After the iSCSI boot policies have been created, a user with ls-compute privileges can include them in a service profile or service profile template. However, a user with only ls-compute privileges cannot create iSCSI boot policies.
- To set up iSCSI boot from a Windows 2008 server where the second vNIC (failover vNIC) must boot from an iSCSI LUN, consult Microsoft Knowledge Base Article 976042. Microsoft has a known issue where Windows might fail to boot from an iSCSI drive or cause a bugcheck error if the networking hardware is changed. To work around this issue, follow the resolution recommended by Microsoft.

- The storage array must be licensed for iSCSI boot and the array side LUN masking must be properly configured.
- Two IP addresses must be determined, one for each iSCSI initiator. If possible, the IP addresses should be on the same subnet as the storage array. The IP addresses are assigned statically or dynamically using the Dynamic Host Configuration Protocol (DHCP).
- You cannot configure boot parameters in the Global boot policy. Instead, after configuring boot parameters, you need to include the boot policy in the appropriate service profile.
- The operating system (OS) must be iSCSI Boot Firmware Table (iBFT) compatible.
- For Cisco UCS M51KR-B Broadcom BCM57711 network adapters:
    - ◦ Servers that use iSCSI boot must contain the Cisco UCS M51KR-B Broadcom BCM57711 network adapter. For information on installing or replacing an adapter card, see the *Cisco UCS B250 Extended Memory Blade Server Installation and Service Note*. The service note is accessible from the *Cisco UCS B-Series Servers Documentation Roadmap* at http://www.cisco.com/go/unifiedcomputing/b-series-doc.
    - ◦ Set the MAC addresses on the iSCSI device.
    - ◦ If you are using the DHCP Vendor ID (Option 43), configure the MAC address of an iSCSI device in /etc/dhcpd.conf.
    - ◦ HBA mode (also known as TCP offload) and the boot to target setting are supported. However, only Windows OS supports HBA mode during installation.
    - ◦ Before installing the OS, disable the boot to target setting in the iSCSI adapter policy, then after installing the OS, reenable the boot to target setting.

      Note Each time you change an adapter policy setting, the adapter reboots to apply the new setting.

    - ◦ When installing the OS on the iSCSI target, the iSCSI target must be ordered *before* the device where the OS image resides. For example, if you are installing the OS on the iSCSI target from a CD, the boot order should be the iSCSI target and then the CD.
    - ◦ After the server has been iSCSI booted, do not modify the Initiator Name, Target name, LUN, iSCSI device IP, or Netmask/gateway using the Broadcom tool.
    - ◦ Do not interrupt the POST (power on self-test) process or the Cisco UCS M51KR-B Broadcom BCM57711 network adapter will fail to initialize.
- For Cisco UCS M81KR Virtual Interface Card and Cisco UCS VIC-1240 Virtual Interface Card:
    - Do not set MAC addresses on the iSCSI device.
    - HBA mode and the boot to target setting are *not* supported.
    - When installing the OS on the iSCSI target, the iSCSI target must be ordered *after* the device where the OS image resides. For example, if you are installing the OS on the iSCSI target from a CD, the boot order should be the CD and then the iSCSI target.
    - If you are using the DHCP Vendor ID (Option 43), the MAC address of the overlay vNIC needs to be configured in /etc/dhcpd.conf.

  - After the server has been iSCSI booted, do not modify the IP details of the overlay vNIC.

- The VMware ESX/ESXi operating system does not support storing a core dump file to an iSCSI boot target LUN. Dump files must be written to a local disk.

Initiator IQN Configuration

Cisco UCS uses the following rules to determine the initiator IQN for an adapter iSCSI vNIC at the time a service profile is associated with a physical server:

- An initiator IQN at the service profile level *and* at the iSCSI vNIC level cannot be used together in a service profile.
- If an initiator IQN is specified at the service profile level, all of the adaptor iSCSI vNICs are configured to use the same initiator IQN, except in the case of DHCP Option 43, where the initiator IQN is set to empty on the adapter iSCSI vNIC.
- When an initiator IQN is set at the iSCSI vNIC level, the initiator IQN at the service profile level is removed, if one is present.
- If there are two iSCSI vNIC in a service profile and only one of them has the initiator IQN set, the second one is configured with the default IQN pool. You can change this configuration later. The only exception is if DHCP Option 43 is configured. In this case, the initiator IQN on the second iSCSI vNIC is removed during service profile association.

Enabling MPIO on Windows

Note If you change the networking hardware, Windows may fail to boot from an iSCSI drive. For more information, see Microsoft support Article ID: 976042.

Before You Begin

The server on which you enable MPIO must have a Cisco VIC driver.

If there are multiple paths configured to the boot LUN, only one path should be enabled when the LUN is installed.

Procedure

Step 1 In the service profile associated with the server, configure the primary iSCSI vNIC.
For more information, see Creating an iSCSI vNIC for a Service Profile, on page 463.

Step 2 Using the primary iSCSI vNIC, install the Windows operating system on the iSCSI target LUN.

Step 3 After Windows installation is completed, enable MPIO on the host.

Step 4 In the service profile associated with the server, add the secondary iSCSI vNIC to the boot policy.
For more information, see Creating an iSCSI Boot Policy, on page 462.

Configuring iSCSI Boot

When you configure an adapter or blade in Cisco UCS to iSCSI boot from a LUN target, you need to complete all of the following steps.

Procedure

	Command or Action	Purpose
Step 1	Configure the iSCSI boot adapter policy.	(Optional) For more information, see Creating an iSCSI Adapter Policy, on page 458
Step 2	Configure the authentication profiles to be used by the initiator and target.	(Optional) For more information, see Creating an iSCSI Authentication Profile, on page 460
Step 3	If you plan to configure the iSCSI initiator to use an IP address from a pool of IP addresses, add a block of IP addresses to the iSCSI initiator pool.	(Optional) For more information, see Creating an iSCSI Initiator IP Pool, on page 461
Step 4	Create a boot policy that can be used in any service profile. Alternatively, you can create a local boot policy only for the specific service policy. However, we recommend that you create a boot policy that can be shared with multiple service profiles.	For more information about creating a boot policy that can be used in any service profile, see Creating an iSCSI Boot Policy, on page 462.
Step 5	If you created a boot policy that can be used in any service profile, you need to assign it to the service profile. Otherwise, proceed to the next step.	You can assign the boot policy to the service profile while configuring the iSCSI boot and vNIC parameters in the service profile in step 7.
Step 6	Create an iSCSI vNIC in a service profile.	For more information, see Creating an iSCSI vNIC for a Service Profile, on page 463
Step 7	Configure the iSCSI boot parameters, including the iSCSI qualifier name (IQN), initiator, target interfaces, and iSCSI vNIC parameters in a service profile in expert mode or service profile template.	For more information, see Creating a Service Profile with the Expert Wizard or Creating a Service Profile Template, respectively.
Step 8	Verify the iSCSI boot operation.	For more information, see Verifying iSCSI Boot
Step 9	Install the OS on the server.	For more information, see one of the following guides: • *Cisco UCS B-Series Blade Servers VMware Installation Guide* • *Cisco UCS B-Series Blade Servers Linux Installation Guide*

	Command or Action	Purpose
		• *Cisco UCS B-Series Blade Servers Windows Installation Guide*
Step 10	Boot the server.	

Creating an iSCSI Adapter Policy

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 **Adapter Policies** and choose **Create iSCSI Adapter Policy**.

Step 5 In the **Create iSCSI Adapter Policy** dialog box, complete 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.
Connection Timeout field	The number of seconds to wait until Cisco UCS assumes that the initial login has failed and the iSCSI adapter is unavailable. Enter an integer between 0 and 255. If you enter 0, Cisco UCS uses the value set in the adapter firmware (default: 15 seconds).
LUN Busy Retry Count field	The number of times to retry the connection in case of a failure during iSCSI LUN discovery. Enter an integer between 0 and 60. If you enter 0, Cisco UCS uses the value set in the adapter firmware (default: 15 seconds).
DHCP Timeout field	The number of seconds to wait before the initiator assumes that the DHCP server is unavailable. Enter an integer between 60 and 300 (default: 60 seconds).

Name	Description
Enable TCP Timestamp check box	Check this box if you want to use a TCP Timestamp. With this setting, transmitted packets are given a time stamp of when the packet was sent so that the packet's round-trip time can be calculated, when needed. **Note** This option only applies to servers with the Cisco UCS NIC M51KR-B adapter.
HBA Mode check box	Check this box to enable HBA mode (also known as TCP offload). **Important** This option should only be enabled for servers with the Cisco UCS NIC M51KR-B adapter running the Windows operating system.
Boot to Target check box	Check this box to boot from the iSCSI target. **Note** This option only applies to servers with the Cisco UCS NIC M51KR-B adapter. It should be disabled until you have installed an operating system on the server.
Owner field	This can be one of the following: • **Local**—This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global**—Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global**—This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

Step 6 Click **OK**.

What to Do Next

Include the adapter policy in a service profile and/or template.

Deleting an iSCSI Adapter Policy

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 Expand the **Adapter Policies** node.

Step 5 Right-click the adapter policy and choose **Delete.**

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Creating an iSCSI Authentication Profile

For iSCSI boot, you need to create both an initiator and a target iSCSI authentication profile.

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 **iSCSI Authentication Profiles** and choose **Create iSCSI Authentication Profile**.

Step 5 In the **Create Authentication Profile** dialog box, complete the following fields:

Name	Description
Name field	The name of the authentication profile. 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.
User Id field	The user Id associated with this profile. Enter between 1 and 128 characters, spaces, or special characters.
Password field	The password associated with this profile. Enter between 12 and 16 characters, including special characters.
Confirm Password field	The password again for confirmation purposes.

Step 6 Click **OK**.

What to Do Next

Include the authentication profile in a service profile and/or template.

Deleting an iSCSI Authentication Profile

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 Expand the **iSCSI Authentication Profiles** node.

Step 5 Right-click the IP pool you want to delete and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Creating an iSCSI Initiator IP Pool

You can create a group of IP addresses to be used for iSCSI boot. Cisco UCS Manager reserves the block of IP addresses you specify.

The IP pool must not contain any IP addresses that have been assigned as static IP addresses for a server or service profile.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Pools**.

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

Step 4 Expand the **IP Pools** node.

Step 5 Right-click **IP Pool iscsi-initiator-pool** and choose **Create Block of IP Addresses**.

Step 6 In the **Create a Block of IP Addresses** dialog box, complete the following fields:

Name	Description
From field	The first IP address in the block.
Size field	The number of IP addresses in the pool.
Subnet Mask field	The subnet mask associated with the IP addresses in the block.
Default Gateway field	The default gateway associated with the IP addresses in the block.
Primary DNS field	The primary DNS server that this block of IP addresses should access.
Secondary DNS field	The secondary DNS server that this block of IP addresses should access.

Step 7 Click **OK**.

What to Do Next

Configure one or more service profiles or service profile templates to obtain the iSCSI initiator IP address from the iSCSI initiator IP pool.

Creating an iSCSI Boot Policy

You can add up to two iSCSI vNICs per boot policy. One vNIC acts as the primary iSCSI boot source, and the other acts as the secondary iSCSI boot source.

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 **Boot Policies** and choose **Create Boot Policy**.
The **Create Boot Policy** wizard displays.

Step 5 Enter a unique name and description for 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.

Step 6 (Optional) To reboot a server that uses this boot policy after you make changes to the boot order, check the **Reboot on Boot Order Change** check box.
In the Cisco UCS Manager GUI, if the **Reboot on Boot Order Change** check box is checked for a boot policy, and if CD-ROM or Floppy is the last device in the boot order, deleting or adding the device does not directly affect the boot order and the server does not reboot.

Step 7 (Optional) If desired, check the **Enforce vNIC/vHBA/iSCSI Name** check box.

- If checked, Cisco UCS Manager displays a configuration error and reports whether one or more of the vNICs, vHBAs, or iSCSI vNICs listed in the **Boot Order** table match the server configuration in the service profile.
- If not checked, Cisco UCS Manager uses the vNICs, vHBAs, or iSCSI vNICs (as appropriate for the boot option) from the server configuration in the service profile. It does not report whether the vNICs, vHBAs, or iSCSI vNICs specified in the boot policy match the server configuration in the service profile.

Step 8 To add a iSCSI boot to the boot policy, do the following:

a) Click the down arrows to expand the iSCSI vNICs area.
b) Click the **Add iSCSI Boot** link.
c) In the **Add iSCSI Boot** dialog box, enter a name for the iSCSI vNIC, and click **OK**.

d) Repeat steps b and c to create another iSCSI vNIC.

What to Do Next

Include the boot policy in a service profile and/or template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.

Creating an iSCSI vNIC for a 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 contains the service profile for which you want to create an iSCSI vNIC.

Step 4 Expand the service profile for which you want to create a iSCSI vNIC.

Step 5 Right-click the **iSCSI vNICs** node and choose **Create vNICs**.

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

Name	Description
Name field	The name of the iSCSI vNIC. 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.
Overlay vNIC drop-down list	The LAN vNIC associated with this iSCSI vNIC, if any.
iSCSI Adapter Policy drop-down list	The iSCSI adapter policy associated with this iSCSI vNIC, if any.
Create iSCSI Adapter Policy link	Click this link to create a new iSCSI adapter policy that will be available to all iSCSI vNICs.
MAC Address field	The MAC address associated with this iSCSI vNIC, if any. If the MAC address is not set, the Cisco UCS Manager GUI displays **Derived**.
MAC Pool field	The MAC pool associated with this iSCSI vNIC, if any.

Name	Description
VLAN drop-down list	The virtual LAN associated with this iSCSI vNIC. The default VLAN is **default**. **Note** For the Cisco UCS M81KR Virtual Interface Card and the Cisco UCS VIC-1240 Virtual Interface Card, the VLAN that you specify must be the same as the native VLAN on the overlay vNIC. For the Cisco UCS M51KR-B Broadcom BCM57711 Adapter, the VLAN that you specify can be any VLAN assigned to the overlay vNIC.

Step 7 In the **MAC Address Assignment** drop-down list in the **iSCSI MAC Address** area, choose one of the following:

- Leave the MAC address unassigned, select **Select (None used by default)**. Select this option if the server that will be associated with this service profile contains a Cisco UCS M81KR Virtual Interface Card adapter or a Cisco UCS VIC-1240 Virtual Interface Card.

  Important If the server that will be associated with this service profile contains a Cisco UCS NIC M51KR-B adapter, you must specify a MAC address.

- A specific MAC address, select **00:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link.
- A MAC address from a pool, select the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

  If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.

Step 8 (Optional) If you want to create a MAC pool that will be available to all service profiles, click **Create MAC Pool** and complete the fields in the **Create MAC Pool** wizard.
For more information, see Creating a MAC Pool, on page 245.

Step 9 Click **OK**.

Step 10 (Optional) If you want to set or change the initiator name, from the **iSCSI vNICs** tab, click **Reset Initiator Name** or **Change Initiator Name** and complete the fields in the **Change Initiator Name** dialog box or click . For more information, see either Setting the Initiator IQN at the Service Profile Level, on page 465 or Setting the Initiator IQN at the Service Profile Level, on page 465.

Deleting an iSCSI vNIC from a 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 contains the service profile from which you want to delete an iSCSI vNIC.

Step 4 Expand the service profile from which you want to delete an iSCSI vNIC.

Step 5 Expand the **iSCSI vNICs** node.

Step 6 Right-click the iSCSI vNIC you want to delete and choose **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Setting the Initiator IQN at the Service Profile Level

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 desired node for the organization.

Step 4 Click the service profile that has the iSCSI vNIC that you want to change.

Step 5 In the **Work** pane, click the **iSCSI vNICs** tab.

Step 6 Click **Reset Initiator Name**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Changing the Initiator IQN at the Service Profile Level

Procedure

	Command or Action	Purpose
Step 1	In the **Navigation** pane, click the **Servers** tab.	
Step 2	On the **Servers** tab, expand **Servers** > **Service Profiles**.	
Step 3	Expand the desired node for the organization.	
Step 4	Click the service profile that has the iSCSI vNIC that you want to change.	

<table>
<tr><th></th><th>Command or Action</th><th>Purpose</th></tr>
<tr><td><b>Step 5</b></td><td>In the <b>Work</b> pane, click the <b>iSCSI vNICs</b> tab.</td><td></td></tr>
<tr><td><b>Step 6</b></td><td>In the <b>Actions</b> area, click <b>Change Initiator Name</b>.</td><td></td></tr>
<tr><td><b>Step 7</b></td><td>In the <b>Change Initiator Name</b> dialog box, change the values in the following fields</td><td>
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td><b>Initiator Name Assignment</b> drop-down list</td><td>Choose the IQN initiator name that you want to use from the drop-down list.</td></tr>
<tr><td><b>Initiator Name</b> field</td><td>If you selected a manual initiator name assignment, enter the initiator name.</td></tr>
<tr><td><b>Create IQN Suffix Pool</b> link</td><td>Click to create a new IQN suffix pool.</td></tr>
</table>
</td></tr>
<tr><td><b>Step 8</b></td><td>Click <b>OK</b>.</td><td></td></tr>
</table>

Setting iSCSI Boot Parameters

You can set iSCSI boot parameters, including the boot order, boot policy, iSCSI authentication profile, initiator interface, and target interface for an iSCSI vNIC.

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 contains the service profile for which you want to create iSCSI boot parameters. If the system does not include multi-tenancy, expand the root node.

Step 4 Click the service profile for which you want to create iSCSI boot parameters.

Step 5 Click the **Boot Order** tab.

Step 6 In the **Specific Boot Policy** area, click the down arrows to expand the **iSCSI vNICs** area.

Step 7 In the **iSCSI vNICs** area, double-click the iSCSI vNICs from which you want to boot the server to add them to the **Boot Order** table.

Step 8 In the **iSCSI vNICs** area, click the **Set Boot Parameters** link.

If there are two iSCSI vNICs, choose the one for which you want to set boot parameters.

Step 9 In the **Set iSCSI Boot Parameters** dialog box, complete the following fields:

Name	Description
Name field	The name of the iSCSI vNIC for which you are setting the boot parameters.
Authentication Profile drop-down list	The name of the associated iSCSI authentication profile.
Create Authentication Profile link	Click this link to create a new iSCSI authentication profile that will be available to all iSCSI vNICs.

Step 10 In the **Initiator Name** area, complete the following fields:

Name	Description
Initiator Name Assignment drop-down list	Select how the iSCSI boot initiator name is assigned. Choose one of the following methods: • **Manual—**You will enter a name in the **Initiator Name** field. The initiator name can contain up to 223 characters. • **Pools—**Choose an IQN suffix pool from which the name will be assigned. **Note** If you need to, you can change or reset the initiator name. For more information, see Changing the Initiator IQN at the Service Profile Level, on page 465 **Note** Setting the Initiator Name from the Set iSCSI Boot Parameters dialog box sets the initiator IQN at the iSCSI vNIC level and not at the service profile level. If more than one path is configured, you must set the initiator IQN from the iSCSI vNICs tab or when creating a service profile.
Create IQN Suffix Pool link	Click this link to create a new IQN suffix pool that will be available to all iSCSI vNICs.
Initiator Name field	A regular expression that defines the name of the iSCSI initiator. You can enter any alphanumeric string as well as the following special characters: • . (period) • : (colon) • - (dash)

Step 11 From the **Initiator IP Address Policy** drop-down list, choose of the following:

Option	Description
Select (DHCP used by default)	The system selects an interface automatically using DHCP. Proceed to Step 13.
Static	A static IPv4 address is assigned to the iSCSI boot vNIC based on the information entered in this area. Proceed to Step 12.
Pool	An IPv4 address is assigned to the iSCSI boot vNIC from the management IP address pool. Proceed to Step 13.

Step 12 If you chose **Static** from the **Initiator IP Address Policy** drop-down list, complete the following fields:

Name	Description
IPv4 Address field	The IPv4 address assigned to the iSCSI boot vNIC. If you want to specify this address, you must select **Static** in the **Initiator IP Address Policy** drop-down list.
Subnet Mask field	The subnet mask associated with the IPv4 address.
Default Gateway field	The default gateway associated with the IPv4 address.
Primary DNS field	The primary DNS server address.
Secondary DNS field	The secondary DNS server address.

Step 13 For the iSCSI target interface, choose one of the following radio buttons:

Option	Description
iSCSI Static Target Interface	The system creates a static target interface that you need to configure. Proceed to Step 14.
iSCSI Auto Target Interface	The system creates an auto target interface. You need to specify whether the auto target uses an initiator or a DCHP vendor ID. Proceed to Step 16.

Step 14 If you chose **iSCSI Static Target Interface**, in the **Static Target Interface** table, click **Add**.

Step 15 In the **Create iSCSI Static Target** dialog box, complete the following fields:

Name	Description
iSCSI Target Name field	A regular expression that defines the iSCSI Qualified Name (IQN) or Extended Unique Identifier (EUI) name of the iSCSI target. You can enter any alphanumeric characters as well as the following special characters: • . (period) • : (colon) • - (dash) **Important** This name must be properly formatted using standard IQN or EUI guidelines. The following examples show properly formatted iSCSI target names: • iqn.2001-04.com.example • iqn.2001-04.com.example:storage:diskarrays-sn-a8675309 • iqn.2001-04.com.example:storage.tape1.sys1.xyz • iqn.2001-04.com.example:storage.disk2.sys1.xyz • eui.02004567A425678D
Priority field	The system-assigned priority for the iSCSI target.
Port field	The port associated with the iSCSI target. Enter an integer between 1 and 65535. The default is 3260.
Authentication Profile drop-down list	The name of the associated iSCSI authentication profile.
Create iSCSI Authentication Profile link	Click this link to create a new iSCSI authentication profile that will be available to all iSCSI vNICs.
IPv4 Address field	The IPv4 address assigned to the iSCSI target.
LUN Id field	The LUN identifier in the iSCSI target.

Step 16 If you chose **iSCSI Auto Target Interface**, enter either the initiator name or the DHCP vendor ID in the **DHCP Vendor Id** field. The initiator must have already been configured. The vendor ID can be up to 32 alphanumeric characters.

Step 17 Click **OK**.

Modifying iSCSI Boot Parameters

You can modify iSCSI boot parameters, including the boot order, boot policy, iSCSI authentication profile, initiator interface, and target interface for an iSCSI vNIC.

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 contains the service profile for which you want to modify iSCSI boot parameters. If the system does not include multi-tenancy, expand the root node.

Step 4 Click the service profile for which you want to modify iSCSI boot parameters.

Step 5 Click the **Boot Order** tab.

Step 6 In the **Specific Boot Policy** area, click the down arrows to expand the **iSCSI vNICs** area.

Step 7 To add or delete an iSCSI vNIC from the boot order or to change the boot order, do one of the following:

- To add an iSCSI vNIC, in the **iSCSI vNICs** area, double-click an iSCSI vNICs to add it to the **Boot Order** table.
- To delete an iSCSI vNIC from the boot order, in the **Boot Order** table, select the iSCSI vNIC and click **Delete**.
- To change the iSCSI vNIC boot order, in the **Boot Order** table, select the iSCSI vNIC and click either **Move Up** or **Move Down**.

Step 8 To change the boot parameters, in the **iSCSI vNICs** area, click the **Set Boot Parameters** link.
If there are two iSCSI vNICs, choose the one for which you want to change boot parameters.

Step 9 In the **Set iSCSI Boot Parameters** dialog box, change the values in any of the following fields:

Name	Description
Name field	The name of the iSCSI vNIC for which you are setting the boot parameters.
Authentication Profile drop-down list	The name of the associated iSCSI authentication profile.
Create Authentication Profile link	Click this link to create a new iSCSI authentication profile that will be available to all iSCSI vNICs.

Step 10 In the **Initiator Name** area, complete the following fields:

Name	Description
Initiator Name Assignment drop-down list	Select how the iSCSI boot initiator name is assigned. Choose one of the following methods: • **Manual—**You will enter a name in the **Initiator Name** field. The initiator name can contain up to 223 characters. • **Pools—**Choose an IQN suffix pool from which the name will be assigned. **Note** If you need to, you can change or reset the initiator name. For more information, see Changing the Initiator IQN at the Service Profile Level, on page 465 **Note** Setting the Initiator Name from the Set iSCSI Boot Parameters dialog box sets the initiator IQN at the iSCSI vNIC level and not at the service profile level. If more than one path is configured, you must set the initiator IQN from the iSCSI vNICs tab or when creating a service profile.
Create IQN Suffix Pool link	Click this link to create a new IQN suffix pool that will be available to all iSCSI vNICs.
Initiator Name field	A regular expression that defines the name of the iSCSI initiator. You can enter any alphanumeric string as well as the following special characters: • . (period) • : (colon) • - (dash)

Step 11 From the **Initiator IP Address Policy** drop-down list, change the selection to one of the following:

Option	Description
Select (DHCP used by default)	The system selects an interface automatically using DHCP. Proceed to Step 13.
Static	A static IPv4 address is assigned to the iSCSI boot vNIC based on the information entered in this area. Proceed to Step 12.
Pool	An IPv4 address is assigned to the iSCSI boot vNIC from the management IP address pool. Proceed to Step 13.

Step 12 If you chose **Static** from the **Initiator IP Address Policy** drop-down list, complete or change the following fields:

Name	Description
IPv4 Address field	The IPv4 address assigned to the iSCSI boot vNIC. If you want to specify this address, you must select **Static** in the **Initiator IP Address Policy** drop-down list.
Subnet Mask field	The subnet mask associated with the IPv4 address.
Default Gateway field	The default gateway associated with the IPv4 address.
Primary DNS field	The primary DNS server address.
Secondary DNS field	The secondary DNS server address.

Step 13 For the iSCSI target interface, choose one of the following radio buttons:

Option	Description
iSCSI Static Target Interface	The system creates a static target interface that you need to configure. Proceed to Step 14.
iSCSI Auto Target Interface	The system creates an auto target interface. You need to specify whether the auto target uses an initiator or a DCHP vendor ID. Proceed to Step 15.

Step 14 If you chose **iSCSI Static Target Interface**, do one of the following in the **Static Target Interface** table:

- To add an iSCSI static target interface, click **Add** or to modify an iSCSI target interface, select the iSCSI target interface that you want to change and click **Modify**. Then and complete or change the following fields in the **Create iSCSI Static Target** dialog box:

Name	Description
iSCSI Target Name field	A regular expression that defines the iSCSI Qualified Name (IQN) or Extended Unique Identifier (EUI) name of the iSCSI target. You can enter any alphanumeric characters as well as the following special characters: • . (period) • : (colon) • - (dash) **Important** This name must be properly formatted using standard IQN or EUI guidelines. The following examples show properly formatted iSCSI target names: • iqn.2001-04.com.example • iqn.2001-04.com.example:storage:diskarrays-sn-a8675309 • iqn.2001-04.com.example:storage.tape1.sys1.xyz • iqn.2001-04.com.example:storage.disk2.sys1.xyz • eui.02004567A425678D
Priority field	The system-assigned priority for the iSCSI target.
Port field	The port associated with the iSCSI target. Enter an integer between 1 and 65535. The default is 3260.
Authentication Profile drop-down list	The name of the associated iSCSI authentication profile.
Create iSCSI Authentication Profile link	Click this link to create a new iSCSI authentication profile that will be available to all iSCSI vNICs.
IPv4 Address field	The IPv4 address assigned to the iSCSI target.
LUN Id field	The LUN identifier in the iSCSI target.

- To delete an iSCSI target interface, select the iSCSI target interface that you want to delete and click **Delete**.

Note If you have two iSCSI static targets and you delete the first priority target, the second priority target becomes the first priority target, although Cisco UCS Manager still shows it as the second priority target.

Step 15 If you chose **iSCSI Auto Target Interface**, change the entry to either the initiator name or the DHCP vendor ID in the **DHCP Vendor Id** field. The initiator must have already been configured. The vendor ID can be up to 32 alphanumeric characters.

Step 16 Click **OK**.

IQN Pools

An IQN pool is a collection of iSCSI Qualified Names (IQNs) for use as initiator identifiers by iSCSI vNICs in a Cisco UCS domain.

IQN pool members are of the form *prefix*:*suffix*:*number*, where you can specify the prefix, suffix, and a block (range) of numbers.

An IQN pool can contain more than one IQN block, with different number ranges and different suffixes, but sharing the same prefix.

Creating an IQN Pool

Note In most cases, the maximum IQN size (prefix + suffix + additional characters) is 223 characters. When using the Cisco UCS NIC M51KR-B adapter, you must limit the IQN size to 128 characters.

Procedure

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

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

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

Step 4 Right-click **IQN Pools** and select **Create IQN Suffix Pool**.

Step 5 In the **Define Name and Description** page of the **Create IQN Suffix Pool** wizard, fill in the following fields:

Name	Description
Name field	The name of the iSCSI Qualified Name (IQN) pool. 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 has been saved.
Description field	The user-defined description of the pool. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Prefix field	The prefix for any IQN blocks created for this pool. Enter from 1 to 150 characters. You can use any letter or number, as well as the special characters . (period), : (colon), and - (hyphen). For example, you could use iqn1.alpha.com.
Assignment Order field	This can be one of the following: • **Default—**Cisco UCS Manager selects a random identity from the pool. • **Sequential—**Cisco UCS Manager selects the lowest available identity from the pool.

Step 6 Click **Next**.

Step 7 In the **Add IQN Blocks** page of the **Create IQN Suffix Pool** wizard, click **Add**.

Step 8 In the **Create a Block of IQN Suffixes** dialog box, fill in the following fields:

Name	Description
Suffix field	The suffix for this bock of iSCSI Qualified Names (IQNs). Enter from 1 to 64 characters. You can use any letter or number, as well as the special characters . (period), : (colon), and - (hyphen). For example, you could use alphadc-1.
From field	The first suffix number in the block.
Size field	The number of suffixes in the block.

Step 9 Click **OK**.

Step 10 Click **Finish** to complete the wizard.

What to Do Next

Include the IQN suffix pool in a service profile and/or template.

Adding a Block to an IQN Pool

Procedure

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

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

Step 3 Expand the node for the organization containing the pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Expand the **IQN Pools** node.

Step 5 Right-click the desired IQN pool and select **Create a Block of IQN Suffixes**.

Step 6 In the **Create a Block of IQN Suffixes** dialog box, fill in the following fields:

Name	Description
Suffix field	The suffix for this bock of iSCSI Qualified Names (IQNs). Enter from 1 to 64 characters. You can use any letter or number, as well as the special characters . (period), : (colon), and - (hyphen). For example, you could use alphadc-1.
From field	The first suffix number in the block.
Size field	The number of suffixes in the block.

Step 7 Click **OK**.

Deleting a Block from an IQN Pool

If you delete an address block from a pool, Cisco UCS Manager does not reallocate any addresses in that block that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted block remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

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

Step 3 Expand the node for the organization containing the pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Expand the **IQN Pools** node.

Step 5 Choose the IQN pool for which you want to delete a block of IQN suffixes.

Step 6 In the **Work pane**, click the **IQN Blocks** tab.

Step 7 Right-click the block to be deleted and select **Delete**.

Step 8 Click **Yes** to confirm the deletion.

Step 9 Click **Save Changes**.

Deleting an IQN Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that have been assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

Procedure

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

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

Step 3 Expand the node for the organization containing the pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Expand the **IQN Pools** node.

Step 5 Right-click the pool you want to delete and select **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

LAN Boot

You can configure a boot policy to boot one or more servers from a centralized provisioning server on the LAN. A LAN (or PXE) boot is frequently used to install operating systems on a server from that LAN server.

You can add more than one type of boot device to a LAN boot policy. For example, you could add a local disk or virtual media boot as a secondary boot device.

Configuring a LAN Boot for a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, we recommend that you create a global boot policy that can be included in multiple service profiles or service profile templates.

You can add more than one type of boot device to a boot policy. For example, you could add a local disk or virtual media boot as a secondary boot device.

This procedure continues directly from Creating a Boot Policy, on page 450.

Procedure

Step 1 Click the down arrows to expand the **vNICs** area.

Step 2 Click the **Add LAN Boot** link.

Step 3 In the **Add LAN Boot** dialog box, enter the name of the vNIC that you want to use for the LAN boot in the **vNIC** field, then click **OK**.

Step 4 Do one of the following:

- Add another boot device to the **Boot Order** table.
- Click **OK** to finish.

What to Do Next

Include the boot policy in a service profile and/or template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.

Local Disk Boot

If a server has a local drive or bootable USB device, you can configure a boot policy to boot the server from that device with a local disk boot policy.

Note Cisco UCS Manager does not differentiate between the types of local boot devices. If an operating system has been installed on more than one local drive or on an internal USB drive (eUSB), you cannot specify which of these devices the server should use as the boot drive.

Configuring a Local Disk Boot for a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, we recommend that you create a global boot policy that can be included in multiple service profiles or service profile templates.

You can add more than one type of boot device to a boot policy. For example, you could add a virtual media boot as a secondary boot device.

This procedure continues directly from Creating a Boot Policy, on page 450.

Procedure

Step 1 Click the down arrows to expand the **Local Devices** area.

Step 2 Click **Add Local Disk** to add the device to the **Boot Order** table.

Step 3 Do one of the following:

- Add another boot device to the **Boot Order** table.
- Click **OK** to finish.

What to Do Next

Include the boot policy in a service profile and/or template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.

Virtual Media Boot

You can configure a boot policy to boot one or more servers from a virtual media device that is accessible from the server. A virtual media device mimics the insertion of a physical CD-ROM disk (read-only) or floppy disk (read-write) into a server. This type of server boot is typically used to manually install operating systems on a server.

Configuring a Virtual Media Boot for a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, we recommend that you create a global boot policy that can be included in multiple service profiles or service profile templates.

You can add more than one type of boot device to a boot policy. For example, you could add a local disk boot as a secondary boot device.

Note Virtual Media requires the USB to be enabled. If you modify the BIOS settings that affect the USB functionality, you also affect the Virtual Media. Therefore, we recommend that you leave the following USB BIOS defaults for best performance:

- Make Device Non Bootable—set to **disabled**
- USB Idle Power Optimizing Setting—set to **high-performance**

This procedure continues directly from Creating a Boot Policy, on page 450.

Procedure

Step 1 Click the down arrows to expand the **Local Devices** area.

Step 2 Click one of the following links to add the device to the **Boot Order** table:

- **Add CD-ROM**
- **Add Floppy**

Step 3 Do one of the following:

- Add another boot device to the **Boot Order** table.
- Click **OK** to finish.

What to Do Next

Include the boot policy in a service profile and/or template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.

Deleting a Boot Policy

Procedure

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

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

Step 3 Expand the **Boot 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**.

CHAPTER 33

Deferring Deployment of Service Profile Updates

This chapter includes the following sections:

Deferred Deployment of Service Profiles

Some modifications to a service profile or to an updating service profile template can be disruptive and require a reboot of the server. You can, however, configure deferred deployment to control when those disruptive configuration changes are implemented. For example, you can choose to deploy the service profile changes immediately or have them deployed during a specified maintenance window. You can also choose whether or not a service profile deployment requires explicit user acknowledgement.

Deferred deployment is available for all configuration changes that occur through the association of a service profile with a server. These configuration changes can be prompted by a change to a service profile, to a policy that is included in a service profile, or to an updating service profile template. For example, you can defer the upgrade and activation of firmware through host firmware packages and management firmware packages, such as server BIOS, RAID controller, host HBA, and network adapters. However, you cannot defer the direct deployment of firmware images for components that do not use either of the firmware packages, such as Cisco UCS Manager, fabric interconnects, and I/O modules.

Deferred deployment is not available for the following actions which require the reboot of a server:

- Initial association of a service profile with a server
- Final disassociation of a service profile from a server, without associating the service profile with a different server
- Decommissioning a server
- Reacknowledging a server
- Resetting a server

If you want to defer the deployment of service profile changes, you must configure one or more maintenance policies and configure each service profile with a maintenance policy. If you want to define the time period when the deployment should occur, you also need to create at least one schedule with one or more recurring occurrences or one time occurrences, and include that schedule in a maintenance policy.

Deferred Deployment Schedules

A schedule contains a set of occurrences. These occurrences can be one time only or can recur at a specified time and day each week. The options defined in the occurrence, such as the duration of the occurrence or the maximum number of tasks to be run, determine whether a service profile change is deployed. For example, if a change cannot be deployed during a given maintenance window because the maximum duration or number of tasks has been reached, that deployment is carried over to the next maintenance window.

Each schedule checks periodically to see whether the Cisco UCS domain has entered one or more maintenance windows. If it has, the schedule executes the deployments that are eligible according to the constraints specified in the maintenance policy

A schedule contains one or more occurrences, which determine the maintenance windows associated with that schedule. An occurrence can be one of the following:

One Time Occurrence

One time occurrences define a single maintenance window. These windows continue until the maximum duration of the window or the maximum number of tasks that can be run in the window has been reached.

Recurring Occurrence

Recurring occurrences define a series of maintenance windows. These windows continue until the maximum number of tasks or the end of the day specified in the occurrence has been reached.

Maintenance Policy

A maintenance policy determines how Cisco UCS Manager reacts when a change that requires a server reboot is made to a service profile associated with a server or to an updating service profile bound to one or more service profiles.

The maintenance policy specifies how Cisco UCS Manager deploys the service profile changes. The deployment can occur in one of the following ways:

- Immediately
- When acknowledged by a user with admin privileges
- Automatically at the time specified in a schedule

If the maintenance policy is configured to deploy the change during a scheduled maintenance window, the policy must include a valid schedule. The schedule deploys the changes in the first available maintenance window.

Note A maintenance policy only prevents an immediate server reboot when a configuration change is made to an associated service profile. However, a maintenance policy does not prevent the following actions from taking place right away:

- Deleting an associated service profile from the system
- Disassociating a server profile from a server
- Directly installing a firmware upgrade without using a service policy
- Resetting the server

Pending Activities

If you configure deferred deployment in a Cisco UCS domain, Cisco UCS Manager enables you to view all pending activities. You can see activities that are waiting for user acknowledgement and those that have been scheduled.

If a Cisco UCS domain has pending activities, Cisco UCS Manager GUI notifies users with admin privileges when they log in.

Cisco UCS Manager displays information about all pending activities, including the following:

- Name of the service profile to be deployed and associated with a server
- Server affected by the deployment
- Disruption caused by the deployment
- Change performed by the deployment

Note You cannot specify the maintenance window in which a specific pending activity is applied to the server. The maintenance window depends upon how many activities are pending and which maintenance policy is assigned to the service profile. However, any user with admin privileges can manually initiate a pending activity and reboot the server immediately, whether it is waiting for user acknowledgment or for a maintenance window.

Guidelines and Limitations for Deferred Deployment

Cannot Undo All Changes to Service Profiles or Service Profile Templates

If you cancel a pending change, Cisco UCS Manager attempts to roll back the change without rebooting the server. However, for complex changes, Cisco UCS Manager may have to reboot the server a second time to roll back the change. For example, if you delete a vNIC, Cisco UCS Manager reboots the server according to the maintenance policy included in the service profile. You cannot cancel this reboot and change, even if you restore the original vNIC in the service profile. Instead, Cisco UCS Manager schedules a second deployment and reboot of the server.

Association of Service Profile Can Exceed Boundaries of Maintenance Window

After Cisco UCS Manager begins the association of the service profile, the scheduler and maintenance policy do not have any control over the procedure. If the service profile association does not complete within the allotted maintenance window, the process continues until it is completed. For example, this can occur if the association does not complete in time because of retried stages or other issues.

Cannot Specify Order of Pending Activities

Scheduled deployments run in parallel and independently. You cannot specify the order in which the deployments occur. You also cannot make the deployment of one service profile change dependent upon the completion of another.

Cannot Perform Partial Deployment of Pending Activity

Cisco UCS Manager applies all changes made to a service profile in the scheduled maintenance window. You cannot make several changes to a service profile at the same time and then have those changes be spread across several maintenance windows. When Cisco UCS Manager deploys the service profile changes, it updates the service profile to match the most recent configuration in the database.

Configuring Schedules

Creating a Schedule

Procedure

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

Step 2 On the **Servers** tab, right-click **Schedules** and choose **Create Schedule**.

Step 3 In the **Identify Schedule** page of the **Create Schedule** wizard, complete the following fields:

Name	Description
Name field	The name of the schedule. 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 schedule. We recommend including information about where and when the schedule should be used. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Owner field	The owner of the schedule. This can be one of the following: • **Local**—Cisco UCS Manager owns the schedule, which is configured in this Cisco UCS domain. • **Pending Global**—Cisco UCS Manager is in the process of transferring this schedule to Cisco UCS Central. • **Global**—Cisco UCS Central owns the schedule, which is configured on a remote server.

Step 4 Click **Next**.

Step 5 On the **One Time Occurrences** page, click one of the following:

Option	Description
Next	Moves to the next page. Choose this option if you do not want to create a one time occurrence for this schedule. If you choose this option, continue with Step 8.
Add	Opens the **Create a One Time Occurrence** dialog box, where you can specify a single time when this schedule should be run. If you choose this option, continue with Step 6.

Step 6 (Optional) In the **Create a One Time Occurrence** dialog box, do the following:

a) Complete the following fields:

Name	Description
Name field	The name of the one time occurrence of this schedule. 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.
Start Time field	The date and time that the occurrence will run. Click the down arrow at the end of the field to select the date from a calendar.

b) Click the down arrows to expand the **Options** area.

c) In the **Options** area, complete the following fields:

Name	Description
Max Duration field	The maximum length of time that the scheduled occurrence can run. This can be one of the following: • **None—**The occurrence runs until all tasks are completed. • **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the maximum amount of time that the occurrence can run. Cisco UCS completes as many scheduled tasks as possible within the specified time. By default, the maximum duration is set to **none**. If you do not change this setting and you do not set a maximum number of tasks, the maintenance window continues until all pending activities are completed.
Max Number of Tasks field	The maximum number of scheduled tasks that can be run during this occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs all scheduled tasks unless those tasks exceed the maximum time specified in the **Max Duration** field. If **Max Duration** is set to **none** and you select this option, the maintenance window continues until all pending activities are completed. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.
Max Number of Concurrent Tasks field	The maximum number of tasks that can run concurrently during this occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs as many concurrent tasks as the system can handle. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of concurrent tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.

Name	Description
Minimum Interval Between Tasks field	The minimum length of time that the system should wait before starting a new task. This setting is meaningful only if the maximum number of concurrent tasks is set to a value other than None. This can be one of the following: • **None**—Cisco UCS runs the next task as soon as possible. • **other**—Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the minimum amount of time that Cisco UCS will wait between tasks. **Note** This option does not apply if this schedule is associated with a fault suppression task.

d) Click **OK**.

Step 7 To add another one time occurrence, click **Add** and repeat step 6. Otherwise, click **Next**.

Step 8 (Optional) If you want to define a recurring occurrence for this schedule, on the **Recurring Occurrences** page, click **Add**.

a) In the **Create a Recurring Occurrence** dialog box, complete the following fields:

Name	Description
Name field	The name of the recurring occurrence of this schedule. 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.
Day field	The day on which Cisco UCS runs an occurrence of this schedule. This can be one of the following: • **every day** • **Monday** • **Tuesday** • **Wednesday** • **Thursday** • **Friday** • **Saturday** • **Sunday** • **odd days** • **even days**

Name	Description
Hour field	The hour of the specified day at which this occurrence of the schedule starts. This can be an integer between 0 and 24, where 0 and 24 are both equivalent to midnight. **Note** Cisco UCS ends all recurring occurrences on the same day in which they start, even if the maximum duration has not been reached. For example, if you specify a start time of 11 p.m. and a maximum duration of 3 hours, Cisco UCS starts the occurrence at 11 p.m. but ends it at 11:59 p.m. after only 59 minutes. Ensure that the start time you specify is early enough so that the recurring occurrence finishes before 11:59 p.m.
Minute field	The minute of the hour at which the schedule occurrence starts. This can be an integer between 0 and 60.

b) Click the down arrows to expand the **Options** area.

c) In the **Options** area, complete the following fields:

Name	Description
Max Duration field	The maximum length of time that each occurrence of this schedule can run. This can be one of the following: • **None—**The occurrence runs until all tasks are completed. • **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the maximum amount of time that the occurrence can run. Cisco UCS completes as many scheduled tasks as possible within the specified time.
Max Number of Tasks field	The maximum number of scheduled tasks that can be run during each occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs all scheduled tasks unless those tasks exceed the maximum time specified in the **Max Duration** field. If **Max Duration** is set to **none** and you select this option, the maintenance window continues until all pending activities are completed. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.

Name	Description
Max Number of Concurrent Tasks field	The maximum number of tasks that can run concurrently during each occurrence. This can be one of the following: - **Unlimited—**Cisco UCS runs as many concurrent tasks as the system can handle. - **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of concurrent tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.
Minimum Interval Between Tasks field	The minimum length of time that the system should wait before starting a new task. This setting is meaningful only if the maximum number of concurrent tasks is set to a value other than None. This can be one of the following: - **None—**Cisco UCS runs the next task as soon as possible. - **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the minimum amount of time that Cisco UCS will wait between tasks. **Note** This option does not apply if this schedule is associated with a fault suppression task.

d) Click **OK**.

e) To add another recurring occurrence, click **Add** and repeat this step.

Step 9 Click **Finish**.

Creating a One Time Occurrence for a Schedule

Note By default, the maximum duration and the maximum number of tasks are set to **none**. If you do not change either of these defaults, Cisco UCS Manager does not impose any limit to the length of time that the maintenance window lasts. All pending activities are applied as soon as the scheduled maintenance window begins, and Cisco UCS Manager continues to reboot the servers impacted by the pending activities until all of those tasks are complete.

Procedure

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

Step 2 On the **Servers** tab, expand **Schedules**.

Step 3 Right-click the schedule to which you want to add an occurrence and choose **Create a One Time Occurrence**.

Step 4 In the **Create a One Time Occurrence** dialog box, complete the following fields:

Name	Description
Name field	The name of the one time occurrence of this schedule. 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.
Start Time field	The date and time that the occurrence will run. Click the down arrow at the end of the field to select the date from a calendar.

Step 5 Click the down arrows to expand the **Options** area.

Step 6 In the **Options** area, complete the following fields:

Name	Description
Max Duration field	The maximum length of time that the scheduled occurrence can run. This can be one of the following: • **None**—The occurrence runs until all tasks are completed. • **other**—Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the maximum amount of time that the occurrence can run. Cisco UCS completes as many scheduled tasks as possible within the specified time. By default, the maximum duration is set to **none**. If you do not change this setting and you do not set a maximum number of tasks, the maintenance window continues until all pending activities are completed.

Name	Description
Max Number of Tasks field	The maximum number of scheduled tasks that can be run during this occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs all scheduled tasks unless those tasks exceed the maximum time specified in the **Max Duration** field. If **Max Duration** is set to **none** and you select this option, the maintenance window continues until all pending activities are completed. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.
Max Number of Concurrent Tasks field	The maximum number of tasks that can run concurrently during this occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs as many concurrent tasks as the system can handle. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of concurrent tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.
Minimum Interval Between Tasks field	The minimum length of time that the system should wait before starting a new task. This setting is meaningful only if the maximum number of concurrent tasks is set to a value other than None. This can be one of the following: • **None—**Cisco UCS runs the next task as soon as possible. • **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the minimum amount of time that Cisco UCS will wait between tasks. **Note** This option does not apply if this schedule is associated with a fault suppression task.

Step 7 Click **OK**.

Creating a Recurring Occurrence for a Schedule

Procedure

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

Step 2 On the **Servers** tab, expand **Schedules**.

Step 3 Right-click the schedule to which you want to add an occurrence and choose **Create a Recurring Occurrence**.

Step 4 In the **Create a Recurring Occurrence** dialog box, complete the following fields:

Name	Description
Name field	The name of the recurring occurrence of this schedule. 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.
Day field	The day on which Cisco UCS runs an occurrence of this schedule. This can be one of the following: • **every day** • **Monday** • **Tuesday** • **Wednesday** • **Thursday** • **Friday** • **Saturday** • **Sunday** • **odd days** • **even days**
Hour field	The hour of the specified day at which this occurrence of the schedule starts. This can be an integer between 0 and 24, where 0 and 24 are both equivalent to midnight. **Note** Cisco UCS ends all recurring occurrences on the same day in which they start, even if the maximum duration has not been reached. For example, if you specify a start time of 11 p.m. and a maximum duration of 3 hours, Cisco UCS starts the occurrence at 11 p.m. but ends it at 11:59 p.m. after only 59 minutes. Ensure that the start time you specify is early enough so that the recurring occurrence finishes before 11:59 p.m.

Name	Description
Minute field	The minute of the hour at which the schedule occurrence starts. This can be an integer between 0 and 60.

Step 5 Click the down arrows to expand the **Options** area.

Step 6 In the **Options** area, complete the following fields:

Name	Description
Max Duration field	The maximum length of time that each occurrence of this schedule can run. This can be one of the following: • **None—**The occurrence runs until all tasks are completed. • **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the maximum amount of time that the occurrence can run. Cisco UCS completes as many scheduled tasks as possible within the specified time.
Max Number of Tasks field	The maximum number of scheduled tasks that can be run during each occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs all scheduled tasks unless those tasks exceed the maximum time specified in the **Max Duration** field. If **Max Duration** is set to **none** and you select this option, the maintenance window continues until all pending activities are completed. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.
Max Number of Concurrent Tasks field	The maximum number of tasks that can run concurrently during each occurrence. This can be one of the following: • **Unlimited—**Cisco UCS runs as many concurrent tasks as the system can handle. • **other—**Cisco UCS Manager GUI displays a text field allowing you to specify the maximum number of concurrent tasks that can be run during this occurrence. Enter an integer between 1 and 65535. **Note** This option does not apply if this schedule is associated with a fault suppression task.

Name	Description
Minimum Interval Between Tasks field	The minimum length of time that the system should wait before starting a new task. This setting is meaningful only if the maximum number of concurrent tasks is set to a value other than None. This can be one of the following: • **None—**Cisco UCS runs the next task as soon as possible. • **other—**Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field allowing you to specify the minimum amount of time that Cisco UCS will wait between tasks. **Note** This option does not apply if this schedule is associated with a fault suppression task.

Step 7 Click **OK**.

Deleting a One Time Occurrence from a Schedule

If this is the only occurrence in a schedule, that schedule is reconfigured with no occurrences. If the schedule is included in a maintenance policy and that policy is assigned to a service profile, any pending activities related to the server associated with the service profile cannot be deployed. You must add a one time ocurrence or a recurring occurrence to the schedule to deploy the pending activity.

Procedure

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

Step 2 On the **Servers** tab, expand **Schedules** > ***Schedule_Name***.

Step 3 Expand **One Time Occurrences**.

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

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

Deleting a Recurring Occurrence from a Schedule

If this is the only occurrence in a schedule, that schedule is reconfigured with no occurrences. If the schedule is included in a maintenance policy and that policy is assigned to a service profile, any pending activities related to the server associated with the service profile cannot be deployed. You must add a one time ocurrence or a recurring occurrence to the schedule to deploy the pending activity.

Procedure

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

Step 2 On the **Servers** tab, expand **Schedules** > ***Schedule_Name***.

Step 3 Expand **Recurring Occurrences**.

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

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

Deleting a Schedule

If this schedule is included in a maintenance policy, the policy is reconfigured with no schedule. If that policy is assigned to a service profile, any pending activities related to the server associated with the service profile cannot be deployed. You must add a schedule to the maintenance policy to deploy the pending activity.

Procedure

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

Step 2 On the **Servers** tab, expand **Schedules**.

Step 3 Right-click the schedule you want to delete and choose **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Maintenance Policies

Creating a Maintenance Policy

Before You Begin

If you plan to configure this maintenance policy for automatic deferred deployment, create a schedule.

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 **Maintenance Policies** and choose **Create Maintenance Policy**.

Step 5 In the **Create Maintenance Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Reboot Policy field	When a service profile is associated with a server, or when changes are made to a service profile that is already associated with a server, the server needs to be rebooted to complete the process. The **Reboot Policy** field determines when the reboot occurs for servers associated with any service profiles that include this maintenance policy. This can be one of the following: • **Immediate—**The server is rebooted automatically as soon as the service profile association is complete or service profile changes are saved by the user. • **User Ack—**The user must reboot the server manually after the service profile association is complete or changes are made. • **Timer Automatic—**Cisco UCS defers all service profile associations and changes until the maintenance window defined by the schedule shown in the **Schedule** field.
Schedule drop-down list	If the **Reboot Policy** is set to **Timer Automatic**, the schedule specifies when maintenance operations can be applied to the server. Cisco UCS reboots the server and completes the service profile changes at the scheduled time.
Create Schedule link	Click this link to create a new schedule that will be available to all objects in this Cisco UCS domain.

Step 6 Click **OK**.

What to Do Next

Include the policy in a service profile or service profile template.

Deleting a Maintenance Policy

Procedure

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

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

Step 3 Expand **Maintenance Policies**.

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

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

Managing Pending Activities

Viewing Pending Activities

Procedure

Step 1 On the toolbar, click **Pending Activities**.

Step 2 Click one of the following tabs:

- **User Acknowledged Activities—**Contains the **Service Profiles** and **Fabric Interconnects** tabs that display the tasks requiring user acknowledgment before they can complete.
- **Scheduled Activities—**Displays the tasks that will be performed based on the associated maintenance schedule.

Step 3 Click a row in the table to view the details of that pending activity.
If you click the link in the **Server** column, Cisco UCS Manager displays the properties of that server.

Deploying a Service Profile Change Waiting for User Acknowledgement

Important You cannot stop Cisco UCS Manager from rebooting the affected server after you acknowledge a pending activity.

Procedure

Step 1 On the toolbar, click **Pending Activities**.

Step 2 In the **Pending Activities** dialog box, click the **User Acknowledged Activities** tab and then the **Service Profiles** tab.

Step 3 Check the check box in the **Reboot Now** column for each pending activity you want to deploy immediately.

Step 4 Click **OK**.
Cisco UCS Manager immediately reboots the server affected by the pending activity.

Deploying All Service Profile Changes Waiting for User Acknowledgement

Important You cannot stop Cisco UCS Manager from rebooting the affected server after you acknowledge a pending activity.

Procedure

Step 1 On the toolbar, click **Pending Activities**.

Step 2 In the **Pending Activities** dialog box, click the **User Acknowledged Activities** tab and then the **Service Profiles** tab.

Step 3 In the toolbar, check the **Acknowledge All** check box.
Cisco UCS Manager GUI checks the **Reboot Now** check boxes for all pending activities listed in the table.

Step 4 Click **OK**.
Cisco UCS Manager immediately reboots all servers affected by the pending activities listed in the table.

Deploying a Scheduled Service Profile Change Immediately

Important You cannot stop Cisco UCS Manager from rebooting the affected server after you acknowledge a pending activity.

Procedure

Step 1 On the toolbar, click **Pending Activities**.

Step 2 In the **Pending Activities** dialog box, click the **Scheduled Activities** tab.

Step 3 Check the check box in the **Reboot Now** column for each pending activity you want to deploy immediately.

Step 4 Click **OK**.
Cisco UCS Manager immediately reboots the server affected by the pending activity.

Deploying All Scheduled Service Profile Changes Immediately

Important You cannot stop Cisco UCS Manager from rebooting the affected server after you acknowledge a pending activity.

Procedure

Step 1 On the toolbar, click **Pending Activities**.

Step 2 In the **Pending Activities** dialog box, click the **Scheduled Activities** tab.

Step 3 In the toolbar, check the **Acknowledge All** check box.
Cisco UCS Manager GUI checks the **Reboot Now** check boxes for all pending activities listed in the table.

Step 4 Click **OK**.
Cisco UCS Manager immediately reboots all servers affected by the pending activities listed in the table.

CHAPTER 34

Configuring Service Profiles

This chapter includes the following sections:

Service Profiles that Override Server Identity

This type of service profile provides the maximum amount of flexibility and control. This profile allows you to override the identity values that are on the server at the time of association and use the resource pools and policies set up in Cisco UCS Manager to automate some administration tasks.

You can disassociate this service profile from one server and then associate it with another server. This re-association can be done either manually or through an automated server pool policy. The burned-in settings, such as UUID and MAC address, on the new server are overwritten with the configuration in the service profile. As a result, the change in server is transparent to your network. You do not need to reconfigure any component or application on your network to begin using the new server.

This profile allows you to take advantage of and manage system resources through resource pools and policies, such as the following:

- Virtualized identity information, including pools of MAC addresses, WWN addresses, and UUIDs
- Ethernet and Fibre Channel adapter profile policies
- Firmware package policies
- Operating system boot order policies

Unless the service profile contains power management policies, a server pool qualification policy, or another policy that requires a specific hardware configuration, the profile can be used for any type of server in the Cisco UCS domain.

You can associate these service profiles with either a rack-mount server or a blade server. The ability to migrate the service profile depends upon whether you choose to restrict migration of the service profile.

Note If you choose not to restrict migration, Cisco UCS Manager does not perform any compatibility checks on the new server before migrating the existing service profile. If the hardware of both servers are not similar, the association might fail.

Service Profiles that Inherit Server Identity

This hardware-based service profile is the simplest to use and create. This profile uses the default values in the server and mimics the management of a rack-mounted server. It is tied to a specific server and cannot be moved or migrated to another server.

You do not need to create pools or configuration policies to use this service profile.

This service profile inherits and applies the identity and configuration information that is present at the time of association, such as the following:

- MAC addresses for the two NICs
- For a converged network adapter or a virtual interface card, the WWN addresses for the two HBAs
- BIOS versions
- Server UUID

Important The server identity and configuration information inherited through this service profile may not be the values burned into the server hardware at manufacture if those values were changed before this profile is associated with the server.

Service Profile Templates

With a service profile template, you can quickly create several service profiles with the same basic parameters, such as the number of vNICs and vHBAs, and with identity information drawn from the same pools.

Tip If you need only one service profile with similar values to an existing service profile, you can clone a service profile in the Cisco UCS Manager GUI.

For example, if you need several service profiles with similar values to configure servers to host database software, you can create a service profile template, either manually or from an existing service profile. You then use the template to create the service profiles.

Cisco UCS supports the following types of service profile templates:

Initial template

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.

Updating template

Service profiles created from an updating template inherit all the properties of the template and remain connected to the template. Any changes to the template automatically update the service profiles created from the template.

Guidelines and Recommendations for Service Profiles

In addition to any guidelines or recommendations that are specific to policies and pools included in service profiles and service profile templates, such as the local disk configuration policy, you need to be aware of the following guidelines and recommendations that impact the ability to associate a service profile with a server:

Limit to the Number of vNICs that Can Be Configured on a Rack-Mount Server

You can configure up to 56 vNICs per supported adapter, such as the Cisco UCS P81E Virtual Interface Card (N2XX-ACPCI01), on any rack-mount server that is integrated with Cisco UCS Manager.

No Power Capping Support for Rack-Mount Servers

Power capping is not supported for rack servers. If you include a power control policy in a service profile that is associated with a rack-mount server, the policy is not implemented.

QoS Policy Guidelines for vNICs

You can only assign a QoS policy to a vNIC if the priority setting for that policy is not set to **fc**, which represents the Fibre Channel system class. You can configure the priority for the QoS policy with any other system class.

QoS Policy Guidelines for vHBAs

You can only assign a QoS policy to a vHBA if the priority setting for that policy is set to **fc**, which represents the Fibre Channel system class.

The Host Control setting for a QoS policy applies to vNICs only. It has no effect on a vHBA.

Creating Service Profiles

Creating a Service Profile with the Expert Wizard

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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the organization and select **Create Service Profile (expert)**.

Step 5 In the **Create Service Profile (expert)** wizard, complete the following:

- Page 1: Identifying the Service Profile
- Page 3: Configuring the Networking Options
- Page 2: Configuring the Storage Options
- Page 4: Configuring the Fibre Channel Zoning Options, on page 518
- Page 4: Setting the vNIC/vHBA Placement
- Page 5: Setting the Server Boot Order
- Page 6: Adding the Maintenance Policy
- Page 7: Specifying the Server Assignment
- Page 8: Adding Operational Policies

Page 1: Identifying the Service Profile

This procedure directly follows the steps in Creating a Service Profile with the Expert Wizard. It describes how to set the identity of a service profile on the **Identify Service Profile** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 In the **Name** field, enter a unique name that you can use to identify the service profile.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

This name must be unique within the organization or sub-organization in which you are creating the service profile.

Step 2 From the **UUID Assignment** drop-down list, do one of the following:

Option	Description
Select (pool default used by default)	Assigns a UUID from the default UUID Suffix pool. Continue with Step 5.
Hardware Default	Uses the UUID assigned to the server by the manufacturer. If you choose this option, the UUID remains unassigned until the service profile is associated with a server. At that point, the UUID is set to the UUID value assigned to the server by the manufacturer. If the service profile is later moved to a different server, the UUID is changed to match the new server. Continue with Step 5.
XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX	Uses the UUID that you manually assign. Continue with Step 3.
Pools ***Pool_Name***	Assigns a UUID from the UUID Suffix pool that you select from the list at the bottom of the drop-down list. Each pool name is followed by two numbers in parentheses that show the number of UUIDs still available in the pool and the total number of UUIDs in the pool. If you do not want use any of the existing pools, but instead want to create a pool that all serivce profiles can access, continue with Step 4. Otherwise, continue with Step 5.

Step 3 (Optional) If you selected the **XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX** option, do the following:

a) In the **UUID** field, enter the valid UUID that you want to assign to the server which uses this service profile.
b) To verify that the selected UUID is available, click the **here** link.

Step 4 (Optional) If you want to create a new UUID Suffix pool to use to use in this service profile, click **Create UUID Suffix Pool** and complete the fields in the **Create UUID Suffix Pool** wizard.
For more information, see Creating a UUID Suffix Pool, on page 368.

Step 5 (Optional) In the text box, enter a description of this service profile.
The user-defined description for this service profile.

Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 6 Click **Next**.

What to Do Next

Complete the steps in Page 3: Configuring the Networking Options.

Page 2: Configuring the Networking Options

This procedure directly follows Page 1: Identifying the Service Profile. It describes how to configure the networking options, including LAN connectivity, on the **Networking** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 (Optional) If you plan to assign this service profile to a server with an adapter that supports dynamic vNICs, choose one of the following options from the **Dynamic vNIC Connection** drop-down list:

Option	Description
Select a Policy to use	Enables you to create a service profile without a dynamic vNIC connection policy for a server with an adapter that does not support dynamic vNICs. This option does not include a dynamic vNIC connection policy in the service profile. If you are configuring this service profile/template for iSCSI boot, choose this option. Continue with Step 4 .
Create a Specific Dynamic vNIC Connection Policy	Enables you to create a dynamic vNIC connection policy that can only be accessed by this service profile. Continue with Step 2.
Dynamic vNIC Connection Policies ***Policy_Name***	Select an existing dynamic vNIC connection policy from the list at the bottom of the drop-down list. Cisco UCS Manager assigns this policy to the service profile. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles can access, continue with Step 3. Otherwise, continue with Step 4.

Step 2 (Optional) If you clicked **Create a Specific Dynamic vNIC Connection Policy**, do the following to create a new dynamic vNIC connection policy that can only be used by this service profile:

a) Complete the following fields:

Name	Description
Number of Dynamic vNICs field	The number of dynamic vNICs that this policy affects.
Adapter Policy drop-down list	The adapter profile associated with this policy. The profile must already exist to be included in the drop-down list.

Name	Description
Protection field	Dynamic vNICs are always protected in Cisco UCS, but this field allows you to select a preferred fabric, if any. You can choose one of the following: • **Protected Pref A—**Cisco UCS attempts to use fabric A but fails over to fabric B if necessary • **Protected Pref B—**Cisco UCS attempts to use fabric B but fails over to fabric A if necessary • **Protected—**Cisco UCS uses whichever fabric is available

b) Continue with Step 4.

Step 3 (Optional) To create a dynamic vNIC connection policy that will be available to all service profiles, do the following:

a) Click **Create Dynamic vNIC Connection Policy**.

b) In the **Create Dynamic vNIC Connect Policy** dialog box, complete the fields.

Note Do not specify "default" as the value for the dynamic vNIC connection policy name. Cisco UCS Manager automatically resolves any empty policy references to "default". Any service profiles or service profile templates with only static vNICS defined will automatically reference the policy "default" when it is present. If you specify “default” for the dynamic vNIC connection policy name, then unexpected dynamic vNICs might be created on those service profiles or service profile templates.

For more information, see the Cisco UCS Manager VM-FEX configuration guides.

c) Click **OK**.

d) From the **Dynamic vNIC Connection** drop-down list, choose the policy you created.

e) Continue with Step 4.

Step 4 In the **How would you like to configure LAN connectivity?** field, click one of the following options:

Option	Description
Simple	Allows you to create a maximum of two vNICs, in dual fabric mode, for this service profile. Continue with Step 5.
Expert	Allows you to create an unlimited number of vNICs for this service profile. If you are configuring this service profile/template for iSCSI boot, choose this option. If you are configuring this service profile for iSCSI boot, continue with Step 7. For all other configurations, continue with Step 6.
No vNICs	Does not include any vNICs for connections to a LAN in the service profile. Any server associated with this service profile cannot be able to communicate with a LAN unless you modify the service profile to add vNICs. Continue with Step 9.

Option	Description
Hardware Inherited	Uses the vNICs assigned to the Ethernet adapter profile associated with the server. Continue with Step 9.
Use Connectivity Policy	Allows you to use a LAN Connectivity policy for this service profile. Continue with Step 8. **Note** You cannot have a LAN connectivity policy and locally created vNICs in the same service profile. When you add a LAN connectivity policy to a service profile, any existing vNIC configuration is erased.

Step 5 (Optional) If you chose the simple LAN connectivity option, do the following:

a) In the **vNIC 0 (Fabric A)** area, complete the following fields:

- In the **Name** field, enter a unique name for the vNIC.
- From the **Select Native VLAN** drop-down list, choose the name of the VLAN with which this vNIC should communicate.

If the VLAN you need is not in the drop-down list, click the **Create VLAN** link. For more information, see Creating a Named VLAN, on page 224.

b) Repeat Step 2a in the **vNIC 1 (Fabric B)** area to create a VLAN for that vNIC.

c) Continue with Step 9.

Step 6 If you chose the expert LAN connectivity option and are not configuring this service profile for iSCSI boot, do the following:

a) Click **Add** on the icon bar of the table to open the **Create vNICs** dialog box.

b) Complete the following fields to specify the identity information for the vNIC:

Name	Description
Name field	The user-defined name for this vNIC. 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.
Use vNIC Template check box	Check this check box if you want to use a template to create the vNIC. The Cisco UCS Manager GUI displays the **vNIC Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vNIC templates exist in the system.
Create vNIC Template link	Click this link if you want to create a vNIC template.

Name	Description
MAC Address Assignment drop-down list	If you want to: • Use the default MAC address pool, leave this field set to **Select (pool default used by default)**. • Use the MAC address assigned to the server by the manufacturer, select **Hardware Default**. • Use a specific MAC address, choose **02:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link. • Use a MAC address from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

c) In the **Fabric Interconnect** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component. If you want this vNIC to be able to access the second fabric interconnect if the default one is unavailable, check the **Enable Failover** check box. **Note** Do not enable fabric failover for the vNIC under the following circumstances: • 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 to the other. • If you plan to associate this vNIC with a server that has an adapter which does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.

Name	Description
VLANs table	This table lists the VLANs that can be associated with this vNIC. The columns are: • **Select—**Check the check box in this column for each VLAN that you want to use. **Note** VLANs and PVLANs can not be assigned to the same vNIC. • **Name—**The name of the VLAN. • **Native VLAN—**To designate one of the VLANs as the native VLAN, click the radio button in this column.
Create VLAN link	Click this link if you want to create a VLAN.
MTU field	The maximum transmission unit, or packet size, that this vNIC accepts. Enter an integer between 1500 and 9216. **Note** If the vNIC 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 get dropped during data transmission.
Pin Group drop-down list	Choose the LAN pin group that you want associated with this vNIC.
Create LAN Pin Group link	Click this link if you want to create a LAN pin group.
Operational Parameters Section	
Stats Threshold Policy drop-down list	The statistics collection policy with which this vNIC is associated.

d) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list	The Ethernet adapter policy with which this vNIC is associated.
Create Ethernet Adapter Policy link	Click this link if you want to create an Ethernet adapter policy.
Dynamic vNIC Connection Policy drop-down list	The dynamic vNIC connection policy with which this vNIC is associated.
Create Dynamic vNIC Connection Policy link	Click this link if you want to create a dynamic vNIC connection policy.

Name	Description
QoS drop-down list	The quality of service policy with which this vNIC is associated.
Create QoS Policy link	Click this link if you want to create a quality of service policy.
Network Control Policy drop-down list	The network control policy with which this vNIC is associated.
Create Network Control Policy Policy link	Click this link if you want to create a network control policy.

e) Click **OK**.

f) Continue with Step 9.

Step 7 If you chose the expert LAN connectivity option and are configuring this service profile for iSCSI boot, do the following:

a) Click the down arrows to expand the **iSCSI vNICs** bar.

b) Click **Add** on the icon bar of the table to open the **Create iSCSI vNIC** dialog box.

c) Complete the following fields to specify the identity information for the iSCSI vNIC:

Name	Description
Name field	The name of the iSCSI vNIC. 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.
Overlay vNIC drop-down list	The LAN vNIC associated with this iSCSI vNIC, if any.
iSCSI Adapter Policy drop-down list	The iSCSI adapter policy associated with this iSCSI vNIC, if any.
Create iSCSI Adapter Policy link	Click this link to create a new iSCSI adapter policy that will be available to all iSCSI vNICs.
MAC Address field	The MAC address associated with this iSCSI vNIC, if any. If the MAC address is not set, the Cisco UCS Manager GUI displays **Derived**.
MAC Pool field	The MAC pool associated with this iSCSI vNIC, if any.

Name	Description
VLAN drop-down list	The virtual LAN associated with this iSCSI vNIC. The default VLAN is **default**. **Note** For the Cisco UCS M81KR Virtual Interface Card and the Cisco UCS VIC-1240 Virtual Interface Card, the VLAN that you specify must be the same as the native VLAN on the overlay vNIC. For the Cisco UCS M51KR-B Broadcom BCM57711 Adapter, the VLAN that you specify can be any VLAN assigned to the overlay vNIC.

d) Click **OK**.

e) Repeat steps b through d to configure additional iSCSI vNICs.

f) Continue with Step 9.

Step 8 If you chose **Use Connectivity Policy**, do one of the following:

- To use an existing LAN connectivity policy, choose that policy from the **LAN Connectivity Policy** drop-down list.
- If you do not want use any of the existing LAN connectivity policies, but instead want to create a policy that all serivce profiles can access, click the **Create LAN Connectivity Policy** link and complete the fields.

For more information about LAN connectivity policies, see Creating a LAN Connectivity Policy, on page 270.

Step 9 Click **Next**.

What to Do Next

Complete Page 2: Configuring the Storage Options.

Page 3: Configuring the Storage Options

This procedure directly follows Page 3: Configuring the Networking Options. It describes how to configure the storage options for a service profile on the **Storage** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 From the **Local Storage** drop-down list, choose one of the following:

Option	Description
Select Local Storage Policy to use	Assigns the default local disk storage policy to this service profile. Continue with Step 4.

Option	Description
Create a Specific Storage Policy	Enables you to create a local disk policy that can only be accessed by this service profile. Continue with Step 2.
Storage Policies *Policy_Name*	Select an existing local disk policy from the list at the bottom of the drop-down list. Cisco UCS Manager assigns this policy to the service profile. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles can access, continue with Step 3. Otherwise, continue with Step 4.

Step 2 (Optional) If you chose **Create a Specific Storage Policy** and want to create a new policy that can only be used by this service profile, do the following:

a) From the **Mode** drop-down list, choose one of the following:

- **No Local Storage—**For a diskless server or a SAN only configuration. If you select this option, you cannot associate any service profile which uses this policy with a server that has a local disk.
- **RAID 0 Striped—**Data is striped across all disks in the array, providing fast throughput. There is no data redundancy, and all data is lost if any disk fails.
- **RAID 1 Mirrored—**Data is written to two disks, providing complete data redundancy if one disk fails. The maximum array size is equal to the available space on the smaller of the two drives.
- **Any Configuration—**For a server configuration that carries forward the local disk configuration without any changes.
- **No RAID—**For a server configuration that removes the RAID and leaves the disk MBR and payload unaltered.

  If you choose **No RAID** and you apply this policy to a server that already has an operating system with RAID storage configured, the system does not remove the disk contents. Therefore, there may be no visible differences on the server after you apply the **No RAID** mode. This can lead to a mismatch between the RAID configuration in the policy and the actual disk configuration shown in the **Inventory** > **Storage** tab for the server.

  To make sure that any previous RAID configuration information is removed from a disk, apply a scrub policy that removes all disk information after you apply the **No RAID** configuration mode.
- **RAID 5 Striped Parity—**Data is striped across all disks in the array. Part of the capacity of each disk stores parity information that can be used to reconstruct data if a disk fails. RAID 5 provides good data throughput for applications with high read request rates.
- **RAID 6 Striped Dual Parity—**Data is striped across all disks in the array and two parity disks are used to provide protection against the failure of up to two physical disks. In each row of data blocks, two sets of parity data are stored.
- **RAID10 Mirrored and Striped—** RAID 10 uses mirrored pairs of disks to provide complete data redundancy and high throughput rates.

Note Some Cisco UCS servers require a license for certain RAID configuration options. When Cisco UCS Manager associates a service profile containing this local disk policy with a server, Cisco UCS Manager verifies that the selected RAID option is properly licensed. If there are issues, Cisco UCS Manager displays a configuration error during the service profile association.

For RAID license information for a specific Cisco UCS server, see the *Hardware Installation Guide* for that server.

b) If you want to ensure that the server retains the configuration in the local disk configuration policy even if the server is disassociated from the service profile, check the **Protect Configuration** check box.
When a service profile is disassociated from a server and a new service profile associated, the setting for the Protect Configuration property in the new service profile takes precedence and overwrites the setting in the previous service profile.

Note If you disassociate the server from a service profile with this option enabled and then associate it with a new service profile that includes a local disk configuration policy with different properties, the server returns a configuration mismatch error and the association fails.

c) Continue with Step 4.

Step 3 (Optional) To create a local disk configuration policy that will be available to all service profiles, do the following:

a) Click the **Create Local Disk Configuration Policy** link.
b) In the **Create Local Disk Configuration** dialog box, complete the fields.
For more information, see Creating a Local Disk Configuration Policy, on page 415.
c) Click **OK**.
d) From the **Local Storage** drop-down list, choose the policy you created.

Step 4 In the **How would you like to configure SAN storage?** field, click one of the following options:

Option	Description
Simple	Allows you to create a maximum of two vHBAs for this service profile. Continue with Step 5.
Expert	Allows you to create an unlimited number of vHBAs for this service profile. Continue with Step 6.
No vHBAs	Does not include any vHBAs for connections to a Fibre Channel SAN in the service profile. If you are configuring this service profile/template for iSCSI boot, choose this option. Continue with Step 8.
Hardware Inherited	Uses the vHBAs assigned to the Fibre Channel adapter profile associated with the server. Continue with Step 8.

Option	Description
Use Connectivity Policy	Allows you to use a SAN Connectivity policy for this service profile. Continue with Step 7. **Note** You cannot have a SAN connectivity policy and locally created vHBAs in the same service profile. When you add a SAN connectivity policy to a service profile, any existing vHBA configuration is erased.

Step 5 (Optional) If you chose the simple SAN storage option, do the following:

a) From the **WWNN Assignment** drop-down list, choose one of the following:

- Choose **Select (pool default used by default)** to use the default WWN pool.
- Choose one of the options listed under **Manual Using OUI** and then enter the WWN in the **World Wide Node Name** field.

  You can specify a WWNN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. You can click the **here** link to verify that the WWNN you specified is available.
- Choose a WWN pool name from the list to have a WWN assigned from the specified pool. Each pool name is followed by two numbers in parentheses that show the number of WWNs still available in the pool and the total number of WWNs in the pool.

b) In the **vHBA 0 (Fabric A)** area, complete the following fields:

- In the **Name** field, enter a unique name for the vHBA.
- From the **Select VSAN** drop-down list, choose the name of the VSAN with which this vHBA should be associated.

If the VSAN you need is not in the drop-down list, click the **Create VSAN** link. For more information, see Creating a Named VSAN, on page 303.

c) Repeat Step 5b in the **vHBA 1 (Fabric B)** area to create a VSAN for that vHBA.

d) Continue with Step 8.

Step 6 (Optional) If you chose the expert SAN storage option, do the following:

a) From the **WWNN Assignment** drop-down list, choose one of the following:

- Choose **Select (pool default used by default)** to use the default WWN pool.
- Choose one of the options listed under **Manual Using OUI** and then enter the WWN in the **World Wide Node Name** field.

  You can specify a WWNN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. You can click the **here** link to verify that the WWNN you specified is available.
- Choose a WWN pool name from the list to have a WWN assigned from the specified pool. Each pool name is followed by two numbers in parentheses that show the number of WWNs still available in the pool and the total number of WWNs in the pool.

b) Click **Add** on the icon bar of the table to open the **Create vHBA** dialog box.

c) Complete the following fields to specify the identity information for the vHBA:

Name	Description
Name field	The name of this vHBA. 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.
Use vHBA Template check box	Check this check box if you want to use a template to create the vHBA. The Cisco UCS Manager GUI displays the **vHBA Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vHBA templates exist in the system.
Create vHBA Template link	Click this link if you want to create a vHBA template.
WWPN Assignment drop-down list	How Cisco UCS assigns the World Wide Port Node to the vHBA. If you want Cisco UCS to: • Use the default WWPN pool, leave this field set to **Select (pool default used by default)**. • Use the WWPN assigned to the server by the manufacturer, select **Derived**. • Use a specific WWPN, select **20:00:00:25:B5:00:00:00**, **20:XX:XX:XX:XX:XX:XX:XX**, or **5X:XX:XX:XX:XX:XX:XX:XX** and enter the WWPN in the **WWPN** field. If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template **20:00:00:25:B5:XX:XX:XX**. • Use a WWPN from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available addresses in the pool and the second is the total number of addresses in the pool. If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.
Create WWPN Pool link	Click this link if you want to create a new WWPN pool that will be available to all objects in the Cisco UCS domain.

Name	Description
WWPN field	The manually-assigned WWPN if the **WWPN Assignment** drop-down list is set to one of the manual templates. You can specify a WWPN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. To make sure the WWPN is available, click the corresponding link.

d) In the **VSAN** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component.
Select VSAN drop-down list box	The VSAN with which this vHBA is associated.
Create VSAN link	Click this link if you want to create a VSAN.
Pin Group drop-down list box	The SAN pin group with which this vHBA is associated.
Create SAN Pin Group link	Click this link if you want to create a pin group.
Persistent Binding field	This can be one of the following: • **Disabled** • **Enabled**
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.
Operational Parameters Section	
Stats Threshold Policy drop-down list box	The statistics threshold policy with which this vHBA is associated.

e) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list box	The Fibre Channel adapter policy with which this vHBA is associated.
Create Fibre Channel Adapter Policy link	Click this link if you want to create a Fibre Channel adapter policy.

Name	Description
QoS drop-down list box	The quality of service policy with which this vHBA is associated.
Create QoS Policy link	Click this link if you want to create a QoS policy.

f) Click **OK**.

g) Continue with Step 8.

Step 7 If you chose **Use Connectivity Policy**, do one of the following:

- To use an existing SAN connectivity policy, choose that policy from the **SAN Connectivity Policy** drop-down list.
- If you do not want use any of the existing SAN connectivity policies, but instead want to create a policy that all serivce profiles can access, click the **SAN Connectivity Policy** link and complete the fields.

For more information about SAN connectivity policies, see Creating a SAN Connectivity Policy, on page 341.

Step 8 Click **Next**.

What to Do Next

Complete Page 4: Configuring the Fibre Channel Zoning Options, on page 518.

Page 4: Configuring the Fibre Channel Zoning Options

This procedure directly follows Page 2: Configuring the Storage Options. It describes how to configure the vHBA initiator groups required for Fibre Channel zoning for a service profile on the **Zoning** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 If you have not already done so, create one or more vHBA initiator groups as follows:

a) On the icon bar at the bottom of the **Select vHBA Initiator Groups** table, click +.

b) In the **Create vHBA Initiator Group** dialog box, complete the following fields:

Name	Description
Name field	The name of the vHBA initiator group. 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.

Name	Description
Description field	A description of the group. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Storage Connection Policy drop-down list	The storage connection policy associated with this vHBA initiator group. This can be one of the following: • Use an existing storage connection policy, then choose that policy from the drop-down list. The Cisco UCS Manager GUI displays information about the policy and its FC target endpoints in the **Global Storage Connection Policy** area. Create a new storage connection policy that will be globally available, then click the **Create Storage Connection Policy** link. • Create a local storage connection policy that is available only to this vHBA initiator group, then choose the **Specific Storage Connection Policy** option. The Cisco UCS Manager GUI displays the **Specific Storage Connection Policy** area that allows you to configure the local storage connection policy.
Create Storage Connection Policy link	Click this link to create a new storage connection policy that will be available to all service profiles and service profile templates.

For more information about how to create a storage connection policy, see Creating a Fibre Channel Storage Connection Policy, on page 358.

c) Click **OK**.

Step 2 In the **Select vHBA Initiators** table, click one or more vHBA initiators that you want to add to the vHBA initiator group.

Step 3 In the **Select vHBA Initiator Groups** table, click the vHBA initiator group to which you want to add the selected vHBA initiator(s).

Step 4 Click the **>> Add To >>** button to add the selected vHBA initiator(s) to the selected vHBA initiator group.

Step 5 When you have added the vHBA initiators to all vHBA initiator groups required for the zones through which any associated servers communicate, click **Next**.

What to Do Next

Complete Page 4: Setting the vNIC/vHBA Placement.

Page 5: Setting the vNIC/vHBA Placement

This procedure directly follows Page 4: Configuring the Fibre Channel Zoning Options, on page 518. It describes how to set the vNIC and vHBA placement options on the **vNIC/vHBA Placement** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 From the **Select Placement** drop-down list, choose one of the following:

Option	Description
Let System Perform Placement	Specifies that Cisco UCS Manager determines the vNIC/vHBA placement for the server associated with the service profile. The placement is determined by the order set in the PCI Order table. If you are configuring this service profile/template for iSCSI boot, choose this option. If you are configuring this service profile for iSCSI boot, continue with Step 5. For all configurations, continue with Step 2.
Specify Manually	Enables you to do the following: • Explicitly assign the vNICs and vHBAs associated with this service profile to a virtual network interface connection (vCon). • Configure the types of vNICs and vHBAs that can be assigned to a vCon, either manually or through a vNIC/vHBA placement policy. Continue with Step 3.
vNIC/vHBA Placement Profiles ***Placement Profile Name***	Assigns an existing vNIC/vHBA placement policy to the service profile. If you choose this option, Cisco UCS Manager displays the details of the policy. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles can access, click **Create Placement Policy** and continue with Step 4. Otherwise, continue with Step 5.

Step 2 (Optional) If you chose **Let System Perform Placement**, do the following:

a) Use one or more of the following buttons to adjust the order of the vNICs and vHBAs:

Name	Description
Move Up button	Moves the selected vNIC or VHBA to a higher priority in the list.
Move Down button	Moves the selected vNIC or vHBA to a lower priority in the list.
Delete button	Deletes the selected vNIC or vHBA.

Name	Description
Reorder button	Returns all vNICs and vHBAs to their original order.
Modify button	Enables you to modify the currently-selected vNIC or vHBA. **Note** You can change any options for the vNIC or vHBA except its name.

b) Continue with Step 5.

Step 3 (Optional) If you chose **Specify Manually**, do the following:

a) On the appropriate tab in the **vNIC/vHBA** table, click a vNIC or vHBA.

b) In the **Virtual Host Interface** table, click a vCON row and if necessary, choose one of the following values from the **Selection Preference** column:

- **All—**All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **Assigned Only—**vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **Exclude Dynamic—**Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.
- **Exclude Unassigned—**Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **Exclude usNIC—**Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.

  Note An SRIOV usNIC that is explicitly assigned to a vCon set to **Exclude usNIC** will remain assigned to that vCon.

c) Click **Assign**.
If you need to undo an assignment, click **Remove**.

d) Repeat Steps a through c until you have assigned all vNICs and vHBAs.

e) When you have specified all vNIC and vHBA placements, continue with Step 5.

Step 4 If you clicked **Create Placement Policy**, do the following in the **Create Placement Policy** dialog box:

a) Complete the following fields:

Name	Description
Name field	The name for this placement 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.

Name	Description
Virtual Slot Mapping Scheme field	Cisco UCS assigns virtual network interface connections (vCons) to the PCIe adapter cards in the server. Each vCon is a virtual representation of a physical adapter that can be assigned vNICs and vHBAs. For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4. For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the selected virtual slot mapping scheme. This can be one of the following: • **Round Robin—** In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon3 to Adapter1, then assigns vCon2 and vCon4 to Adapter2. In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1, vCon2 and vCon4 to Adapter2, and vCon3 to Adapter3. This is the default scheme. • **Linear Ordered—** In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon2 to Adapter1, then assigns vCon3 and vCon4 to Adapter2. In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1 and vCon2 to Adapter2, then assigns vCon3 and vCon4 to Adapter3. **Note** In N20-B6620-2 and N20-B6625-2 blade servers, the two adapters are numbered left to right while vCons are numbered right to left. If one of these blade servers has a single adapter, Cisco UCS assigns all vCons to that adapter. If the server has two adapters, the vCon assignment depends upon the virtual slot mapping scheme: • **Round Robin—**Cisco UCS assigns vCon2 and vCon4 to Adapter1 and vCon1 and vCon3 to Adapter2. This is the default. • **Linear Ordered—**Cisco UCS assigns vCon3 and vCon4 to Adapter1 and vCon1 and vCon2 to Adapter2. After Cisco UCS assigns the vCons, it assigns the vNICs and vHBAs based on the **Selection Preference** for each vCon.

b) In the **Selection Preference** column for each **Virtual Slot**, choose one of the following from the drop-down list:

- **All**—All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **Assigned Only**—vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **Exclude Dynamic**—Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.
- **Exclude Unassigned**—Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **Exclude usNIC**—Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.

  Note An SRIOV usNIC that is explicitly assigned to a vCon set to **Exclude usNIC** will remain assigned to that vCon.

c) Click **OK**.

d) After the dialog box closes, choose the policy you created from the **Select Placement** drop-down list.

Step 5 Click **Next**.

What to Do Next

Complete Page 5: Setting the Server Boot Order.

Page 6: Setting the Server Boot Order

This procedure directly follows Page 4: Setting the vNIC/vHBA Placement. It describes how to set the server boot order options on the **Server Boot Order** page of the **Create Service Profile (expert)** wizard.

Tip If you configure a local disk and a SAN LUN for the boot order storage type and the operating system or logical volume manager (LVM) is configured incorrectly, the server might boot from the local disk rather than the SAN LUN.

For example, on a server with Red Hat Linux installed, where the LVM is configured with default LV names and the boot order is configured with a SAN LUN and a local disk, Linux reports that there are two LVs with the same name and boots from the LV with the lowest SCSI ID, which could be the local disk.

Procedure

Step 1 From the **Boot Policy** drop-down list, choose one of the following:

Option	Description
Select Boot Policy to use	Assigns the default boot policy to this service profile. Continue with Step 9.

Option	Description
Create a Specific Boot Policy	Enables you to create a local boot policy that can only be accessed by this service profile. Continue with Step 3.
Boot Policies *Policy_Name*	Assigns an existing boot policy to the service profile. If you choose this option, Cisco UCS Manager displays the details of the policy. If you do not want use any of the existing policies but instead want to create a policy that all service profiles can access, click **Create Boot Policy** and continue with Step 2. Otherwise, choose a policy from the list and continue with Step 9.

Step 2 If you clicked **Create Boot Policy** to create a boot policy that all service profiles and templates can use, do the following:

a) In the **Create Boot Policy** dialog box, enter a unique name and description for 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.

b) Continue with Step 3.

Step 3 (Optional) To reboot all servers that use this boot policy after you make changes to the boot order, check the **Reboot on Boot Order Change** check box.
In the Cisco UCS Manager GUI, if the **Reboot on Boot Order Change** check box is checked for a boot policy, and if CD-ROM or Floppy is the last device in the boot order, deleting or adding the device does not directly affect the boot order and the server does not reboot.

Step 4 (Optional) If desired, check the **Enforce vNIC/vHBA/iSCSI Name** check box.

- If checked, Cisco UCS Manager displays a configuration error and reports whether one or more of the vNICs, vHBAs, or iSCSI vNICs listed in the **Boot Order** table match the server configuration in the service profile.
- If not checked, Cisco UCS Manager uses the vNICs, vHBAs, or iSCSI vNICs (as appropriate for the boot option) from the server configuration in the service profile. It does not report whether the vNICs, vHBAs, or iSCSI vNICs specified in the boot policy match the server configuration in the service profile.

Step 5 To add a local disk, virtual CD-ROM, or virtual floppy to the boot order, do the following:

a) Click the down arrows to expand the **Local Devices** area.

b) Click one of the following links to add the device to the **Boot Order** table:

- **Add Local Disk**
- **Add CD-ROM**
- **Add Floppy**

c) Add another boot device to the **Boot Order** table, or click **OK** to finish.

Step 6 To add a LAN boot to the boot order, do the following:

a) Click the down arrows to expand the **vNICs** area.

b) Click the **Add LAN Boot** link.

c) In the **Add LAN Boot** dialog box, enter the name of the vNIC that you want to use for the LAN boot in the **vNIC** field, then click **OK**.

d) Add another device to the **Boot Order** table, or click **OK** to finish.

Step 7 To add a SAN boot to the boot order, do the following:

a) Click the down arrows to expand the **vHBAs** area.

b) Click the **Add SAN Boot** link.

c) In the **Add SAN Boot** dialog box, complete the following fields, and click **OK**:

Name	Description
vHBA field	Enter the name of the vHBA you want to use for the SAN boot.
Type field	This can be one of the following: • **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

d) If this vHBA points to a bootable SAN image, click the **Add SAN Boot Target** link and, in the **Add SAN Boot Target** dialog box, complete the following fields, then click **OK**:

Name	Description
Boot Target LUN field	The LUN that corresponds to the location of the boot image.
Boot Target WWPN field	The WWPN that corresponds to the location of the boot image.

Name	Description
Type field	This can be one of the following: • **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

e) Add another boot device to the **Boot Order** table, or click **OK** to finish.

Step 8 To add an iSCSI boot to the boot order, do the following:

a) In the **Specific Boot Policy** area, click the down arrows to expand the **iSCSI vNICs** area.

b) In the **iSCSI vNICs** area, double-click the iSCSI vNICs from which you want to boot the server to add them to the **Boot Order** table.

c) In the **iSCSI vNICs** area, click the **Set Boot Parameters** link.
If there are two iSCSI vNICs, choose the one for which you want to set boot parameters.

d) Complete the fields in the **Set iSCSI Boot Parameters** dialog box and click **OK**.
For more information about the fields, see Setting iSCSI Boot Parameters, on page 466.

e) (Optional) Repeat steps c and d to set boot parameters for additional iSCSI vNICs.

Step 9 If you created a new boot policy accessible to all service profiles and template, choose that policy from the **Boot Policy** drop-down list.

Step 10 Click **Next**.

What to Do Next

Complete Page 6: Adding the Maintenance Policy.

Page 7: Adding the Maintenance Policy

This procedure directly follows Page 5: Setting the Server Boot Order. It describes how to add a maintenance policy to the service profile on the **Maintenance Policy** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 From the **Maintenance Policy** drop-down list, choose one of the following:

Option	Description
Select a Maintenance Policy to Use (default policy shown)	Assigns the default maintenance policy to this service profile. Continue with Step 4.
Maintenance Policies *Policy_Name*	Assigns an existing maintenance policy to the service profile. If you choose this option, Cisco UCS Manager displays the details of the policy. If you do not want use any of the existing policies but instead want to create a policy that all service profiles can access, click **Create Maintenance Policy** and continue with Step 2. Otherwise, choose a policy from the list and continue with Step 4.

Step 2 If you clicked **Create Maintenance Policy** to create a maintenance policy that all service profiles and templates can use, do the following:

a) In the **Create Maintenance Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Reboot Policy field	When a service profile is associated with a server, or when changes are made to a service profile that is already associated with a server, the server needs to be rebooted to complete the process. The **Reboot Policy** field determines when the reboot occurs for servers associated with any service profiles that include this maintenance policy. This can be one of the following: • **Immediate—**The server is rebooted automatically as soon as the service profile association is complete or service profile changes are saved by the user. • **User Ack—**The user must reboot the server manually after the service profile association is complete or changes are made. • **Timer Automatic—**Cisco UCS defers all service profile associations and changes until the maintenance window defined by the schedule shown in the **Schedule** field.
Schedule drop-down list	If the **Reboot Policy** is set to **Timer Automatic**, the schedule specifies when maintenance operations can be applied to the server. Cisco UCS reboots the server and completes the service profile changes at the scheduled time.
Create Schedule link	Click this link to create a new schedule that will be available to all objects in this Cisco UCS domain.

b) Click **OK** and continue with Step 3.

Step 3 If you created a new boot policy accessible to all service profiles and template, choose that policy from the **Maintenance Policy** drop-down list.

Step 4 Click **Next**.

What to Do Next

Complete Page 7: Specifying the Server Assignment.

Page 8: Specifying the Server Assignment

This procedure directly follows Page 6: Adding the Maintenance Policy. It describes how to specify the way a server is assigned and which firmware packages are associated with the service profile on the **Server Assignment** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 From the **Server Assignment** drop-down list, choose one of the following:

Option	Description
Assign Later	Allows you to assign a server after you have created and configured the service profile. Continue with Step 6.
Pre-provision a slot	Specifies the chassis and slot that contains the server which will be assigned to the service profile. If the server is not in the slot or is otherwise unavailable, the service profile will be associated with the server when it becomes available. Continue with Step 2.
Select existing Server	Displays a table of available, unassociated servers that you can use to select the server which will be assigned to the service profile. Continue with Step 3.
Select from a Pool ***Pool_Name***	Select a server pool from the list at the bottom of the drop-down list. Cisco UCS Manager assigns a server from this pool to the service profile. Continue with Step 4.

Step 2 If you chose **Pre-provision a slot**, do the following:

a) In the **Chassis Id** field, enter the number of the chassis where the selected server is located.
b) In the **Slot Id** field, enter the number of the slot where the selected server is located.
c) Continue with Step 4.

Step 3 If you chose **Select existing Server**, do the following:

a) In the **Select** column of the table of available servers, click the radio button for the server that meets the needs of this service profile.
b) Continue with Step 4.

Step 4 In the **Power State** field, click one of the following radio buttons to set the power state that will be applied to the server when it is associated with this service profile:

- **Down** if you want the server to be powered down before the profile is associated with the server.
- **Up** if you want the server to be powered up before the profile is associated with the server

By default, the server is powered up.

Step 5 If you want to restrict the migration of the service profile after it has been associated with a server, check the **Restrict Migration.** check box.
If you choose not to restrict migration, Cisco UCS Manager does not perform any compatibility checks on the new server before migrating the existing service profile. If the hardware of both servers are not similar, the association might fail.

Step 6 (Optional) In the **Firmware Management** area, do the following to use policies to update the firmware on the server associated with the service profile:

a) Click the down arrows on the **Firmware Management** bar to expand the area.

b) Complete the following fields:

Name	Description
Host Firmware drop-down list	To associate a host firmware package with this service profile, choose its name from the drop-down list.
Create Host Firmware Package link	Click this link if you want to create a host firmware package.

Step 7 Click **Next**.

What to Do Next

Complete Page 8: Adding Operational Policies.

Page 9: Adding Operational Policies

This procedure directly follows Page 7: Specifying the Server Assignment. It describes how to add operational policies to the service profile on the **Operational Policies** page of the **Create Service Profile (expert)** wizard. These policies are optional.

Procedure

Step 1 To override the default BIOS settings and configure them through the service profile, click the down arrows to expand the **BIOS Configuration** bar and do one of the following:

- To add an existing policy, select the desired BIOS policy from the **BIOS Policy** drop-down list.
- To create a BIOS policy that is available to all service profiles, click **Create BIOS Policy**, complete the fields in the dialog box, and then select that policy from the **BIOS Policy** drop-down list.

For more information about how to create a BIOS policy, see Creating a BIOS Policy, on page 407.

Step 2 To provide external access to the CIMC on the server, click the down arrows to expand the **External IPMI Management Configuration** bar and add an IPMI profile and a serial over LAN policy.
If you do not want to provide external access, continue with Step 4.

Step 3 To add an IPMI profile to the service profile, do one of the following:

- To add an existing policy, select the desired IPMI profile from the **IPMI Access Profile** drop-down list.
- If the **IPMI Access Profile** drop-down list does not include an IPMI profile with the desired user access, click the **Create Access IPMI Profile** link to create an IPMI profile that is available to all service profiles and then select that profile from the **IPMI Access Profile** drop-down list.

For more information about how to create an IPMI profile, see Creating an IPMI Access Profile, on page 410.

Step 4 To add a Serial over LAN policy to the service profile, do one of the following:

- To add an existing policy, select the desired Serial over LAN policy from the **SoL Configuration Profile** drop-down list.
- To create a Serial over LAN policy that is only available to service profile created from this template, select **Create a Specific SoL Policy** from the **SoL Configuration Profile** drop-down list and complete the **Admin State** field and the **Speed** drop-down list.
- To create a Serial over LAN policy that is available to all service profile templates, click the **Create Serial over LAN Policy** link, complete the fields in the dialog box, and then select that policy from the **SoL Configuration Profile** drop-down list.

For more information about how to create a serial over LAN policy, see Creating a Serial over LAN Policy, on page 422.

Step 5 To configure the management IP required for external access to the CIMC on the server, click the down arrows to expand the **Management IP Address** bar and do the following:

a) Select one of the following options from the **Management IP Address Policy** drop-down list:

- **None**—No management IP address is assigned to the server through the service profile. The management IP address is based on the CIMC management IP address defined on the server.
- **Static**—The service profile assigns a static management IP address to the associated server. If the service profile is migrated to a new server, the management IPv4 address moves with the service profile.

  Cisco UCS Manager GUI displays the **Static IP Address** area that lets you define the static IP address.
- ***IP-pool-name***—The service profile assigns a management IP address from the selected IP pool to the associated server.

  Click **Create IP Pool** to create a global pool of IP addresses that can be used by all service profiles and service profile templates.

b) If you selected **Static**, complete the following fields:

Name	Description
IP Address field	The management IP address assigned to the server through the service profile.
Subnet Mask field	The subnet mask for the management IP address.
Default Gateway field	The default gateway for the management IP address.

Step 6 To monitor thresholds and collect statistics for the associated server, click the down arrows to expand the **Monitoring Configuration (Thresholds)** bar and do one of the following:

- To add an existing policy, select the desired threshold policy from the **Threshold Policy** drop-down list.
- To create a threshold policy that is available to all service profiles, click the **Create Threshold Policy** link, complete the fields in the dialog box, and then select that policy from the **Threshold Policy** drop-down list.

For more information about how to create a threshold policy, see Creating a Server and Server Component Threshold Policy , on page 716.

Step 7 To associate a power control policy with the service profile, click the down arrows to expand the **Power Control Policy Configuration** bar and do one of the following:

- To add an existing policy, select the desired power control policy from the **Power Control Policy** drop-down list.
- To create a power control policy that is available to all service profiles, click the **Create Power Control Policy** link, complete the fields in the dialog box, and then select that policy from the **Power Control Policy** drop-down list.

For more information about how to create a power control policy, see Creating a Power Control Policy, on page 600.

Step 8 To associate a scrub policy with the service profile, click the down arrows to expand the **Scrub Policy** bar and do one of the following:

- To add an existing policy, select the desired scrub policy from the **Scrub Policy** drop-down list.
- To create a scrub policy that is available to all service profiles, click the **Create Scrub Policy** link, complete the fields in the dialog box, and then select that policy from the **Scrub Policy** drop-down list.

For more information about how to create a scrub policy, see Creating a Scrub Policy, on page 420.

Step 9 Click **Finish**.

Creating a Service Profile that Inherits Server Identity

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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the organization and select **Create Service Profile**.

Step 5 In the **Naming** area of the **Create Service Profile** dialog box, complete the following fields:

a) In the **Name** field, enter a unique name that you can use to identify the service profile.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

b) In the **Description** field, enter a description of this service profile.

Step 6 In the **vNICs** area of the **Create Service Profile** dialog box, complete the following fields:

Name	Description
Primary vNIC Section	
Primary vNIC check box	Check this check box if you want to create a vNIC for this service profile. If you check this box, Cisco UCS Manager GUI displays the rest of the fields in this section.
Name field	The name of the vNIC. 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.
Fabric field	The fabric interconnect that this vNIC is associated with.
Network drop-down list	The LAN that this vNIC is associated with.
Secondary vNIC Section	
Secondary vNIC check box	Check this check box if you want to create a second vNIC for this service profile. If you check this box, Cisco UCS Manager GUI displays the rest of the fields in this section.
Name field	The name of the vNIC. 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.
Fabric field	The fabric interconnect that this vNIC is associated with.
Network drop-down list	The LAN that this vNIC is associated with.

Step 7 In the **vHBAs** area of the **Create Service Profile** dialog box, complete the following fields:

Name	Description
Primary vHBA Section	
Primary vHBA check box	Check this check box if you want to create a vHBA for this service profile. If you check this box, Cisco UCS Manager GUI displays the rest of the fields in this section.

Name	Description
Name field	The name of the vHBA. 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.
Fabric field	The fabric interconnect that this vHBA is associated with. Do not associate the primary vHBA with the same fabric as the secondary vHBA.
Secondary vHBA Section	
Secondary vHBA check box	Check this check box if you want to create a second vHBA for this service profile. If you check this box, Cisco UCS Manager GUI displays the rest of the fields in this section.
Name field	The name of the vHBA. 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.
Fabric field	The fabric interconnect that this vHBA is associated with. Do not associate the secondary vHBA with the same fabric as the primary vHBA.

Step 8 In the **Boot Order** area of the **Create Service Profile** dialog box, complete the following fields:

Name	Description
Primary Boot Device Section	
Primary Boot Device check box	Check this check box if you want to set a boot device for this service profile. If you check this box, Cisco UCS Manager GUI displays the rest of the fields in this section.

Name	Description
Type field	This can be one of the following: • **local-disk—**The server boots from its local disk. **Note** If you select this option, you cannot select **local-disk** or **san** as your secondary boot type. • **san—**The server boots from an image stored in a SAN. If you select this option, Cisco UCS Manager GUI displays the **SAN** area. • **Lan—**The server boots from the LAN. If you select this option, Cisco UCS Manager GUI displays the **Network** area that lets you specify which vNIC the server should use for the PXE boot. • **CD-ROM—**The server boots from a virtual CD-ROM. • **Floppy—**The server boots from a virtual floppy.
SAN area	If **Type** is set to **san**, this area contains the following fields: • **vHBA—**The vHBA used to access the SAN boot image • **LUN—**The LUN that corresponds to the location of the boot image • **WWN—**The WWN that corresponds to the location of the boot image
Network (PXE) area	If **Type** is set to **lan**, this area contains the **vNIC** drop-down list from which you can choose the vNIC from which the server should boot.
Secondary Boot Device Section	
Secondary Boot Device check box	Check this check box if you want to set a second boot device for this service profile. If you check this box, Cisco UCS Manager GUI displays the rest of the fields in this section.
Type field	This can be one of the following: • **local-disk—**The server boots from its local disk. • **san—**The server boots from an image stored in a SAN. If you select this option, Cisco UCS Manager GUI displays the **SAN** area. • **Lan—**The server boots from the LAN. If you select this option, Cisco UCS Manager GUI displays the **Network** area that lets you specify which vNIC the server should use for the PXE boot. • **CD-ROM—**The server boots from a virtual CD-ROM. • **Floppy—**The server boots from a virtual floppy.

Name	Description
SAN area	If **Type** is set to **san**, this area contains the following field: • **vHBA—**The vHBA used to access the SAN boot image • **LUN—**The LUN that corresponds to the location of the boot image • **WWN—**The WWN that corresponds to the location of the boot image
Network (PXE) area	If **Type** is set to **Lan**, this area contains the **vNIC** drop-down list from which you can choose the vNIC from which the server should boot.

Step 9 (Optional) In the **Select** column of the **Server Association (optional)** area, click the radio button for a server to associate this service profile with that server.

Step 10 Click **OK**.

Creating a Hardware Based Service Profile for a Blade Server

You cannot move a hardware based service profile to another server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to create a hardware based service profile.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Create Service Profile**.

Step 6 In the **Create Service Profile for Server** dialog box, do the following:

a) From the **Create Service Profile in Organization** drop-down list, select the organization in which you want to create the service profile.

b) Click the **Hardware Based Service Profile** radio button.

c) In the **Name** field, enter a unique name for the service profile.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

d) If you want Cisco UCS Manager to create vNICs for the service profile, check the **Create Default vNICs** check box.

e) If you want Cisco UCS Manager to create vHBAs for the service profile, check the **Create Default vHBAs** check box.

f) Click **OK**.

Cisco UCS Manager inherits and automatically applies the identity and configuration information in the server, creates the service profile, and associates it with the server.

Creating a Hardware Based Service Profile for a Rack-Mount Server

You cannot move a hardware based service profile to another server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to create a hardware based service profile.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Create Service Profile**.

Step 6 In the **Create Service Profile for Server** dialog box, do the following:

a) From the **Create Service Profile in Organization** drop-down list, select the organization in which you want to create the service profile.

b) Click the **Hardware Based Service Profile** radio button.

c) In the **Name** field, enter a unique name for the service profile.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

d) If you want Cisco UCS Manager to create vNICs for the service profile, check the **Create Default vNICs** check box.

e) If you want Cisco UCS Manager to create vHBAs for the service profile, check the **Create Default vHBAs** check box.

f) Click **OK**.

Cisco UCS Manager inherits and automatically applies the identity and configuration information in the server, creates the service profile, and associates it with the server.

Working with Service Profile Templates

Creating a Service Profile Template

Procedure

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

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

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

Step 4 Right-click the organization and choose **Create Service Profile Template**.

Step 5 In the **Create Service Profile Template** wizard, complete the following:

- Page 1: Identifying the Service Profile Template
- Page 3: Specifying the Networking Options
- Page 2: Specifying the Storage Options
- Page 4: Configuring the Fibre Channel Zoning Options, on page 551
- Page 4: Setting the vNIC/vHBA Placement
- Page 5: Setting the Server Boot Order
- Page 6: Adding the Maintenance Policy
- Page 7: Specifying the Server Assignment Options
- Page 8: Adding Operational Policies

Page 1: Identifying the Service Profile Template

This procedure directly follows the steps in Creating a Service Profile Template. It describes how to set the identity of a service profile template on the **Identify Service Profile Template** page of the **Create Service Profile Template** wizard.

Procedure

Step 1 In the **Name** field, enter a unique name that you can use to identify this service profile template.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

This name must be unique within the organization or sub-organization in which you are creating the service profile.

Step 2 In the **Type** field, click one of the following radio buttons:

- **Initial Template—**Any service profiles created from this template are not updated if the template changes
- **Updating Template—**Any service profiles created from this template are updated if the template changes

Step 3 From the **UUID Assignment** drop-down list, choose one of the following:

Option	Description
Select (pool default used by default)	Assigns a UUID from the default UUID Suffix pool.
Hardware Default	Uses the UUID assigned to the server by the manufacturer. If you choose this option, the UUID remains unassigned until the service profile is associated with a server. At that point, the UUID is set to the UUID value assigned to the server by the manufacturer. If the service profile is later moved to a different server, the UUID is changed to match the new server.
Pools ***Pool_Name***	Assigns a UUID from the UUID Suffix pool that you select from the list at the bottom of the drop-down list. Each pool name is followed by two numbers in parentheses that show the number of UUIDs still available in the pool and the total number of UUIDs in the pool.

Step 4 (Optional) In the text box, enter a description of this service profile template.
A user-defined description of the service profile template.

Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 5 Click **Next**.

What to Do Next

Complete the steps in Page 3: Specifying the Networking Options.

Page 2: Specifying the Networking Options

This procedure directly follows Page 1: Identifying the Service Profile Template. It describes how to configure the networking options, including LAN connectivity, on the **Networking** page of the **Create Service Profile Template** wizard.

Procedure

Step 1 (Optional) If you plan to assign service profiles created from this template to a server with an adapter that supports dynamic vNICs, choose one of the following options from the **Dynamic vNIC Connection** drop-down list:

Option	Description
Select a Policy to use	Enables you to create a service profile template without a dynamic vNIC connection policy for a server with an adapter that does not support dynamic vNICs. This option does not include a dynamic vNIC connection policy in the template. If you are configuring this service profile/template for iSCSI boot, choose this option. Continue with Step 4.
Create a Specific Dynamic vNIC Connection Policy	Enables you to create a dynamic vNIC connection policy that can only be accessed by this service profile template. Continue with Step 2.
Dynamic vNIC Connection Policies ***Policy_Name***	Select an existing dynamic vNIC connection policy from the list at the bottom of the drop-down list. Cisco UCS Manager assigns this policy to the service profile template. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles and templates can access, continue with Step 3. Otherwise, continue with Step 4.

Step 2 (Optional) If you clicked **Create a Specific Dynamic vNIC Connection Policy**, do the following to create a new dynamic vNIC connection policy that can only be used by service profiles created from this template:

a) Complete the following fields:

Name	Description
Number of Dynamic vNICs field	The number of dynamic vNICs that this policy affects.
Adapter Policy drop-down list	The adapter profile associated with this policy. The profile must already exist to be included in the drop-down list.
Protection field	Dynamic vNICs are always protected in Cisco UCS, but this field allows you to select a preferred fabric, if any. You can choose one of the following: • **Protected Pref A—**Cisco UCS attempts to use fabric A but fails over to fabric B if necessary • **Protected Pref B—**Cisco UCS attempts to use fabric B but fails over to fabric A if necessary • **Protected—**Cisco UCS uses whichever fabric is available

b) Continue with Step 4.

Step 3 (Optional) To create a dynamic vNIC connection policy that will be available to all service profiles and templates, do the following:

a) Click **Create Dynamic vNIC Connection Policy**.

b) In the **Create Dynamic vNIC Connect Policy** dialog box, complete the fields.

Note Do not specify "default" as the value for the dynamic vNIC connection policy name. Cisco UCS Manager automatically resolves any empty policy references to "default". Any service profiles or service profile templates with only static vNICS defined will automatically reference the policy "default" when it is present. If you specify “default” for the dynamic vNIC connection policy name, then unexpected dynamic vNICs might be created on those service profiles or service profile templates.

For more information, see the Cisco UCS Manager VM-FEX configuration guides.

c) Click **OK**.

d) From the **Dynamic vNIC Connection** drop-down list, choose the policy you created.

e) Continue with Step 4.

Step 4 In the **How would you like to configure LAN connectivity?** field, click one of the following options:

Option	Description
Simple	Allows you to create a maximum of two vNICs, in dual fabric mode, for every service profile created from this template. Continue with Step 5.
Expert	Allows you to create an unlimited number of vNICs for every service profile created from this template. If you are configuring this service profile for iSCSI boot, continue with Step 7. For all other configurations, continue with Step 6.
No vNICs	Does not include any vNICs for connections to a LAN in a service profile created from this template. Any server associated with these service profiles cannot communicate with a LAN unless you modify the individual service profile later. Continue with Step 9.
Use Connectivity Policy	Allows you to use a LAN Connectivity policy for this service profile. Continue with Step 8. **Note** You cannot have a LAN connectivity policy and locally created vNICs in the same service profile. When you add a LAN connectivity policy to a service profile, any existing vNIC configuration is erased.

Step 5 (Optional) If you chose the simple LAN connectivity option and are not configuring this service profile for iSCSI boot, do the following:

a) In the **vNIC 0 (Fabric A)** area:

- In the **Name** field, enter a unique name for the vNIC.
- From the **Select Native VLAN** drop-down list, choose the name of the VLAN with which this vNIC should communicate.

If the VLAN you need is not in the drop-down list, click the **Create VLAN** link. For more information, see Creating a Named VLAN, on page 224.

b) Repeat Step 2a in the **vNIC 1 (Fabric B)** area to create a VLAN for that vNIC.

c) Continue with Step 9.

Step 6 If you chose the expert LAN connectivity option, do the following:

a) Click **Add** on the icon bar of the table to open the **Create vNICs** dialog box.

b) Complete the following fields to specify the identity information for the vNIC:

Name	Description
Name field	The user-defined name for this vNIC. 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.
Use vNIC Template check box	Check this check box if you want to use a template to create the vNIC. The Cisco UCS Manager GUI displays the **vNIC Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vNIC templates exist in the system.
Create vNIC Template link	Click this link if you want to create a vNIC template.
MAC Address Assignment drop-down list	If you want to: • Use the default MAC address pool, leave this field set to **Select (pool default used by default)**. • Use the MAC address assigned to the server by the manufacturer, select **Hardware Default**. • Use a specific MAC address, choose **02:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link. • Use a MAC address from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

c) In the **Fabric Interconnect** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component. If you want this vNIC to be able to access the second fabric interconnect if the default one is unavailable, check the **Enable Failover** check box. **Note** Do not enable fabric failover for the vNIC under the following circumstances: • 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 to the other. • If you plan to associate this vNIC with a server that has an adapter which does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.
VLANs table	This table lists the VLANs that can be associated with this vNIC. The columns are: • **Select**—Check the check box in this column for each VLAN that you want to use. **Note** VLANs and PVLANs can not be assigned to the same vNIC. • **Name**—The name of the VLAN. • **Native VLAN**—To designate one of the VLANs as the native VLAN, click the radio button in this column.
Create VLAN link	Click this link if you want to create a VLAN.
MTU field	The maximum transmission unit, or packet size, that this vNIC accepts. Enter an integer between 1500 and 9216. **Note** If the vNIC 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 get dropped during data transmission.
Pin Group drop-down list	Choose the LAN pin group that you want associated with this vNIC.
Create LAN Pin Group link	Click this link if you want to create a LAN pin group.
Operational Parameters Section	

Name	Description
Stats Threshold Policy drop-down list	The statistics collection policy with which this vNIC is associated.

d) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list	The Ethernet adapter policy with which this vNIC is associated.
Create Ethernet Adapter Policy link	Click this link if you want to create an Ethernet adapter policy.
Dynamic vNIC Connection Policy drop-down list	The dynamic vNIC connection policy with which this vNIC is associated.
Create Dynamic vNIC Connection Policy link	Click this link if you want to create a dynamic vNIC connection policy.
QoS drop-down list	The quality of service policy with which this vNIC is associated.
Create QoS Policy link	Click this link if you want to create a quality of service policy.
Network Control Policy drop-down list	The network control policy with which this vNIC is associated.
Create Network Control Policy Policy link	Click this link if you want to create a network control policy.

e) Click **OK**.

Step 7 If you chose the expert LAN connectivity option and are configuring this service profile for iSCSI boot, do the following:

a) Click the down arrows to expand the **iSCSI vNICs** bar.

b) Click **Add** on the icon bar of the table to open the **Create iSCSI vNIC** dialog box.

c) Complete the following fields to specify the identity information for the iSCSI vNIC:

Name	Description
Name field	The name of the iSCSI vNIC. 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.
Overlay vNIC drop-down list	The LAN vNIC associated with this iSCSI vNIC, if any.

Name	Description
iSCSI Adapter Policy drop-down list	The iSCSI adapter policy associated with this iSCSI vNIC, if any.
Create iSCSI Adapter Policy link	Click this link to create a new iSCSI adapter policy that will be available to all iSCSI vNICs.
MAC Address field	The MAC address associated with this iSCSI vNIC, if any. If the MAC address is not set, the Cisco UCS Manager GUI displays **Derived**.
MAC Pool field	The MAC pool associated with this iSCSI vNIC, if any.
VLAN drop-down list	The virtual LAN associated with this iSCSI vNIC. The default VLAN is **default**. **Note** For the Cisco UCS M81KR Virtual Interface Card and the Cisco UCS VIC-1240 Virtual Interface Card, the VLAN that you specify must be the same as the native VLAN on the overlay vNIC. For the Cisco UCS M51KR-B Broadcom BCM57711 Adapter, the VLAN that you specify can be any VLAN assigned to the overlay vNIC.

d) Click **OK**.

e) Repeat steps b through d to create additional iSCSI vNICs.

Step 8 If you chose **Use Connectivity Policy**, do one of the following:

- To use an existing LAN connectivity policy, choose that policy from the **LAN Connectivity Policy** drop-down list.
- If you do not want use any of the existing LAN connectivity policies, but instead want to create a policy that all serivce profiles can access, click the **Create LAN Connectivity Policy** link and complete the fields.

For more information about LAN connectivity policies, see Creating a LAN Connectivity Policy, on page 270.

Step 9 Click **Next**.

What to Do Next

Complete Page 2: Specifying the Storage Options.

Page 3: Specifying the Storage Options

This procedure directly follows Page 3: Specifying the Networking Options. It describes how to configure the storage options for a service profile template on the **Storage** page of the **Create Service Profile Template** wizard.

Procedure

Step 1 From the **Local Storage** drop-down list, choose one of the following:

Option	Description
Select Local Storage Policy to use	Assigns the default local disk storage policy to every service profile created from this template. Continue with Step 4.
Create a Specific Storage Policy	Enables you to create a local disk policy that can only be accessed by a service profile created from this template. Continue with Step 2.
Storage Policies ***Policy_Name***	Allows you to choose an existing local disk policy from the list at the bottom of the drop-down list. Cisco UCS Manager assigns this policy to every service profile created from this template. If you do not want use any of the existing policies but instead want to create a new policy that all service profiles and templates can access, continue with Step 3. Otherwise, continue with Step 4.

Step 2 (Optional) If you chose **Create a Specific Storage Policy** and want to create a new policy that can only be used by service profiles created from this service profile template, do the following:

a) From the **Mode** drop-down list, choose one of the following:

- **No Local Storage**—For a diskless server or a SAN only configuration. If you select this option, you cannot associate any service profile which uses this policy with a server that has a local disk.
- **RAID 0 Striped**—Data is striped across all disks in the array, providing fast throughput. There is no data redundancy, and all data is lost if any disk fails.
- **RAID 1 Mirrored**—Data is written to two disks, providing complete data redundancy if one disk fails. The maximum array size is equal to the available space on the smaller of the two drives.
- **Any Configuration**—For a server configuration that carries forward the local disk configuration without any changes.
- **No RAID**—For a server configuration that removes the RAID and leaves the disk MBR and payload unaltered.

  If you choose **No RAID** and you apply this policy to a server that already has an operating system with RAID storage configured, the system does not remove the disk contents. Therefore, there may be no visible differences on the server after you apply the **No RAID** mode. This can lead to a mismatch between the RAID configuration in the policy and the actual disk configuration shown in the **Inventory** > **Storage** tab for the server.

To make sure that any previous RAID configuration information is removed from a disk, apply a scrub policy that removes all disk information after you apply the **No RAID** configuration mode.

- **RAID 5 Striped Parity—**Data is striped across all disks in the array. Part of the capacity of each disk stores parity information that can be used to reconstruct data if a disk fails. RAID 5 provides good data throughput for applications with high read request rates.
- **RAID 6 Striped Dual Parity—**Data is striped across all disks in the array and two parity disks are used to provide protection against the failure of up to two physical disks. In each row of data blocks, two sets of parity data are stored.
- **RAID10 Mirrored and Striped—** RAID 10 uses mirrored pairs of disks to provide complete data redundancy and high throughput rates.

Note Some Cisco UCS servers require a license for certain RAID configuration options. When Cisco UCS Manager associates a service profile containing this local disk policy with a server, Cisco UCS Manager verifies that the selected RAID option is properly licensed. If there are issues, Cisco UCS Manager displays a configuration error during the service profile association.

For RAID license information for a specific Cisco UCS server, see the *Hardware Installation Guide* for that server.

b) If you want to ensure that the server retains the configuration in the local disk configuration policy even if the server is disassociated from the service profile, check the **Protect Configuration** check box. When a service profile is disassociated from a server and a new service profile associated, the setting for the Protect Configuration property in the new service profile takes precedence and overwrites the setting in the previous service profile.

Note If you disassociate the server from a service profile with this option enabled and then associate it with a new service profile that includes a local disk configuration policy with different properties, the server returns a configuration mismatch error and the association fails.

c) Continue with Step 4.

Step 3 (Optional) To create a local disk configuration policy that will be available to all service profiles and templates, do the following:

a) Click the **Create Local Disk Configuration Policy** link.
b) In the **Create Local Disk Configuration** dialog box, complete the fields.
For more information, see Creating a Local Disk Configuration Policy, on page 415.
c) Click **OK**.
d) From the **Local Storage** drop-down list, choose the policy you created.

Step 4 In the **How would you like to configure SAN storage?** field, click one of the following options:

Option	Description
Simple	Allows you to create a maximum of two vHBAs for every service profile created from this template. Continue with Step 5.
Expert	Allows you to create an unlimited number of vHBAs for every service profile created from this template. Continue with Step 6.

Option	Description
No vHBAs	Does not include any vHBAs for connections to a Fibre Channel SAN in a service profile created from this template. If you are configuring this service profile/template for iSCSI boot, choose this option. Continue with Step 8.
Use Connectivity Policy	Allows you to use a SAN Connectivity policy for this service profile. Continue with Step 7. **Note** You cannot have a SAN connectivity policy and locally created vHBAs in the same service profile. When you add a SAN connectivity policy to a service profile, any existing vHBA configuration is erased.

Step 5 (Optional) If you chose the simple SAN storage option, do the following:

a) From the **WWNN Assignment** drop-down list, choose one of the following:

- Choose **Select (pool default used by default)** to use the default WWN pool.
- Choose one of the options listed under **Manual Using OUI** and then enter the WWN in the **World Wide Node Name** field.

  You can specify a WWNN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. You can click the **here** link to verify that the WWNN you specified is available.
- Choose a WWN pool name from the list to have a WWN assigned from the specified pool. Each pool name is followed by two numbers in parentheses that show the number of WWNs still available in the pool and the total number of WWNs in the pool.

b) In the **vHBA 0 (Fabric A)** area, complete the following fields:

- In the **Name** field, enter a unique name for the vHBA.
- From the **Select VSAN** drop-down list, choose the name of the VSAN with which this vHBA should be associated.

If the VSAN you need is not in the drop-down list, click the **Create VSAN** link. For more information, see Creating a Named VSAN, on page 303.

c) Repeat Step 5b in the **vHBA 1 (Fabric B)** area to create a VSAN for that vHBA.

d) Continue with Step 8.

Step 6 (Optional) If you chose the expert SAN storage option, do the following:

a) From the **WWNN Assignment** drop-down list, choose one of the following:

- Choose **Select (pool default used by default)** to use the default WWN pool.
- Choose one of the options listed under **Manual Using OUI** and then enter the WWN in the **World Wide Node Name** field.

  You can specify a WWNN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. You can click the **here** link to verify that the WWNN you specified is available.

- Choose a WWN pool name from the list to have a WWN assigned from the specified pool. Each pool name is followed by two numbers in parentheses that show the number of WWNs still available in the pool and the total number of WWNs in the pool.

b) Click **Add** on the icon bar of the table to open the **Create vHBA** dialog box.

c) Complete the following fields to specify the identity information for the vHBA:

Name	Description
Name field	The name of this vHBA. 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.
Use SAN Connectivity Template check box	Check this check box if you want to use a template to create the vHBA. The Cisco UCS Manager GUI displays the **vHBA Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vHBA templates exist in the system.
Create vHBA Template link	Click this link if you want to create a vHBA template.
WWPN Assignment drop-down list	How Cisco UCS assigns the World Wide Port Node to the vHBA. If you want Cisco UCS to: • Use the default WWPN pool, leave this field set to **Select (pool default used by default)**. • Use the WWPN assigned to the server by the manufacturer, select **Derived**. • Use a specific WWPN, select **20:00:00:25:B5:00:00:00**, **20:XX:XX:XX:XX:XX:XX:XX**, or **5X:XX:XX:XX:XX:XX:XX:XX** and enter the WWPN in the **WWPN** field. If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template **20:00:00:25:B5:XX:XX:XX**. • Use a WWPN from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available addresses in the pool and the second is the total number of addresses in the pool. To create a new WWPN pool, click **Create WWPN Pool**.

d) In the **VSAN** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component.
Select VSAN drop-down list box	The VSAN with which this vHBA is associated.
Create VSAN link	Click this link if you want to create a VSAN.
Pin Group drop-down list box	The SAN pin group with which this vHBA is associated.
Create SAN Pin Group link	Click this link if you want to create a pin group.
Persistent Binding field	This can be one of the following: • **Disabled** • **Enabled**
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.
Operational Parameters Section	
Stats Threshold Policy drop-down list box	The statistics threshold policy with which this vHBA is associated.

e) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list box	The Fibre Channel adapter policy with which this vHBA is associated.
Create Fibre Channel Adapter Policy link	Click this link if you want to create a Fibre Channel adapter policy.
QoS drop-down list box	The quality of service policy with which this vHBA is associated.
Create QoS Policy link	Click this link if you want to create a QoS policy.

f) Click **OK**.

g) Continue with Step 7.

Step 7 If you chose **Use Connectivity Policy**, do one of the following:

- To use an existing SAN connectivity policy, choose that policy from the **SAN Connectivity Policy** drop-down list.

- If you do not want use any of the existing SAN connectivity policies, but instead want to create a policy that all serivce profiles can access, click the **SAN Connectivity Policy** link and complete the fields.

For more information about SAN connectivity policies, see Creating a SAN Connectivity Policy, on page 341.

Step 8 Click **Next**.

What to Do Next

Complete Page 4: Configuring the Fibre Channel Zoning Options, on page 551.

Page 4: Configuring the Fibre Channel Zoning Options

This procedure directly follows Page 2: Specifying the Storage Options. It describes how to configure the vHBA initiator groups required for Fibre Channel zoning for a service profile template on the **Zoning** page of the **Create Service Profile Template** wizard.

Procedure

Step 1 If you have not already done so, create one or more vHBA initiator groups as follows:

a) On the icon bar at the bottom of the **Select vHBA Initiator Groups** table, click **+**.

b) In the **Create vHBA Initiator Group** dialog box, complete the following fields:

Name	Description
Name field	The name of the vHBA initiator group. 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 group. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Storage Connection Policy drop-down list	The storage connection policy associated with this vHBA initiator group. This can be one of the following: • Use an existing storage connection policy, then choose that policy from the drop-down list. The Cisco UCS Manager GUI displays information about the policy and its FC target endpoints in the **Global Storage Connection Policy** area. Create a new storage connection policy that will be globally available, then click the **Create Storage Connection Policy** link. • Create a local storage connection policy that is available only to this vHBA initiator group, then choose the **Specific Storage Connection Policy** option. The Cisco UCS Manager GUI displays the **Specific Storage Connection Policy** area that allows you to configure the local storage connection policy.
Create Storage Connection Policy link	Click this link to create a new storage connection policy that will be available to all service profiles and service profile templates.

For more information about how to create a storage connection policy, see Creating a Fibre Channel Storage Connection Policy, on page 358.

c) Click **OK**.

Step 2 In the **Select vHBA Initiators** table, click one or more vHBA initiators that you want to add to the vHBA initiator group.

Step 3 In the **Select vHBA Initiator Groups** table, click the vHBA initiator group to which you want to add the selected vHBA initiator(s).

Step 4 Click the >> **Add To** >> button to add the selected vHBA initiator(s) to the selected vHBA initiator group.

Step 5 When you have added the vHBA initiators to all vHBA initiator groups required for the zones through which any associated servers communicate, click **Next**.

What to Do Next

Complete Page 4: Setting the vNIC/vHBA Placement.

Page 5: Setting the vNIC/vHBA Placement

This procedure directly follows Page 4: Configuring the Fibre Channel Zoning Options, on page 551. It describes how to set the vNIC and vHBA placement options on the **vNIC/vHBA Placement** page of the **Create Service Profile Template** wizard.

Procedure

Step 1 From the **Select Placement** drop-down list, choose one of the following:

Option	Description
Let System Perform Placement	Specifies that Cisco UCS Manager determines the vNIC/vHBA placement for all servers associated with a service profile created from this template. The placement is determined by the order set in the PCI Order table. If you are configuring this service profile/template for iSCSI boot, choose this option. If you are configuring this service profile for iSCSI boot, continue with Step 5. For all configurations, continue with Step 2.
Specify Manually	Enables you to do the following: • Explicitly assign the vNICs and vHBAs associated with this service profile template to a virtual network interface connection (vCon). • Configure the types of vNICs and vHBAs that can be assigned to a vCon, either manually or through a vNIC/vHBA placement policy. Continue with Step 3.
vNIC/vHBA Placement Profiles ***Placement Profile Name***	Assigns an existing vNIC/vHBA placement policy to a service profile created from this template. If you choose this option, Cisco UCS Manager displays the details of the policy. If a vNIC/vHBA placement policy has not been configured in Cisco UCS Manager, this option may not display in the drop-down list. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles and templates can access, click **Create Placement Policy** and continue with Step 4. Otherwise, continue with Step 5.

Step 2 (Optional) If you chose **Let System Perform Placement**, do the following:

a) Use one or more of the following buttons to adjust the order of the vNICs and vHBAs:

Name	Description
Move Up button	Moves the selected vNIC or VHBA to a higher priority in the list.
Move Down button	Moves the selected vNIC or vHBA to a lower priority in the list.
Delete button	Deletes the selected vNIC or vHBA.
Reorder button	Returns all vNICs and vHBAs to their original order.

Name	Description
Modify button	Enables you to modify the currently-selected vNIC or vHBA. **Note** You can change any options for the vNIC or vHBA except its name.

b) Continue with Step 5.

Step 3 (Optional) If you chose **Specify Manually**, do the following:

a) On the appropriate tab in the **vNIC/vHBA** table, click a vNIC or vHBA.

b) In the **Virtual Host Interface** table, click a vCon row and if necessary, choose one of the following values from the **Selection Preference** column:

- **All—**All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **Assigned Only—**vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **Exclude Dynamic—**Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.
- **Exclude Unassigned—**Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **Exclude usNIC—**Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.

  Note An SRIOV usNIC that is explicitly assigned to a vCon set to **Exclude usNIC** will remain assigned to that vCon.

c) Click **Assign**.
If you need to undo an assignment, click **Remove**.

d) Repeat Steps a through c until you have assigned all vNICs and vHBAs.

e) When you have specified all vNIC and vHBA placements, continue with Step 5.

Step 4 If you clicked **Create Placement Policy**, do the following in the **Create Placement Policy** dialog box:

a) Complete the following fields:

Name	Description
Name field	The name for this placement 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.

Name	Description
Virtual Slot Mapping Scheme field	Cisco UCS assigns virtual network interface connections (vCons) to the PCIe adapter cards in the server. Each vCon is a virtual representation of a physical adapter that can be assigned vNICs and vHBAs. For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4. For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the selected virtual slot mapping scheme. This can be one of the following: • **Round Robin—** In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon3 to Adapter1, then assigns vCon2 and vCon4 to Adapter2. In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1, vCon2 and vCon4 to Adapter2, and vCon3 to Adapter3. This is the default scheme. • **Linear Ordered—** In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon2 to Adapter1, then assigns vCon3 and vCon4 to Adapter2. In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1 and vCon2 to Adapter2, then assigns vCon3 and vCon4 to Adapter3. **Note** In N20-B6620-2 and N20-B6625-2 blade servers, the two adapters are numbered left to right while vCons are numbered right to left. If one of these blade servers has a single adapter, Cisco UCS assigns all vCons to that adapter. If the server has two adapters, the vCon assignment depends upon the virtual slot mapping scheme: • **Round Robin—**Cisco UCS assigns vCon2 and vCon4 to Adapter1 and vCon1 and vCon3 to Adapter2. This is the default. • **Linear Ordered—**Cisco UCS assigns vCon3 and vCon4 to Adapter1 and vCon1 and vCon2 to Adapter2. After Cisco UCS assigns the vCons, it assigns the vNICs and vHBAs based on the **Selection Preference** for each vCon.

b) In the **Selection Preference** column for each **Virtual Slot**, choose one of the following from the drop-down list:

- **All**—All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **Assigned Only**—vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **Exclude Dynamic**—Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.
- **Exclude Unassigned**—Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **Exclude usNIC**—Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.

  Note An SRIOV usNIC that is explicitly assigned to a vCon set to **Exclude usNIC** will remain assigned to that vCon.

c) Click **OK**.

d) After the dialog box closes, choose the policy you created from the **Select Placement** drop-down list.

Step 5 Click **Next**.

What to Do Next

Complete Page 5: Setting the Server Boot Order.

Page 6: Setting the Server Boot Order

This procedure directly follows Page 4: Setting the vNIC/vHBA Placement. It describes how to set the server boot order options on the **Server Boot Order** page of the **Create Service Profile Template** wizard.

Tip If you configure a local disk and a SAN LUN for the boot order storage type and the operating system or logical volume manager (LVM) is configured incorrectly, the server might boot from the local disk rather than the SAN LUN.

For example, on a server with Red Hat Linux installed, where the LVM is configured with default LV names and the boot order is configured with a SAN LUN and a local disk, Linux reports that there are two LVs with the same name and boots from the LV with the lowest SCSI ID, which could be the local disk.

Procedure

Step 1 From the **Boot Policy** drop-down list, choose one of the following:

Option	Description
Select Boot Policy to use	Assigns the default boot policy to every service profile created from this template. Continue with Step 9.

Option	Description
Create a Specific Boot Policy	Enables you to create a local boot policy that can only be accessed by a service profile created from this template. Continue with Step 3.
Boot Policies *Policy_Name*	Assigns an existing boot policy to every service profile created from this template. If you choose this option, Cisco UCS Manager displays the details of the policy. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles and templates can access, continue with Step 2. Otherwise, choose a policy from the list and continue with Step 9.

Step 2 If you clicked **Create Boot Policy** to create a boot policy that all service profiles and templates can use, do the following:

a) In the **Create Boot Policy** dialog box, enter a unique name and description for 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.

b) Continue with Step 3.

Step 3 (Optional) To reboot all servers that use this boot policy after you make changes to the boot order, check the **Reboot on Boot Order Change** check box.
In the Cisco UCS Manager GUI, if the **Reboot on Boot Order Change** check box is checked for a boot policy, and if CD-ROM or Floppy is the last device in the boot order, deleting or adding the device does not directly affect the boot order and the server does not reboot.

Step 4 (Optional) If desired, check the **Enforce vNIC/vHBA/iSCSI Name** check box.

- If checked, Cisco UCS Manager displays a configuration error and reports whether one or more of the vNICs, vHBAs, or iSCSI vNICs listed in the **Boot Order** table match the server configuration in the service profile.
- If not checked, Cisco UCS Manager uses the vNICs, vHBAs, or iSCSI vNICs (as appropriate for the boot option) from the server configuration in the service profile. It does not report whether the vNICs, vHBAs, or iSCSI vNICs specified in the boot policy match the server configuration in the service profile.

Step 5 To add a local disk, virtual CD-ROM, or virtual floppy to the boot order, do the following:

a) Click the down arrows to expand the **Local Devices** area.
b) Click one of the following links to add the device to the **Boot Order** table:

- **Add Local Disk**
- **Add CD-ROM**
- **Add Floppy**

c) Add another boot device to the **Boot Order** table, or click **OK** to finish.

Step 6 To add a LAN boot to the boot order, do the following:

a) Click the down arrows to expand the **vNICs** area.

b) Click the **Add LAN Boot** link.

c) In the **Add LAN Boot** dialog box, enter the name of the vNIC that you want to use for the LAN boot in the **vNIC** field, then click **OK**.

d) Add another device to the **Boot Order** table, or click **OK** to finish.

Step 7 To add a SAN boot to the boot order, do the following:

a) Click the down arrows to expand the **vHBAs** area.

b) Click the **Add SAN Boot** link.

c) In the **Add SAN Boot** dialog box, complete the following fields, and click **OK**:

Name	Description
vHBA field	Enter the name of the vHBA you want to use for the SAN boot.
Type field	This can be one of the following: • **Primary**—The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary**—The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

d) If this vHBA points to a bootable SAN image, click the **Add SAN Boot Target** link and, in the **Add SAN Boot Target** dialog box, complete the following fields, then click **OK**:

Name	Description
Boot Target LUN field	The LUN that corresponds to the location of the boot image.
Boot Target WWPN field	The WWPN that corresponds to the location of the boot image.

Name	Description
Type field	This can be one of the following: - **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. - **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

e) Add another boot device to the **Boot Order** table, or click **OK** to finish.

Step 8 To add an iSCSI boot to the boot order, do the following:

a) In the **Specific Boot Policy** area, click the down arrows to expand the **iSCSI vNICs** area.

b) In the **iSCSI vNICs** area, double-click the iSCSI vNICs from which you want to boot the server to add them to the **Boot Order** table.

c) In the **iSCSI vNICs** area, click the **Set Boot Parameters** link.
If there are two iSCSI vNICs, choose the one for which you want to set boot parameters.

d) Complete the fields in the **Set iSCSI Boot Parameters** dialog box and then click **OK**.
For more information about the fields, see Setting iSCSI Boot Parameters, on page 466.

e) Repeat steps c and d to set boot parameters for additional iSCSI vNICs.

Step 9 If you created a new boot policy accessible to all service profiles and template, choose that policy from the **Boot Policy** drop-down list.

Step 10 Click **Next**.

What to Do Next

Complete Page 6: Adding the Maintenance Policy.

Page 7: Adding the Maintenance Policy

This procedure directly follows Page 5: Setting the Server Boot Order. It describes how to add a maintenance policy to the service profile on the **Maintenance Policy** page of the **Create Service Profile (expert)** wizard.

Procedure

Step 1 From the **Maintenance Policy** drop-down list, choose one of the following:

Option	Description
Select a Maintenance Policy to Use (default policy shown)	Assigns the default maintenance policy to this service profile. Continue with Step 4.
Maintenance Policies ***Policy_Name***	Assigns an existing maintenance policy to the service profile. If you choose this option, Cisco UCS Manager displays the details of the policy. If you do not want use any of the existing policies but instead want to create a policy that all service profiles can access, click **Create Maintenance Policy** and continue with Step 2. Otherwise, choose a policy from the list and continue with Step 4.

Step 2 If you clicked **Create Maintenance Policy** to create a maintenance policy that all service profiles and templates can use, do the following:

a) In the **Create Maintenance Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Reboot Policy field	When a service profile is associated with a server, or when changes are made to a service profile that is already associated with a server, the server needs to be rebooted to complete the process. The **Reboot Policy** field determines when the reboot occurs for servers associated with any service profiles that include this maintenance policy. This can be one of the following: • **Immediate**—The server is rebooted automatically as soon as the service profile association is complete or service profile changes are saved by the user. • **User Ack**—The user must reboot the server manually after the service profile association is complete or changes are made. • **Timer Automatic**—Cisco UCS defers all service profile associations and changes until the maintenance window defined by the schedule shown in the **Schedule** field.
Schedule drop-down list	If the **Reboot Policy** is set to **Timer Automatic**, the schedule specifies when maintenance operations can be applied to the server. Cisco UCS reboots the server and completes the service profile changes at the scheduled time.
Create Schedule link	Click this link to create a new schedule that will be available to all objects in this Cisco UCS domain.

b) Click **OK** and continue with Step 3.

Step 3 If you created a new boot policy accessible to all service profiles and template, select that policy from the **Maintenance Policy** drop-down list.

Step 4 Click **Next**.

What to Do Next

Complete Page 7: Specifying the Server Assignment Options.

Page 8: Specifying the Server Assignment Options

This procedure directly follows Page 6: Adding the Maintenance Policy. It describes how to specify the way a server is assigned to a service profile created from this template on the **Server Assignment** page of the **Create Service Profile Template** wizard.

Procedure

Step 1 From the **Pool Assignment** drop-down list, choose one of the following:

Option	Description
Assign Later	Allows you to assign a server after you have created and configured the service profile template. Continue with Step 2.
Select from a Pool *Pool_Name*	Select a server pool from the list at the bottom of the drop-down list. Cisco UCS Manager assigns a server from this pool to a service profile created from this template. Continue with Step 2.

Step 2 In the **Power State** field, click one of the following radio buttons to set the power state that will be applied to the server when it is associated with a service profile created from this template:

- **Down** if you want the server to be powered down before the profile is associated with the server
- **Up** if you want the server to be powered up before the profile is associated with the server

By default, the server is powered up.

Step 3 If you want to restrict the migration of the service profile after it has been associated with a server, check the **Restrict Migration.** check box.
If you choose not to restrict migration, Cisco UCS Manager does not perform any compatibility checks on the new server before migrating the existing service profile. If the hardware of both servers are not similar, the association might fail.

Step 4 (Optional) In the **Firmware Management** area, do the following to use policies to update the firmware on the server associated with a service profile created from this template:

a) Click the down arrows on the **Firmware Management** bar.
b) Complete the following fields:

Name	Description
Host Firmware drop-down list	To associate a host firmware package with this service profile, choose its name from the drop-down list.
Create Host Firmware Package link	Click this link if you want to create a host firmware package.

Step 5 Click **Next**.

What to Do Next

Complete Page 8: Adding Operational Policies.

Page 9: Adding Operational Policies

This procedure directly follows Page 7: Specifying the Server Assignment Options. It describes how to add operational policies to the service profile template on the **Operational Policies** page of the **Create Service Profile Template** wizard. These policies are optional.

Procedure

Step 1 To override the default BIOS settings and configure them through the service profile, click the down arrows to expand the **BIOS Configuration** bar and do one of the following:

- To add an existing policy, choose the desired BIOS policy from the **BIOS Policy** drop-down list.
- To create a BIOS policy that is available to all service profiles, click **Create BIOS Policy**, complete the fields in the dialog box, and then choose the desired BIOS policy from the **BIOS Policy** drop-down list.

For more information about how to create a BIOS policy, see Creating a BIOS Policy, on page 407.

Step 2 To provide external access to the CIMC on the server, click the down arrows to expand the **External IPMI Management Configuration** bar and add an IPMI profile and a serial over LAN policy.
If you do not want to provide external access, continue with Step 4.

Step 3 To add an IPMI profile to service profiles created from this template, do one of the following:

- To add an existing policy, choose the desired IPMI profile from the **IPMI Access Profile** drop-down list.
- If the **IPMI Access Profile** drop-down list does not include an IPMI profile with the desired user access, click the **Create Access IPMI Profile** link to create an IPMI profile that is available to all service profiles and then choose that profile from the **IPMI Access Profile** drop-down list.

For more information about how to create an IPMI profile, see Creating an IPMI Access Profile, on page 410.

Step 4 To add a Serial over LAN policy to service profiles created from this template, do one of the following:

- To add an existing policy, choose the desired Serial over LAN policy from the **SoL Configuration Profile** drop-down list.
- To create a Serial over LAN policy that is only available to service profile created from this template, choose **Create a Specific SoL Policy** from the **SoL Configuration Profile** drop-down list and complete the **Admin State** field and the **Speed** drop-down list.
- To create a Serial over LAN policy that is available to all service profile templates, click the **Create Serial over LAN Policy** link, complete the fields in the dialog box, and then choose that policy from the **SoL Configuration Profile** drop-down list.

For more information about how to create a serial over LAN policy, see Creating a Serial over LAN Policy, on page 422.

Step 5 To configure the management IP required for external access to the CIMC on the server, click the down arrows to expand the **Management IP Address** bar and click one of the following radio buttons:

- **None**—No management IP address is assigned to the server through the service profile. The management IP address is based on the CIMC management IP address defined on the server.

- **Pooled—**The service profile assigns a management IP address from the pool shown in **Pool Name** to the associated server. If the service profile is migrated to a new server, the management IP address moves with the service profile.

Step 6 To monitor thresholds and collect statistics for the associated server, click the down arrows to expand the **Monitoring Configuration** bar and do one of the following:

- To add an existing policy, choose the desired threshold policy from the **Threshold Policy** drop-down list.
- To create a threshold policy that is available to all service profiles, click the **Create Threshold Policy** link, complete the fields in the dialog box, and then choose that policy from the **Threshold Policy** drop-down list.

For more information about how to create a threshold policy, see Creating a Server and Server Component Threshold Policy , on page 716.

Step 7 To associate a power control policy with the service profile template, click the down arrows to expand the **Power Control Policy Configuration** bar and do one of the following:

- To add an existing policy, choose the desired power control policy from the **Power Control Policy** drop-down list.
- To create a power control policy that is available to all service profiles and templates, click the **Create Power Control Policy** link, complete the fields in the dialog box, and then choose that policy from the **Power Control Policy** drop-down list.

For more information about how to create a power control policy, see Creating a Power Control Policy, on page 600.

Step 8 To associate a scrub policy with the service profile template, click the down arrows to expand the **Scrub Policy** bar and do one of the following:

- To add an existing policy, choose the desired scrub policy from the **Scrub Policy** drop-down list.
- To create a scrub policy that is available to all service profiles and templates, click the **Create Scrub Policy** link, complete the fields in the dialog box, and then choose that policy from the **Scrub Policy** drop-down list.

For more information about how to create a scrub policy, see Creating a Scrub Policy, on page 420.

Step 9 Click **Finish**.

Creating One or More Service Profiles from a Service Profile Template

Procedure

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

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

Step 3 Expand the node for the organization that contains the service profile template that you want to use as the basis for your service profiles.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile template from which you want to create the profiles and select **Create Service Profiles From Template**.

Step 5 In the **Create Service Profiles From Template** dialog box, complete the following fields:

Name	Description
Naming Prefix field	The prefix to use for the template name. When the system creates the service profile, it appends a unique numeric identifier to this prefix. Enter between 1 and 29 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period). For example, if you specify the prefix MyProfile and request two profiles, the first service profile would be called MyProfile1 and the second would be MyProfile2. If you return at a later date and create three more profiles with the same prefix, they would be named MyProfile3, MyProfile4, and MyProfile5.
Number field	The number of service profiles to create. Enter a number between 1 and 255.

Step 6 Click **OK**.

Creating a Template Based Service Profile for a Blade Server

Before You Begin

A qualified service profile template with the desired values must exist in Cisco UCS Manager.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to create a template based service profile.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Create Service Profile**.

Step 6 In the **Create Service Profile for Server** dialog box, do the following:

a) Click the **Template Based Service Profile** radio button.

b) In the **Name** field, enter a unique name for the service profile.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

c) From the **Service Profile Template** drop-down list, select the template from which you want to create the service profile associated with this server.
Note The drop-down list only lists service profile templates compatible with the selected blade server.

d) Click **OK**.

Creating a Template Based Service Profile for a Rack-Mount Server

Before You Begin

A qualified service profile template with the desired values must exist in Cisco UCS Manager.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to create a template based service profile.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Create Service Profile**.

Step 6 In the **Create Service Profile for Server** dialog box, do the following:

a) Click the **Template Based Service Profile** radio button.

b) In the **Name** field, enter a unique name for the service profile.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

c) From the **Service Profile Template** drop-down list, select the template from which you want to create the service profile associated with this server.

d) Click **OK**.

Creating a Service Profile Template from a 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 contains the service profile that you want to use as the basis for your template.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile from which you want to create the template and select **Create a Service Profile Template**.

Step 5 In the **Create Template From Service Profile** dialog box, complete the following fields:

Name	Description
Service Profile Template Name field	The name of the service profile template. This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.
Org drop-down list	Select the organization that you want this template to be associated with.
Type field	This can be one of the following: • **Initial Template—**Any service profiles created from this template are not updated if the template changes • **Updating Template—**Any service profiles created from this template are updated if the template changes

Step 6 Click **OK**.

Managing Service Profiles

Cloning a 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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile you want to clone and select **Create a Clone**.

Step 5 In the **Create Clone From Service Profile** dialog box:

a) Enter the name you want to use for the new profile in the **Clone Name** field.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

This name must be unique within the organization or sub-organization in which you are creating the service profile.

b) Click **OK**.

Step 6 Navigate to the service profile you just created and make sure that all options are correct.

Associating a Service Profile with a Server or Server Pool

Follow this procedure if you did not associate the service profile with a blade server or server pool when you created it, or to change the blade server or server pool with which a service profile is associated.

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 contains the service profile that you want to associate with a new server or server pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile you want to associate with a server and select **Change Service Profile Association**.

Step 5 In the **Associate Service Profile** dialog box, select one of the following options:

Option	Description
Server Pool	Select a server pool from the drop-down list. Cisco UCS Manager assigns a server from this pool to the service profile. Continue with Step 7.
Server	Navigate to the desired available server in the navigation tree and select the server which will be assigned to the service profile. Continue with Step 7.
Custom Server	Specifies the chassis and slot that contains the server that will be assigned to the service profile. If the server is not in the slot or is otherwise unavailable, the service profile will be associated with the server when it becomes available. Continue with Step 6.

Step 6 If you chose **Custom Server**, do the following:

a) In the **Chassis Id** field, enter the number of the chassis where the selected server is located.

b) In the **Server Id** field, enter the number of the slot where the selected server is located.

Step 7 If you want to restrict the migration of the service profile after it has been associated with a server, check the **Restrict Migration.** check box.
If you choose not to restrict migration, Cisco UCS Manager does not perform any compatibility checks on the new server before migrating the existing service profile. If the hardware of both servers are not similar, the association might fail.

Step 8 Click **OK**.

Disassociating a Service Profile from a Server or Server Pool

When you disassociate a service profile, Cisco UCS Manager attempts to shutdown the operating system on the server. If the operating system does not shutdown within a reasonable length of time, Cisco UCS Manager forces the server to shutdown.

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 contains the service profile that you want to disassociate from a server or server pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile you want to disassociate from a server and select **Disassociate Service Profile**.

Step 5 In the **Disassociate Service Profile** dialog box, click **Yes** to confirm that you want to disassociate the service profile.

Step 6 (Optional) Monitor the status and FSM for the server to confirm that the disassociation completed.

Renaming a Service Profile

When you rename a service profile, the following occurs:

- Event logs and audit logs that reference the previous name for the service profile are retained under that name.
- A new audit record is created to log the rename operation.
- All records of faults against the service profile under its previous name are transferred to the new service profile name.

Note You cannot rename a service profile that has pending changes.

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 you want to rename.
If the system does not include multitenancy, expand the **root** node.

Step 4 Click the service profile you want to rename.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Rename Service Profile**.

Step 7 In the **Rename Service Profile** dialog box, enter the new name for the service profile in the **New Name** field.
This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.

Step 8 Click **OK**.

Changing the UUID in a 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 contains the service profile for which you want to change the UUID. If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile that requires the UUID for the associated server to be changed.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Change UUID**.

Step 7 From the **UUID Assignment** drop-down list, do one of the following:

Option	Description
Select (pool default used by default)	Assigns a UUID from the default UUID Suffix pool. Continue with Step 9.
Hardware Default	Uses the UUID assigned to the server by the manufacturer. If you choose this option, the UUID remains unassigned until the service profile is associated with a server. At that point, the UUID is set to the UUID value assigned to the server by the manufacturer. If the service profile is later moved to a different server, the UUID is changed to match the new server. Continue with Step 9.
XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX	Uses the UUID that you manually assign. Continue with Step 8.
Pools ***Pool_Name***	Assigns a UUID from the UUID Suffix pool that you select from the list at the bottom of the drop-down list. Each pool name is followed by two numbers in parentheses that show the number of UUIDs still available in the pool and the total number of UUIDs in the pool. Continue with Step 9.

Step 8 (Optional) If you selected the **XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX** option, do the following:

a) In the **UUID** field, enter the valid UUID that you want to assign to the server which uses this service profile.
b) To verify that the selected UUID is available, click the **here** link.

Step 9 Click **OK**.

Modifying the Boot Order in a 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 for which you want to change the boot order.
If the system does not include multi-tenancy, expand the **root** node.

Step 4 Click the service profile for which you want to change the boot order.

Step 5 In the **Work** pane, click the **Boot Order** tab.

Step 6 Click **Modify Boot Policy** to change the existing boot policy.

Step 7 In the **Modify Boot Policy** dialog box, choose one of the following from the **Boot Policy** drop-down list:

Option	Description
Select Boot Policy to use	Assigns the default boot policy to this service profile. Continue with Step 14.
Create a Specific Boot Policy	Enables you to create a local boot policy that can only be accessed by this service profile. Continue with Step 8.
Boot Policies ***Policy_Name***	Assigns an existing boot policy to the service profile. If you choose this option, Cisco UCS Manager displays the details of the policy. If you do not want use any of the existing policies, but instead want to create a policy that all service profiles can access, click **Create Boot Policy** and continue with Step 2. Otherwise, continue with Step 14.

Step 8 If you chose to create a boot policy, in the **Create Boot Policy** dialog box, enter a unique name and description for 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.

Step 9 (Optional) To reboot all servers that use this boot policy after you make changes to the boot order, check the **Reboot on Boot Order Change** check box.

In the Cisco UCS Manager GUI, if the **Reboot on Boot Order Change** check box is checked for a boot policy, and if CD-ROM or Floppy is the last device in the boot order, deleting or adding the device does not directly affect the boot order and the server does not reboot.

Step 10 (Optional) If desired, check the **Enforce vNIC/vHBA/iSCSI Name** check box.

- If checked, Cisco UCS Manager displays a configuration error and reports whether one or more of the vNICs, vHBAs, or iSCSI vNICs listed in the **Boot Order** table match the server configuration in the service profile.
- If not checked, Cisco UCS Manager uses the vNICs, vHBAs, or iSCSI vNICs (as appropriate for the boot option) from the server configuration in the service profile. It does not report whether the vNICs, vHBAs, or iSCSI vNICs specified in the boot policy match the server configuration in the service profile.

Step 11 To add a local disk, virtual CD-ROM, or virtual floppy to the boot order, do the following:

a) Click the down arrows to expand the **Local Devices** area.
b) Click one of the following links to add the device to the **Boot Order** table:

- **Add Local Disk**
- **Add CD-ROM**
- **Add Floppy**

c) Add another boot device to the **Boot Order** table, or click **OK** to finish.

Step 12 To add a LAN boot to the boot order, do the following:

a) Click the down arrows to expand the **vNICs** area.
b) Click the **Add LAN Boot** link.
c) In the **Add LAN Boot** dialog box, enter the name of the vNIC that you want to use for the LAN boot in the **vNIC** field, then click **OK**.
d) Add another device to the **Boot Order** table, or click **OK** to finish.

Step 13 To add a SAN boot to the boot order, do the following:

a) Click the down arrows to expand the **vHBAs** area.
b) Click the **Add SAN Boot** link.
c) In the **Add SAN Boot** dialog box, complete the following fields, and click **OK**:

Name	Description
vHBA field	Enter the name of the vHBA you want to use for the SAN boot.

Name	Description
Type field	This can be one of the following: • **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

d) If this vHBA points to a bootable SAN image, click the **Add SAN Boot Target** link and, in the **Add SAN Boot Target** dialog box, complete the following fields, then click **OK**:

Name	Description
Boot Target LUN field	The LUN that corresponds to the location of the boot image.
Boot Target WWPN field	The WWPN that corresponds to the location of the boot image.
Type field	This can be one of the following: • **Primary—**The first address defined for the associated boot device class. A boot policy can only have one primary LAN, SAN, or iSCSI boot location. • **Secondary—**The second address defined for the associated boot device class. Each boot policy can have only one secondary LAN or SAN boot location. When using the enhanced boot order on Cisco UCS M3 servers, the boot order that you define is used. For standard boot mode, the use of the terms primary or secondary boot devices does not imply a boot order. The effective order of boot devices within the same device class is determined by PCIe bus scan order.

e) Add another boot device to the **Boot Order** table, or click **OK** to finish.

Step 14 Click **OK**.

Creating a vNIC for a 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 contains the service profile for which you want to create a vNIC.

Step 4 Expand the service profile for which you want to create a vNIC.

Step 5 Right-click the **vNICs** node and choose **Create vNICs**.

Step 6 In the **Create vNIC** dialog box, do the following:

a) Complete the following fields to specify the identity information for the vNIC:

Name	Description
Name field	The user-defined name for this vNIC. 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.
Use vNIC Template check box	Check this check box if you want to use a template to create the vNIC. The Cisco UCS Manager GUI displays the **vNIC Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vNIC templates exist in the system.
Create vNIC Template link	Click this link if you want to create a vNIC template.

Name	Description
MAC Address Assignment drop-down list	If you want to: • Use the default MAC address pool, leave this field set to **Select (pool default used by default)**. • Use the MAC address assigned to the server by the manufacturer, select **Hardware Default**. • Use a specific MAC address, choose **02:25:B5:XX:XX:XX** and enter the address in the **MAC Address** field. To verify that this address is available, click the corresponding link. • Use a MAC address from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available MAC addresses in the pool and the second is the total number of MAC addresses in the pool.

b) Complete the following fields to specify the fabric connection information:

Name	Description
Fabric ID field	The fabric interconnect associated with the component. If you want this vNIC to be able to access the second fabric interconnect if the default one is unavailable, check the **Enable Failover** check box. **Note** Do not enable fabric failover for the vNIC under the following circumstances: • 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 to the other. • If you plan to associate this vNIC with a server that has an adapter which does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.

Name	Description
VLANs table	This table lists the VLANs that can be associated with this vNIC. The columns are: • **Select—**Check the check box in this column for each VLAN that you want to use. **Note** VLANs and PVLANs can not be assigned to the same vNIC. • **Name—**The name of the VLAN. • **Native VLAN—**To designate one of the VLANs as the native VLAN, click the radio button in this column.
Create VLAN link	Click this link if you want to create a VLAN.
MTU field	The maximum transmission unit, or packet size, that this vNIC accepts. Enter an integer between 1500 and 9216. **Note** If the vNIC 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 get dropped during data transmission.
Pin Group drop-down list	Choose the LAN pin group that you want associated with this vNIC.
Create LAN Pin Group link	Click this link if you want to create a LAN pin group.
Operational Parameters Section	
Stats Threshold Policy drop-down list	The statistics collection policy with which this vNIC is associated.

c) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list	The Ethernet adapter policy with which this vNIC is associated.
Create Ethernet Adapter Policy link	Click this link if you want to create an Ethernet adapter policy.
Dynamic vNIC Connection Policy drop-down list	The dynamic vNIC connection policy with which this vNIC is associated.
Create Dynamic vNIC Connection Policy link	Click this link if you want to create a dynamic vNIC connection policy.

Name	Description
QoS drop-down list	The quality of service policy with which this vNIC is associated.
Create QoS Policy link	Click this link if you want to create a quality of service policy.
Network Control Policy drop-down list	The network control policy with which this vNIC is associated.
Create Network Control Policy Policy link	Click this link if you want to create a network control policy.

d) Click **OK**.

Deleting a vNIC from a 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 contains the service profile from which you want to delete a vNIC.

Step 4 Expand the service profile from which you want to delete a vNIC.

Step 5 Expand the **vNICs** node.

Step 6 Right-click the vNIC you want to delete and choose **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Creating a vHBA for a 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 contains the service profile for which you want to create a vHBA.

Step 4 Expand the service profile for which you want to create a vHBA.

Step 5 Right-click the **vHBAs** node and choose **Create vHBAs**.

Step 6 In the **Create vHBAs** dialog box, do the following:

a) Complete the following fields to specify the identity information for the vHBA:

Name	Description
Name field	The name of this vHBA. 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.
Use vHBA Template check box	Check this check box if you want to use a template to create the vHBA. The Cisco UCS Manager GUI displays the **vHBA Template** drop-down list from which you can choose the appropriate template and the **Adapter Performance Profile** area from which you can choose an adapter profile. **Note** You can choose this option only if one or more vHBA templates exist in the system.
Create vHBA Template link	Click this link if you want to create a vHBA template.
WWPN Assignment drop-down list	How Cisco UCS assigns the World Wide Port Node to the vHBA. If you want Cisco UCS to: • Use the default WWPN pool, leave this field set to **Select (pool default used by default)**. • Use the WWPN assigned to the server by the manufacturer, select **Derived**. • Use a specific WWPN, select **20:00:00:25:B5:00:00:00**, **20:XX:XX:XX:XX:XX:XX:XX**, or **5X:XX:XX:XX:XX:XX:XX:XX** and enter the WWPN in the **WWPN** field. If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template **20:00:00:25:B5:XX:XX:XX**. • Use a WWPN from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available addresses in the pool and the second is the total number of addresses in the pool. If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.
Create WWPN Pool link	Click this link if you want to create a new WWPN pool that will be available to all objects in the Cisco UCS domain.

Name	Description
WWPN field	The manually-assigned WWPN if the **WWPN Assignment** drop-down list is set to one of the manual templates. You can specify a WWPN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. To make sure the WWPN is available, click the corresponding link.

b) In the **VSAN** area, complete the following fields:

Name	Description
Fabric ID field	The fabric interconnect associated with the component.
Select VSAN drop-down list box	The VSAN with which this vHBA is associated.
Create VSAN link	Click this link if you want to create a VSAN.
Pin Group drop-down list box	The SAN pin group with which this vHBA is associated.
Create SAN Pin Group link	Click this link if you want to create a pin group.
Persistent Binding field	This can be one of the following: • **Disabled** • **Enabled**
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.
Operational Parameters Section	
Stats Threshold Policy drop-down list box	The statistics threshold policy with which this vHBA is associated.

c) In the **Adapter Performance Profile** area, complete the following fields:

Name	Description
Adapter Policy drop-down list box	The Fibre Channel adapter policy with which this vHBA is associated.
Create Fibre Channel Adapter Policy link	Click this link if you want to create a Fibre Channel adapter policy.

Name	Description
QoS drop-down list box	The quality of service policy with which this vHBA is associated.
Create QoS Policy link	Click this link if you want to create a QoS policy.

d) Click **OK**.

Changing the WWPN for a vHBA

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 contains the service profile for which you want to change the WWPN.

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

Step 5 Click the vHBA for which you want to change the WWPN.

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

Step 7 In the **Actions** area, click **Change World Wide Name**.

Step 8 In the **Change World Wide Port Name** dialog box, complete the following fields:

Name	Description
WWPN Assignment drop-down list	How Cisco UCS assigns the World Wide Port Node to the vHBA. If you want Cisco UCS to: • Use the default WWPN pool, leave this field set to **Select (pool default used by default)**. • Use the WWPN assigned to the server by the manufacturer, select **Derived**. • Use a specific WWPN, select **20:00:00:25:B5:00:00:00**, **20:XX:XX:XX:XX:XX:XX:XX**, or **5X:XX:XX:XX:XX:XX:XX:XX** and enter the WWPN in the **WWPN** field. If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template **20:00:00:25:B5:XX:XX:XX**. • Use a WWPN from a pool, choose the pool name from the list. Each pool name is followed by a pair of numbers in parentheses. The first number is the number of available addresses in the pool and the second is the total number of addresses in the pool. If this Cisco UCS domain is registered with Cisco UCS Central, there may be two pool categories. **Domain Pools** are defined locally in the Cisco UCS domain and **Global Pools** are defined in Cisco UCS Central.
WWPN field	The manually-assigned WWPN if the **WWPN Assignment** drop-down list is set to one of the manual templates. You can specify a WWPN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF. To make sure the WWPN is available, click the corresponding link.

Step 9 Click **OK**.

Clearing Persistent Binding for a vHBA

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 contains the service profile for which you want to modify the vHBA.

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

Step 5 Click the vHBA for which you want to clear the persistent binding.

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

Step 7 In the **Actions** area, click **Clear Persistent Binding**.

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

Deleting a vHBA from a 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 contains the service profile from which you want to delete a vHBA.

Step 4 Expand the service profile from which you want to delete a vHBA.

Step 5 Expand the **vHBAs** node.

Step 6 Right-click the vHBA you want to delete and choose **Delete**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Adding a vHBA Initiator Group to a Service Profile

Procedure

Step 1 On the **Servers** tab, expand **Servers** > **Service Profiles**.

Step 2 Expand the node for the organization that contains the service profile to which you want to add a vHBA initiator group.
If the system does not include multitenancy, expand the **root** node.

Step 3 Choose the service profile to which you want to add a vHBA initiator group.

Step 4 In the **Work** pane, click the **Storage** > **vHBA Initiator Groups**.

Step 5 On the icon bar at the right of the **Select vHBA Initiator Groups** table, click **+**.

Step 6 In the **Create vHBA Initiator Group** dialog box, complete the following fields to set the name and description:

Name	Description
Name field	The name of the vHBA initiator group. 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 group. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 7 In the **Select vHBA Initiators** table, check the check box in the **Select** column for each vHBA you want to include in the vHBA initiator group.

Step 8 To add a storage connection policy to the initiator group, choose one of the following options:

- Choose an existing storage connection policy from the **Storage Connection Policy** drop-down list. Continue with Step 10.
- Click the **Create Storage Connection Policy** link if you want to create a new storage connection policy that will be available for use by other vHBA initiator groups within the Cisco UCS domain. For more information, see Creating a Fibre Channel Storage Connection Policy, on page 358. After you create the storage connection policy, continue with Step 10.
- Choose the **Specific Storage Connection Policy** option to create a storage connection policy that is only available to this vHBA initiator group. Continue with Step 9.

Step 9 In the **Specific Storage Connection Policy** area, complete the following fields to create a storage connection policy that is only available to this vHBA initiator group:

Name	Description
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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Name	Description
Zoning Type field	This can be one of the following: • **None—**Cisco UCS Manager does not configure Fibre Channel 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.
FC Target Endpoints table	The Fibre Channel target endpoints associated with this policy. This table contains the following columns and buttons: • **WWPN** column—The World Wide Port Name associated with the endpoint. • **Path** column—The path to the endpoint. • **VSAN** column—The VSAN associated with the endpoint. • **Add** button—Creates a new FC target endpoint. • **Delete** button—Deletes the selected endpoint. • **Properties** button—Displays all properties for the selected endpoint.

Step 10 Click **OK**.

Step 11 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Binding a Service Profile to a Service Profile Template

You can bind a service profile to a service profile template. When you bind the service profile to a template, Cisco UCS Manager configures the service profile with the values defined in the service profile template. If the existing service profile configuration does not match the template, Cisco UCS Manager reconfigures the service profile. You can only change the configuration of a bound service profile through the associated 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 you want to bind.
If the system does not include multi-tenancy, expand the **root** node.

Step 4 Click the service profile you want to bind.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Bind to a Template**.

Step 7 In the **Bind to a Service Profile Template** dialog box, do the following:

a) From the **Service Profile Template** drop-down list, choose the template to which you want to bind the service profile.
b) Click **OK**.

Unbinding a Service Profile from a Service Profile 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 you want to unbind.
If the system does not include multi-tenancy, expand the **root** node.

Step 4 Click the service profile you want to unbind.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Unbind from the Template**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a Service Profile

Procedure

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

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

Step 3 Right-click the service profile you want to delete and select **Delete**.

Step 4 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 5 Click **OK**.

Managing Service Profile Templates

Associating a Service Profile Template with a Server Pool

Follow this procedure if you did not associate the service profile template with a server pool when you created it, or to change the server pool with which a service profile created from this template is associated.

Procedure

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

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

Step 3 Expand the node for the organization that contains the service profile that you want to associate with a server pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile template you want to associate with a server pool and select **Associate with Server Pool**.
The **Associate with Server Pool** dialog box opens.

Step 5 From the **Server Pool** section of the **Pool Assignment** drop-down list, select a server pool.
If you select **Assign Later**, the service profile template is not associated with a server pool.

Step 6 (Optional) From the **Select Qualification** drop-down list, select the server pool policy qualifications you want to apply to a server that is associated with a service profile created from this template.

Step 7 Click **OK**.

Disassociating a Service Profile Template from its Server Pool

Procedure

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

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

Step 3 Expand the node for the organization that contains the service profile that you want to disassociate from its server pool.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the service profile template you want to disassociate from its server pool and select **Disassociate Template**.

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

Changing the UUID in a Service Profile Template

Procedure

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

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

Step 3 Expand the node for the organization that contains the service profile template for which you want to change the UUID.
If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile template whose UUID assignment you want to change.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Change UUID**.

Step 7 From the **UUID Assignment** drop-down list, choose one of the following:

Option	Description
Select (pool default used by default)	Assigns a UUID from the default UUID Suffix pool.
Hardware Default	Uses the UUID assigned to the server by the manufacturer. If you choose this option, the UUID remains unassigned until the service profile is associated with a server. At that point, the UUID is set to the UUID value assigned to the server by the manufacturer. If the service profile is later moved to a different server, the UUID is changed to match the new server.

Option	Description
Pools *Pool_Name*	Assigns a UUID from the UUID Suffix pool that you select from the list at the bottom of the drop-down list. Each pool name is followed by two numbers in parentheses that show the number of UUIDs still available in the pool and the total number of UUIDs in the pool.

Step 8 Click **OK**.

Resetting the UUID Assigned to a Service Profile from a Pool in a Service Profile Template

If you change the UUID suffix pool assigned to an updating service profile template, Cisco UCS Manager does not change the UUID assigned to a service profile created with that template. If you want Cisco UCS Manager to assign a UUID from the newly assigned pool to the service profile, and therefore to the associated server, you must reset the UUID. You can only reset the UUID assigned to a service profile and its associated server under the following circumstances:

- The service profile was created from an updating service profile template and includes a UUID assigned from a UUID suffix pool.
- The UUID suffix pool name is specified in the service profile. For example, the pool name is not empty.
- The UUID value is not 0, and is therefore not derived from the server hardware.

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 contains the service profile for which you want to reset the UUID. If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile that requires the UUID for the associated server to be reset to a different UUID suffix pool.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Reset UUID**.
If this action is not visible, then the UUID configuration in the service profile does not meet the requirements for resetting a UUID.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **OK**

Resetting the MAC Address Assigned to a vNIC from a Pool in a Service Profile Template

If you change the MAC pool assigned to an updating service profile template, Cisco UCS Manager does not change the MAC address assigned to a service profile created with that template. If you want Cisco UCS Manager to assign a MAC address from the newly assigned pool to the service profile, and therefore to the associated server, you must reset the MAC address. You can only reset the MAC address assigned to a service profile and its associated server under the following circumstances:

- The service profile was created from an updating service profile template and includes a MAC address assigned from a MAC pool.
- The MAC pool name is specified in the service profile. For example, the pool name is not empty.
- The MAC address value is not 0, and is therefore not derived from the server hardware.

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 contains the service profile for which you want to reset the MAC address.
If the system does not include multitenancy, expand the **root** node.

Step 4 Expand ***Service_Profile_Name*** > **vNICs**.

Step 5 Click the vNIC for which you want to reset the MAC address.

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

Step 7 In the **Actions** area, click **Reset MAC Address**.

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

Step 9 Click **OK**.

Resetting the WWPN Assigned to a vHBA from a Pool in a Service Profile Template

If you change the WWPN pool assigned to an updating service profile template, Cisco UCS Manager does not change the WWPN assigned to a service profile created with that template. If you want Cisco UCS Manager to assign a WWPN from the newly assigned pool to the service profile, and therefore to the associated server, you must reset the WWPN. You can only reset the WWPN assigned to a service profile and its associated server under the following circumstances:

- The service profile was created from an updating service profile template and includes a WWPN assigned from a WWPN pool.
- The WWPN pool name is specified in the service profile. For example, the pool name is not empty.
- The WWPN value is not 0, and is therefore not derived from the server hardware.

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 contains the service profile for which you want to reset the WWPN.
If the system does not include multitenancy, expand the **root** node.

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

Step 5 Click the vHBA for which you want to reset the WWPN.

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

Step 7 In the **Actions** area, click **Reset WWPN**.

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

Step 9 Click **OK**.

CHAPTER 35

Managing Power in Cisco UCS

This chapter includes the following sections:

Power Management in Cisco UCS

You can manage power through Cisco UCS Manager by configuring any of the following features:

- Power supply redundancy for all chassis in a Cisco UCS domain
- Policy-driven chassis-level power capping
- Manual blade-level power capping

Rack Server Power Management

Power capping is not supported for rack servers.

Power Management Precautions

If the CIMC is reset, the power monitoring functions of Cisco UCS become briefly unavailable for as long as it takes for the CIMC to reboot. While this usually only takes 20 seconds, there is a possibility that the peak power cap could be exceeded during that time. To avoid exceeding the configured power cap in a very low power-capped environment, consider staggering the rebooting or activation of CIMCs.

Configuring the Power Policy

Power Policy

The power policy is a global policy that specifies the redundancy for power supplies in all chassis in the Cisco UCS domain. This policy is also known as the PSU policy.

For more information about power supply redundancy, see *Cisco UCS 5108 Server Chassis Hardware Installation Guide*.

Configuring the Power Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Global Policies** subtab.

Step 5 In the **Power Policy** area, click one of the following radio buttons in the **Redundancy** field:

- **Non Redundant—**Cisco UCS Manager turns on the minimum number of power supplies (PSUs) needed and balances the load between them. If any additional PSUs are installed, Cisco UCS Manager sets them to a "turned-off" state. If the power to any PSU is disrupted, the system may experience an interruption in service until Cisco UCS Manager can activate a new PSU and rebalance the load.

  In general, a Cisco UCS chassis requires at least two PSUs for non redundant operation. Only smaller configurations (requiring less than 2500W) can be powered by a single PSU.

- **N+1—**The total number of PSUs to satisfy non-redundancy, plus one additional PSU for redundancy, are turned on and equally share the power load for the chassis. If any additional PSUs are installed, Cisco UCS Manager sets them to a "turned-off" state. If the power to any PSU is disrupted, Cisco UCS Manager can recover without an interruption in service.

  In general, a Cisco UCS chassis requires at least three PSUs for N+1 operation.

- **Grid—**Two power sources are turned on, or the chassis requires greater than N+1 redundancy. If one source fails (which causes a loss of power to one or two PSUs), the surviving PSUs on the other power circuit continue to provide power to the chassis.

For more information about power supply redundancy, see *Cisco UCS 5108 Server Chassis Hardware Installation Guide*.

Step 6 Click **Save Changes**.

Configuring the Global Cap Policy

Global Cap Policy

The global cap policy is a global policy that specifies whether policy-driven chassis group power capping or manual blade-level power capping will be applied to all servers in a chassis.

We recommend that you use the default power capping method: policy-driven chassis group power capping.

Important Any change to the manual blade-level power cap configuration will result in the loss of any groups or configuration options set for policy-driven chassis group power capping.

Configuring the Global Cap Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Global Policies** subtab.

Step 5 In the **Global Cap Policy** area, click one of the following radio buttons in the **Allocation Method** field to determine the power cap management mode used in the Cisco UCS domain:

- **Manual Blade Level Cap**—Power allocation is configured on each individual blade server in all chassis. If you select this option, you cannot create power groups.
- **Policy Driven Chassis Group Cap**—Power allocation is configured at the chassis level through power control policies included in the associated service profiles. If you select this option, you can also create power groups that contain one or more chassis in the Cisco UCS domain.

By default, power allocation is done for each chassis through a power control policy.

Step 6 Click **Save Changes**.

Configuring Policy-Driven Chassis Group Power Capping

Policy-Driven Chassis Group Power Capping

When policy-driven power chassis group power capping is selected in the global cap policy, Cisco UCS can maintain the oversubscription of servers without risking costly power failures. This is achieved through a two-tier process. At the chassis level, Cisco UCS divides the amount of power available between members of the power group. At the blade level, the amount of power allotted to a chassis is divided between blades based on priority.

Each time a service profile is associated or disassociated, UCS Manager recalculates the power allotment for each blade server within the chassis. If necessary, power from lower-priority service profiles is redistributed to higher-priority service profiles.

UCS power groups cap power in less than one second in order to safely protect data center circuit breakers. A blade must stay at its cap for 20 seconds before the chassis power distribution is optimized. This is intentionally carried out over a slower timescale to prevent reacting to transient spikes in demand.

Note The system reserves enough power to boot a server in each slot, even if that slot is empty. This reserved power cannot be leveraged by servers requiring more power. Blades that fail to comply with the power cap are penalized or shut down.

Configuring Power Groups

Power Groups

A power group is a set of chassis that all draw power from the same power distribution unit (PDU). In Cisco UCS Manager, you can create power groups that include one or more chassis and then set a peak power cap in AC watts for that power grouping.

Instituting power capping at the chassis level requires the following:

- IOM, CIMC, and BIOS version 1.4 or higher
- 2 PSUs

The peak power cap is a static value that represents the maximum power available to all blade servers within a given power group. If you add or remove a blade from a power group, but do not manually modify the peak power value, the power group adjusts the peak power cap to accommodate the basic power-on requirements of all blades within that power group.

A minimum of 1556 AC watts should be set for each chassis. This converts to 1400 watts of DC power, which is the minimum amount of power required to power a fully-populated chassis.

Once a chassis is added to a power group, every service profile associated with the blades in the chassis also becomes part of that power group. Similarly, if you add a new blade to a chassis, that blade inherently becomes part of the chassis' power group.

Note Creating a power group is not the same as creating a server pool. However, you can populate a server pool with members of the same power group by creating a power qualifier and adding it to server pool policy.

When a chassis is removed or deleted, the chassis gets removed from the power group.

The following table describes the error messages you might encounter while assigning power budget and working with power groups.

Error Message	Cause	Recommended Action
`Insufficient budget for power group POWERGROUP_NAME`	This message is displayed if you did not meet the minimum limit when assigning the power cap for a chassis.	Increase the power cap limit to above 1556 watts in AC (1400 watts in DC).
`Insufficient power available to discover server Chassis ID/BladeID`	This message is displayed when you introduce a new blade and the boot power available for blade discovery is insufficient.	You can reassign the power budget by doing one of the following: • Remove or decommission a chassis or blade in the power group. • Raise the group power budget. • Decrease the priority associated with a blade in the group.

Creating a Power Group

Before You Begin

Make sure the global power allocation policy is set to **Policy Driven Chassis Group Cap** on the **Global Policies** tab.

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **Power Groups** subtab.

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 On the first page of the **Create Power Group** wizard, complete the following fields:

a) Enter a unique name and description for the power group.
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.

b) Click **Next**.

Step 7 On the **Add Chassis Members** page of the **Create Power Group** wizard, do the following:

a) In the **Chassis** table, choose one or more chassis to include in the power group.

b) Click the >> button to add the chassis to the **Selected Chassis** table that displays all chassis included in the power group.

You can use the << button to remove one or more chassis from the power group.

c) Click **Next**.

Step 8 On the **Power Group Attributes** page of the **Create Power Group** wizard, do the following:

a) Complete the following fields:

Name	Description
Power Cap field	The maximum peak power (in watts) available to the power group. Enter an integer between 0 and 10000000.
Enable Dynamic Reallocation field	This can be one of the following: • **Chassis—**Cisco UCS monitors power usage and changes the blade allocations as required to maximize power utilization. • **None—**Blade allocations are not adjusted dynamically.

b) Click **Finish**.

Adding a Chassis to a Power Group

Procedure

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

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

Step 3 In the **Work** pane, click the **Power Groups** tab.

Step 4 Right-click the power group to which you want to add a chassis and choose **Add Chassis Members**.

Step 5 In the **Add Chassis Members** dialog box, do the following:

a) In the **Chassis** table, choose one or more chassis to include in the power group.

b) Click the >> button to add the chassis to the **Selected Chassis** table that displays all chassis included in the power group.
You can use the << button to remove one or more chassis from the power group.

c) Click **OK**.

Removing a Chassis from a Power Group

Procedure

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

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

Step 3 In the **Work** pane, click the **Power Groups** tab.

Step 4 Expand the power group from which you want to remove a chassis.

Step 5 Right-click the chassis that you want to remove from the power group and choose **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a Power Group

Procedure

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

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

Step 3 In the **Work** pane, click the **Power Groups** tab.

Step 4 Right-click the power group that you want to delete and choose **Delete**.

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

Configuring Power Control Policies

Power Control Policy

Cisco UCS uses the priority set in the power control policy, along with the blade type and configuration, to calculate the initial power allocation for each blade within a chassis. During normal operation, the active blades within a chassis can borrow power from idle blades within the same chassis. If all blades are active and reach the power cap, service profiles with higher priority power control policies take precedence over service profiles with lower priority power control policies.

Priority is ranked on a scale of 1-10, where 1 indicates the highest priority and 10 indicates lowest priority. The default priority is 5.

For mission-critical application a special priority called no-cap is also available. Setting the priority to no-cap prevents Cisco UCS from leveraging unused power from a particular server. With this setting, the server is allocated the maximum amount of power possible for that type of server.

Note You must include this policy in a service profile and that service profile must be associated with a server for it to take effect.

Creating a Power Control Policy

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 **Power Control Policies** and choose **Create Power Control Policy**.

Step 5 In the **Create Power Control Policy** dialog box, complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Owner field	This can be one of the following: • **Local—**This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global—**Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global—**This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

Name	Description
Power Capping field	What happens to a server when the demand for power within a power group exceeds the power supply. This can be one of the following: • **No Cap—**The server runs at full capacity regardless of the power requirements of the other servers in its power group. • **cap—**The server is allocated a minimum amount of power capacity based on the the server's priority relative to the other servers in its server group. If more power becomes available, Cisco UCS allows the capped servers to exceed their original allocations. It only lowers the allocations if there is a drop in the total power available to the power group. When you select **cap**, Cisco UCS Manager GUI displays the **Priority** field.
Priority field	The priority the server has within its power group when power capping is in effect. Enter an integer between 1 and 10, where 1 is the highest priority.

Step 6 Click **OK**.

What to Do Next

Include the policy in a service profile or service profile template.

Deleting a Power Control Policy

Procedure

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

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

Step 3 Expand the **Power Control Policies** node.

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

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

Configuring Manual Blade-Level Power Capping

Manual Blade-Level Power Capping

When manual blade-level power capping is configured in the global cap policy, you can set a power cap for each blade server in a Cisco UCS domain.

The following configuration options are available:

Enabled

You can specify the maximum amount of power that the server can consume at one time. This maximum can be any amount between 0 watts and 1100 watts.

Disabled

No power usage limitations are imposed upon the server. The server can use as much power as it requires.

If the server encounters a spike in power usage that meets or exceeds the maximum configured for the server, Cisco UCS Manager does not disconnect or shut down the server. Instead, Cisco UCS Manager reduces the power that is made available to the server. This reduction can slow down the server, including a reduction in CPU speed.

Note If manual blade-level power capping is configured using **Equipment** > **Policies** > **Global Policies** > **Global Power Allocation Policy**, the priority set in the Power Control Policy is no longer relevant .

Setting the Blade-Level Power Cap for a Server

Before You Begin

Make sure the global power allocation policy is set to **Manual Blade Level Cap** on the **Global Policies** tab.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to set the power budget.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Power Budget** area, do the following:

a) Click the **Expand** icon to the right of the heading to display the fields.

b) Complete the following fields:

Name	Description
Admin Status field	Whether this server is power capped. This can be one of the following: • **Unbounded—**The server is not power capped under any circumstances. • **Enabled—**Cisco UCS Manager GUI displays the **Watts** field. **Note** Power capping only goes into effect if there is insufficient power available to the chassis to meet the demand. If there is sufficient power, the server can use as many watts as it requires.
Watts field	The maximum number of watts the server can use if there is not enough power to the chassis to meet the demand. Enter an integer between 0 and 10000000.

Step 6 Click **Save Changes**.

Viewing the Blade-Level Power Cap

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Choose the chassis for which you want to view the server power usage.

Step 4 Do one of the following:

- To view the power usage for all servers in the chassis, click the **Power** tab in the **Work** pane.
- To view the power usage for one server in the chassis, expand the chassis and click the server. Then click the **Power** tab in the **Work** pane.

Step 5 If necessary, expand the **Motherboards** node to view the power counters.

PART VI

System Management

CHAPTER 36

Managing Time Zones

This chapter includes the following sections:

Time Zones

Cisco UCS requires a domain-specific time zone setting and an NTP server to ensure the correct time display in Cisco UCS Manager. If you do not configure both of these settings in a Cisco UCS domain, the time does not display correctly.

Setting the Time Zone

Procedure

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

Step 2 In the **Admin** tab, expand **All**.

Step 3 Click **Time Zone Management**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 From the **Time Zone** drop-down list, select the time zone you want to use for the Cisco UCS domain.

Step 6 Click **Save Changes**.

Adding an NTP Server

Procedure

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

Step 2 In the **Admin** tab, expand **All**.

Step 3 Click **Time Zone Management**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **NTP Servers** area, click the **+** button on the table icon bar.

Step 6 In the **Add NTP Server** dialog box, do the following:

a) In the **NTP Server** field, enter the IP address or hostname of the NTP server you want to use for this Cisco UCS domain.

b) Click **OK**.

Deleting an NTP Server

Procedure

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

Step 2 In the **Admin** tab, expand **All**.

Step 3 Click **Time Zone Management**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **NTP Servers** area, right-click the server you want to delete and select **Delete**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 7 Click **Save Changes**.

CHAPTER 37

Managing the Chassis

This chapter includes the following sections:

Chassis Management in Cisco UCS Manager GUI

You can manage and monitor all chassis in a Cisco UCS domain through Cisco UCS Manager GUI.

Guidelines for Removing and Decommissioning Chassis

Consider the following guidelines when deciding whether to remove or decommission a chassis using Cisco UCS Manager:

Decommissioning a Chassis

Decommissioning is performed when a chassis is physically present and connected but you want to temporarily remove it from the configuration. Because it is expected that a decommissioned chassis will be eventually recommissioned, a portion of the chassis' information is retained by Cisco UCS Manager for future use.

Removing a Chassis

Removing is performed when you physically remove a chassis from the system. Once the physical removal of the chassis is completed, the configuration for that chassis can be removed in Cisco UCS Manager.

Note You cannot remove a chassis from Cisco UCS Manager if it is physically present and connected.

If you need to add a removed chassis back to the configuration, it must be reconnected and then rediscovered. During rediscovery Cisco UCS Manager will assign the chassis a new ID that may be different from ID that it held before.

Acknowledging a Chassis

Perform the following procedure if you increase or decrease the number of links that connect the chassis to the fabric interconnect. Acknowledging the chassis ensures that Cisco UCS Manager is aware of the change in the number of links and that traffics flows along all available links.

After you enable or disable a port on a fabric interconnect, wait for at least 1 minute before you reacknowledge the chassis. If you reacknowledge the chassis too soon, the pinning of server traffic from the chassis may not be updated with the changes to the port that you enabled or disabled.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Choose the chassis that you want to acknowledge.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Acknowledge Chassis**.

Step 6 If Cisco UCS Manager displays a confirmation dialog box, click **Yes**.
Cisco UCS Manager disconnects the chassis and then rebuilds the connections between the chassis and the fabric interconnect or fabric interconnects in the system.

Decommissioning a Chassis

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Choose the chassis that you want to decommission.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Decommission Chassis**.

Step 6 If Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.
The decommission may take several minutes to complete. After the chassis has been removed from the configuration, Cisco UCS Manager adds the chassis to the **Decommissioned** tab.

Removing a Chassis

Before You Begin

Physically remove the chassis before performing the following procedure.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Choose the chassis that you want to remove.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Remove Chassis**.

Step 6 If Cisco UCS Manager displays a confirmation dialog box, click **Yes**.
The removal may take several minutes to complete.

Recommissioning a Single Chassis

This procedure returns the chassis to the configuration and applies the chassis discovery policy to the chassis. After this procedure, you can access the chassis and any servers in it.

Procedure

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

Step 2 In the **Equipment** tab, expand the **Equipment** node.

Step 3 Click the **Chassis** node.

Step 4 In the **Work** pane, click the **Decommissioned** tab.

Step 5 For the chassis that you want to recommission, do the following:

a) Right-click the chassis and choose **Re-commission Chassis**.

b) In the **Chassis ID** field of the **Re-commission Chassis** dialog box, type or use the arrows to choose the ID that you want to assign to the chassis

c) Click **OK**.

Step 6 If Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.
This procedure may take several minutes to complete. After the chassis has been recommissioned, Cisco UCS Manager runs the chassis discovery policy and adds the chassis to the list in the **Navigation** pane.

Recommissioning Multiple Chassis

This procedure returns the chassis to the configuration and applies the chassis discovery policy to the chassis. After this procedure, you can access the chassis and any servers in it.

Note You cannot renumber the chassis when you recommission multiple chassis at the same time. Cisco UCS Manager assigns the same ID that the chassis had previously.

Procedure

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

Step 2 In the **Equipment** tab, expand the **Equipment** node.

Step 3 Click the **Chassis** node.

Step 4 In the **Work** pane, click the **Decommissioned** tab.

Step 5 In the row for each chassis that you want to recommission, check the **Re-commission** check box.

Step 6 Click **Save Changes**.

Step 7 If Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.
This procedure may take several minutes to complete. After the chassis has been recommissioned, Cisco UCS Manager runs the chassis discovery policy and adds the chassis to the list in the **Navigation** pane.

Renumbering a Chassis

Note You cannot renumber a blade server through Cisco UCS Manager. The ID assigned to a blade server is determined by its physical slot in the chassis. To renumber a blade server, you must physically move the server to a different slot in the chassis.

Before You Begin

If you are swapping IDs between chassis, you must first decommission both chassis and then wait for the chassis decommission FSM to complete before proceeding with the renumbering steps.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Verify that the **Chassis** node does not include the following:

- The chassis you want to renumber
- A chassis with the number you want to use

If either of these chassis are listed in the **Chassis** node, decommission those chassis. You must wait until the decommission FSM is complete and the chassis are not listed in the **Chassis** node before continuing. This might take several minutes.

Step 4 On the **Equipment** tab, click the **Chassis** node.

Step 5 In the **Work** pane, click the **Decommissioned** tab.

Step 6 For the chassis that you want to renumber, do the following:

a) Right-click the chassis and choose **Re-commission Chassis**.
b) In the **Chassis ID** field of the **Re-commission Chassis** dialog box, type or use the arrows to choose the ID that you want to assign to the chassis
c) Click **OK**

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Toggling the Locator LED

Turning on the Locator LED for a Chassis

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Click the chassis that you need to locate.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Turn on Locator LED**.
This action is not available if the locator LED is already turned on.

The LED on the chassis starts flashing.

Turning off the Locator LED for a Chassis

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Choose the chassis for which you want to turn off the locator LED.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Turn off Locator LED**.
This action is not available if the locator LED is already turned off.

The LED on the chassis stops flashing.

Health LED Alarms

The blade health LED is located on the front of each Cisco UCS B-Series blade server. Cisco UCS Manager allows you to view the sensor faults that cause the blade health LED to change color from green to amber or blinking amber.

The health LED alarms display the following information:

Name	Description
Severity column	The severity of the alarm. This can be one of the following: • Critical—The blade health LED is blinking amber. This is indicated with a red dot. • Minor—The blade health LED is amber. This is indicated with an orange dot.
Description column	A brief description of the alarm.
Sensor ID column	The ID of the sensor the triggered the alarm.
Sensor Name column	The name of the sensor that triggered the alarm.

Viewing Health LED Alarms

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to view health LED alarms.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **View Health LED Alarms**.
The **View Health LED Alarms** dialog box lists the health LED alarms for the selected server.

Step 6 Click **OK** to close the **View Health LED Alarms** dialog box.

Viewing Health LED Status

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope server** *chassis-id* / *blade-id*	Enters chassis server mode for the specified server.
Step 2	UCS-A /chassis/server # **show health-led expand**	Displays the health LED and sensor alarms for the selected server.

The following example shows how to display the health LED status and sensor alarms for chassis 1 server 1:

```
UCS-A# scope server 1/1
UCS-A /chassis/server # show health-led
Health LED:
    Severity: Minor
    Reason:: P0V75_STBY:Voltage Threshold Crossed;TEMP_SENS_FRONT:Temperature Threshold
Crossed;
    Color: Amber
    Oper State:: On

    Sensor Alarm:
        Severity: Minor
        Sensor ID: 7
        Sensor Name: P0V75_STBY
        Alarm Desc: Voltage Threshold Crossed

        Severity: Minor
        Sensor ID: 76
        Sensor Name: TEMP_SENS_FRONT
        Alarm Desc: Temperature Threshold Crossed

        Severity: Minor
        Sensor ID: 91
        Sensor Name: DDR3_P1_D2_TMP
        Alarm Desc: Temperature Threshold Crossed

UCS-A /chassis/server #
```

Viewing the POST Results for a Chassis

You can view any errors collected during the Power On Self-Test process for all servers and adapters in a chassis.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Choose the chassis for which you want to view the POST results.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **View POST Results**.
The **POST Results** dialog box lists the POST results for each server in the chassis and its adapters.

Step 6 (Optional) Click the link in the **Affected Object** column to view the properties of that adapter.

Step 7 Click **OK** to close the **POST Results** dialog box.

CHAPTER 38

Managing Blade Servers

This chapter includes the following sections:

Blade Server Management

You can manage and monitor all blade servers in a Cisco UCS domain through Cisco UCS Manager. Some blade server management tasks, such as changes to the power state, can be performed from the server and service profile.

The remaining management tasks can only be performed on the server.

If a blade server slot in a chassis is empty, Cisco UCS Manager provides information, errors, and faults for that slot. You can also reacknowledge the slot to resolve server mismatch errors and to have Cisco UCS Manager rediscover the blade server in the slot.

Guidelines for Removing and Decommissioning Blade Servers

Consider the following guidelines when deciding whether to remove or decommission a blade server using Cisco UCS Manager:

Decommissioning a Blade Server

Decommissioning is performed when a blade server is physically present and connected but you want to temporarily remove it from the configuration. Because it is expected that a decommissioned blade server will be eventually recommissioned, a portion of the server's information is retained by Cisco UCS Manager for future use.

Removing a Blade Server

Removing is performed when you physically remove a blade server from the server by disconnecting it from the chassis. You cannot remove a blade server from Cisco UCS Manager if it is physically present and connected to a chassis. Once the physical removal of the blade server is completed, the configuration for that blade server can be removed in Cisco UCS Manager.

During removal, active links to the blade server are disabled, all entries from databases are removed, and the server is automatically removed from any server pools that it was assigned to during discovery.

Note Only those servers added to a server pool automatically during discovery will be removed automatically. Servers that have been manually added to a server pool have to be removed manually.

If you need to add a removed blade server back to the configuration, it must be reconnected and then rediscovered. When a server is reintroduced to Cisco UCS Manager it is treated like a new server and is subject to the deep discovery process. For this reason, it's possible that Cisco UCS Manager will assign the server a new ID that may be different from the ID that it held before.

Recommendations for Avoiding Unexpected Server Power Changes

If a server is not associated with a service profile, you can use any available means to change the server power state, including the physical Power or Reset buttons on the server.

If a server is associated with, or assigned to, a service profile, you should only use the following methods to change the server power state:

- In Cisco UCS Manager GUI, go to the **General** tab for the server or the service profile associated with the server and select **Boot Server** or **Shutdown Server** from the **Actions** area.
- In Cisco UCS Manager CLI, scope to the server or the service profile associated with the server and use the **power up** or **power down** commands.

Important Do *not* use any of the following options on an associated server that is currently powered off:

- **Reset** in the GUI
- **cycle cycle-immediate** or **reset hard-reset-immediate** in the CLI
- The physical Power or Reset buttons on the server

If you reset, cycle, or use the physical power buttons on a server that is currently powered off, the server's actual power state may become out of sync with the desired power state setting in the service profile. If the communication between the server and Cisco UCS Manager is disrupted or if the service profile configuration changes, Cisco UCS Manager may apply the desired power state from the service profile to the server, causing an unexpected power change.

Power synchronization issues can lead to an unexpected server restart, as shown below:

Desired Power State in Service Profile	Current Server Power State	Server Power State After Communication Is Disrupted
Up	Powered Off	Powered On
Down	Powered On	Powered On **Note** Running servers are not shut down regardless of the desired power state in the service profile.

Booting Blade Servers

Booting a Blade Server

If the **Boot Server** link is dimmed in the **Actions** area, you must shut down the server first.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to boot.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Boot Server**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

After the server has booted, the **Overall Status** field on the **General** tab displays an OK status.

Booting a Server from 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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile that requires the associated server to be booted.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Boot Server**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **OK** in the **Boot Server** dialog box.
After the server has booted, the **Overall Status** field on the **General** tab displays an ok status or an up status.

Determining the Boot Order of a Blade Server

Tip You can also view the boot order tabs from the **General** tab of the service profile associated with a server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to determine the boot order.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 If the **Boot Order Details** area is not expanded, click the **Expand** icon to the right of the heading.

Step 6 To view the boot order assigned to the server, click the **Configured Boot Order** tab.

Step 7 To view what will boot from the various devices in the physical server configuration, click the **Actual Boot Order** tab.

Note The **Actual Boot Order** tab always shows "Internal EFI Shell" at the bottom of the boot order list.

Shutting Down Blade Servers

Shutting Down a Blade Server

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.

If the **Shutdown Server** link is dimmed in the **Actions** area, the server is not running.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to shut down.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Shutdown Server**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

After the server has been successfully shut down, the **Overall Status** field on the **General** tab displays a power-off status.

Shutting Down a Server from the Service Profile

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.

If the **Shutdown Server** link is dimmed in the **Actions** area, the server is not running.

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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile that requires the associated server to be shut down.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Shutdown Server**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

After the server has been successfully shut down, the **Overall Status** field on the **General** tab displays a down status or a power-off status.

Resetting a Blade Server

When you reset a server, Cisco UCS Manager sends a pulse on the reset line. You can choose to gracefully shut down the operating system. If the operating system does not support a graceful shut down, the server is power cycled. The option to have Cisco UCS Manager complete all management operations before it resets the server does not guarantee that these operations will be completed before the server is reset.

Note If you are trying to boot a server from a power-down state, you should not use **Reset**.

If you continue the power-up with this process, the desired power state of the servers will become out of sync with the actual power state and the servers may unexpectedly shut down at a later time. To safely reboot the selected servers from a power-down state, click **Cancel** then select the **Boot Server** action.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > *Chassis Number* > **Servers**.

Step 3 Choose the server that you want to reset.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Reset**.

Step 6 In the **Reset Server** dialog box, do the following:

a) Click the **Power Cycle** option.
b) (Optional) Check the check box if you want Cisco UCS Manager to complete all management operations that are pending on this server.
c) Click **OK**.

The reset may take several minutes to complete. After the server has been reset, the **Overall Status** field on the **General** tab displays an ok status.

Reacknowledging a Blade Server

Perform the following procedure if you need to have Cisco UCS Manager rediscover the server and all endpoints in the server. For example, you can use this procedure if a server is stuck in an unexpected state, such as the discovery state.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to acknowledge.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Re-acknowledge**.
b) Click **OK**.

Cisco UCS Manager disconnects the server and then builds the connections between the server and the fabric interconnect or fabric interconnects in the system. The acknowledgment may take several minutes to complete. After the server has been acknowledged, the **Overall Status** field on the **General** tab displays an OK status.

Removing a Server from a Chassis

Before You Begin

Physically remove the server from its chassis before performing the following procedure.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to remove from the chassis.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Decommission**.
b) Click **OK**.

The server is removed from the Cisco UCS configuration.

Step 7 Go to the physical location of the chassis and remove the server hardware from the slot.
For instructions on how to remove the server hardware, see the *Cisco UCS Hardware Installation Guide* for your chassis.

What to Do Next

If you physically re-install the blade server, you must re-acknowledge the slot to have Cisco UCS Manager rediscover the server.

For more information, see Reacknowledging a Server Slot in a Chassis, on page 625.

Decommissioning a Blade Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to decommission.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Decommission**.

b) Click **OK**.

The server is removed from the Cisco UCS configuration.

What to Do Next

If you physically re-install the blade server, you must re-acknowledge the slot to have Cisco UCS Manager rediscover the server.

For more information, see Reacknowledging a Server Slot in a Chassis, on page 625.

Recommissioning a Blade Server

Procedure

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

Step 2 On the **Equipment** tab, click the **Chassis** node.

Step 3 In the **Work** pane, click the **Decommissioned** tab.

Step 4 On the row for each blade server that you want to recommission, do the following:

a) In the **Recommission** column, check the check box.

b) Click **Save Changes**

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

Step 6 (Optional) Monitor the progress of the server recommission and discovery on the **FSM** tab for the server.

What to Do Next

-

Reacknowledging a Server Slot in a Chassis

Perform the following procedure if you decommissioned a blade server without removing the physical hardware from the chassis and you want Cisco UCS Manager to rediscover and recommission the server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server whose slot you want to reacknowledge.

Step 4 If Cisco UCS Manager displays a **Resolve Slot Issue** dialog box, do one of the following:

Option	Description
The **here** link in the **Situation** area	Click this link and then click **Yes** in the confirmation dialog box. Cisco UCS Manager reacknowledges the slot and discovers the server in the slot.
OK	Click this button if you want to proceed to the **General** tab. You can use the **Reacknowledge Slot** link in the **Actions** area to have Cisco UCS Manager reacknowledge the slot and discover the server in the slot.

Removing a Non-Existent Blade Server from the Configuration Database

Perform the following procedure if you physically removed the server hardware without first decommissioning the server. You cannot perform this procedure if the server is physically present.

If you want to physically remove a server, see Removing a Server from a Chassis, on page 623.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to remove from the configuration database.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Remove**.

b) Click **OK**.

Cisco UCS Manager removes all data about the server from its configuration database. The server slot is now available for you to insert new server hardware.

Turning the Locator LED for a Blade Server On and Off

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to turn the locator LED on or off.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click one of the following:

- **Turn on Locator LED**
- **Turn off Locator LED**

Resetting the CMOS for a Blade Server

On rare occasions, troubleshooting a server may require you to reset the CMOS. This procedure is not part of the normal maintenance of a server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to reset the CMOS.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Recover Server**.

Step 6 In the **Recover Server** dialog box, do the following:

a) Click **Reset CMOS**.

b) Click **OK**.

Resetting the CIMC for a Blade Server

On rare occasions, such as an issue with the current running firmware, troubleshooting a server may require you to reset the CIMC. This procedure is not part of the normal maintenance of a server. After you reset the CIMC, the server boots with the running version of the firmware for that server.

If the CIMC is reset, the power monitoring functions of Cisco UCS become briefly unavailable for as long as it takes for the CIMC to reboot. While this usually only takes 20 seconds, there is a possibility that the peak power cap could be exceeded during that time. To avoid exceeding the configured power cap in a very low power-capped environment, consider staggering the rebooting or activation of CIMCs.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to reset the CIMC.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Recover Server**.

Step 6 In the **Recover Server** dialog box, do the following:

a) Click **Reset CIMC (Server Controller)**.

b) Click **OK**.

Recovering the Corrupt BIOS on a Blade Server

On rare occasions, an issue with a server may require you to recover the corrupted BIOS. This procedure is not part of the normal maintenance of a server. After you recover the BIOS, the server boots with the running version of the firmware for that server. This radio button may be dimmed if the BIOS does not require recovery or the option is not available for a particular server.

Before You Begin

Important Remove all attached or mapped USB storage from a server before you attempt to recover the corrupt BIOS on that server. If an external USB drive is attached or mapped from vMedia to the server, BIOS recovery fails.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to recover the BIOS.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Recover Server**.

Step 6 In the **Recover Server** dialog box, do the following:

a) Click **Recover Corrupt BIOS**.

Note If this option is not available for a specific server, follow the instructions to update and activate the BIOS for a server.

b) Click **OK**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 In the **Recover Corrupt BIOS** dialog box, do the following:

a) Complete the following fields:

Name	Description
Version To Be Activated drop-down list	Choose the firmware version that you want to activate from the drop-down list.

b) Click **OK**.

Viewing the POST Results for a Blade Server

You can view any errors collected during the Power On Self-Test process for a server and its adapters.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server for which you want to view the POST results.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **View POST Results**.
The **POST Results** dialog box lists the POST results for the server and its adapters.

Step 6 (Optional) Click the link in the **Affected Object** column to view the properties of that adapter.

Step 7 Click **OK** to close the **POST Results** dialog box.

Issuing an NMI from a Blade Server

Perform the following procedure if the system remains unresponsive and you need Cisco UCS Manager to issue a Non Maskable Interrupt (NMI) to the BIOS or operating system from the CIMC. This action creates a core dump or stack trace, depending on the operating system installed on the server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to issue the NMI.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Diagnostic Interrupt**.

b) Click **OK**.

Cisco UCS Manager sends an NMI to the BIOS or operating system.

Health LED Alarms

The blade health LED is located on the front of each Cisco UCS B-Series blade server. Cisco UCS Manager allows you to view the sensor faults that cause the blade health LED to change color from green to amber or blinking amber.

The health LED alarms display the following information:

Name	Description
Severity column	The severity of the alarm. This can be one of the following: • Critical—The blade health LED is blinking amber. This is indicated with a red dot. • Minor—The blade health LED is amber. This is indicated with an orange dot.
Description column	A brief description of the alarm.
Sensor ID column	The ID of the sensor the triggered the alarm.
Sensor Name column	The name of the sensor that triggered the alarm.

Viewing Health LED Alarms

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to view health LED alarms.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **View Health LED Alarms**.
The **View Health LED Alarms** dialog box lists the health LED alarms for the selected server.

Step 6 Click **OK** to close the **View Health LED Alarms** dialog box.

CHAPTER 39

Managing Rack-Mount Servers

This chapter includes the following sections:

Rack-Mount Server Management

You can manage and monitor all rack-mount servers that have been integrated with a Cisco UCS domain through Cisco UCS Manager. All management and monitoring features are supported for rack-mount servers except power capping. Some rack-mount server management tasks, such as changes to the power state, can be performed from both the server and service profile. The remaining management tasks can only be performed on the server.

Cisco UCS Manager provides information, errors, and faults for each rack-mount server that it has discovered.

Tip For information about how to integrate a supported Cisco UCS rack-mount server with Cisco UCS Manager, see the Cisco UCS C-series server integration guide for your Cisco UCS Manager release.

Guidelines for Removing and Decommissioning Rack-Mount Servers

Consider the following guidelines when deciding whether to remove or decommission a rack-mount server using Cisco UCS Manager:

Decommissioning a Rack-Mount server

Decommissioning is performed when a rack-mount server is physically present and connected but you want to temporarily remove it from the configuration. Because it is expected that a decommissioned rack-mount server will be eventually recommissioned, a portion of the server's information is retained by Cisco UCS Manager for future use.

Removing a Rack-Mount server

Removing is performed when you physically remove the server from the system by disconnecting the rack-mount server from the fabric extender. You cannot remove a rack-mount server from Cisco UCS Manager if it is physically present and connected to the fabric extender. Once the rack-mount server is disconnected, the configuration for that rack-mount server can be removed in Cisco UCS Manager.

During removal, management interfaces are disconnected, all entries from databases are removed, and the server is automatically removed from any server pools that it was assigned to during discovery.

Note Only those servers added to a server pool automatically during discovery will be removed automatically. Servers that have been manually added to a server pool have to be removed manually.

If you need to add a removed rack-mount server back to the configuration, it must be reconnected and then rediscovered. When a server is reintroduced to Cisco UCS Manager it is treated like a new server and is subject to the deep discovery process. For this reason, it's possible that Cisco UCS Manager will assign the server a new ID that may be different from the ID that it held before.

Recommendations for Avoiding Unexpected Server Power Changes

If a server is not associated with a service profile, you can use any available means to change the server power state, including the physical Power or Reset buttons on the server.

If a server is associated with, or assigned to, a service profile, you should only use the following methods to change the server power state:

- In Cisco UCS Manager GUI, go to the **General** tab for the server or the service profile associated with the server and select **Boot Server** or **Shutdown Server** from the **Actions** area.

- In Cisco UCS Manager CLI, scope to the server or the service profile associated with the server and use the **power up** or **power down** commands.

Important Do *not* use any of the following options on an associated server that is currently powered off:

- **Reset** in the GUI
- **cycle cycle-immediate** or **reset hard-reset-immediate** in the CLI
- The physical Power or Reset buttons on the server

If you reset, cycle, or use the physical power buttons on a server that is currently powered off, the server's actual power state may become out of sync with the desired power state setting in the service profile. If the communication between the server and Cisco UCS Manager is disrupted or if the service profile configuration changes, Cisco UCS Manager may apply the desired power state from the service profile to the server, causing an unexpected power change.

Power synchronization issues can lead to an unexpected server restart, as shown below:

Desired Power State in Service Profile	Current Server Power State	Server Power State After Communication Is Disrupted
Up	Powered Off	Powered On
Down	Powered On	Powered On **Note** Running servers are not shut down regardless of the desired power state in the service profile.

Booting Rack-Mount Servers

Booting a Rack-Mount Server

If the **Boot Server** link is dimmed in the **Actions** area, you must shut down the server first.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to boot.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Boot Server**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

After the server has booted, the **Overall Status** field on the **General** tab displays an OK status.

Booting a Server from 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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile that requires the associated server to be booted.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Boot Server**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 Click **OK** in the **Boot Server** dialog box.
After the server has booted, the **Overall Status** field on the **General** tab displays an ok status or an up status.

Determining the Boot Order of a Rack-Mount Server

Tip You can also view the boot order tabs from the **General** tab of the service profile associated with a server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server for which you want to determine the boot order.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 If the **Boot Order Details** area is not expanded, click the **Expand** icon to the right of the heading.

Step 6 To view the boot order assigned to the server, click the **Configured Boot Order** tab.

Step 7 To view what will boot from the various devices in the physical server configuration, click the **Actual Boot Order** tab.

Note The **Actual Boot Order** tab always shows "Internal EFI Shell" at the bottom of the boot order list.

Shutting Down Rack-Mount Servers

Shutting Down a Rack-Mount Server

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.

If the **Shutdown server** link is dimmed in the **Actions** area, the server is not running.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to shut down.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Shutdown Server**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

After the server has been successfully shut down, the **Overall Status** field on the **General** tab displays a power-off status.

Shutting Down a Server from the Service Profile

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.

If the **Shutdown Server** link is dimmed in the **Actions** area, the server is not running.

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 where you want to create the service profile.
If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile that requires the associated server to be shut down.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Shutdown Server**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

After the server has been successfully shut down, the **Overall Status** field on the **General** tab displays a down status or a power-off status.

Resetting a Rack-Mount Server

When you reset a server, Cisco UCS Manager sends a pulse on the reset line. You can choose to gracefully shut down the operating system. If the operating system does not support a graceful shut down, the server is power cycled. The option to have Cisco UCS Manager complete all management operations before it resets the server does not guarantee that these operations will be completed before the server is reset.

Note If you are trying to boot a server from a power-down state, you should not use **Reset**.

If you continue the power-up with this process, the desired power state of the servers will become out of sync with the actual power state and the servers may unexpectedly shut down at a later time. To safely reboot the selected servers from a power-down state, click **Cancel** then select the **Boot Server** action.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to reset.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Reset**.

Step 6 In the **Reset Server** dialog box, do the following:

a) Click the **Power Cycle** option.

b) (Optional) Check the check box if you want Cisco UCS Manager to complete all management operations that are pending on this server.

c) Click **OK**.

The reset may take several minutes to complete. After the server has been reset, the **Overall Status** field on the **General** tab displays an ok status.

Reacknowledging a Rack-Mount Server

Perform the following procedure if you need to have Cisco UCS Manager rediscover the server and all endpoints in the server. For example, you can use this procedure if a server is stuck in an unexpected state, such as the discovery state.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to acknowledge.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Re-acknowledge**.

b) Click **OK**.

Cisco UCS Manager disconnects the server and then builds the connections between the server and the fabric interconnect or fabric interconnects in the system. The acknowledgment may take several minutes to complete. After the server has been acknowledged, the **Overall Status** field on the **General** tab displays an OK status.

Decommissioning a Rack-Mount Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to decommission.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Decommission**.

b) Click **OK**.

The server is removed from the Cisco UCS configuration.

Recommissioning a Rack-Mount Server

Procedure

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

Step 2 On the **Equipment** tab, click the **Rack-Mounts** node.

Step 3 In the **Work** pane, click the **Decommissioned** tab.

Step 4 On the row for each rack-mount server that you want to recommission, do the following:

a) In the **Recommission** column, check the check box.

b) Click **Save Changes**

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

Step 6 (Optional) Monitor the progress of the server recommission and discovery on the **FSM** tab for the server.

Renumbering a Rack-Mount Server

Before You Begin

If you are swapping IDs between servers, you must first decommission both servers and then wait for the server decommission FSM to complete before proceeding with the renumbering steps.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Expand the **Servers** node and verify that it does not include the following:

- The rack-mount server you want to renumber
- A rack-mount server with the number you want to use

If either of these servers are listed in the **Servers** node, decommission those servers. You must wait until the decommission FSM is complete and the servers are not listed in the node before continuing. This might take several minutes.

Step 4 Choose the rack-mount server that you want to renumber.

Step 5 On the **Equipment** tab, click the **Rack-Mounts** node.

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

Step 7 On the row for each rack-mount server that you want to renumber, do the following:

a) Double-click in the **ID** field, and enter the new number that you want to assign to the rack-mount server.

b) In the **Recommission** column, check the check box.

c) Click **Save Changes**

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

Step 9 (Optional) Monitor the progress of the server recommission and discovery on the **FSM** tab for the server.

Removing a Non-Existent Rack-Mount Server from the Configuration Database

Perform the following procedure if you physically removed the server hardware without first decommissioning the server. You cannot perform this procedure if the server is physically present.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to remove from the configuration database.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Remove**.
b) Click **OK**.

Cisco UCS Manager removes all data about the server from its configuration database. The server slot is now available for you to insert new server hardware.

Turning the Locator LED for a Rack-Mount Server On and Off

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to turn the locator LED on or off.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click one of the following:

- **Turn on Locator LED**
- **Turn off Locator LED**

Resetting the CMOS for a Rack-Mount Server

On rare occasions, troubleshooting a server may require you to reset the CMOS. This procedure is not part of the normal maintenance of a server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to reset the CMOS.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Recover Server**.

Step 6 In the **Recover Server** dialog box, do the following:

a) Click **Reset CMOS**.
b) Click **OK**.

Resetting the CIMC for a Rack-Mount Server

On rare occasions, such as an issue with the current running firmware, troubleshooting a server may require you to reset the CIMC. This procedure is not part of the normal maintenance of a server. After you reset the CIMC, the server boots with the running version of the firmware for that server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to reset the CIMC.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Recover Server**.

Step 6 In the **Recover Server** dialog box, do the following:

a) Click **Reset CIMC (Server Controller)**.
b) Click **OK**.

Recovering the Corrupt BIOS on a Rack-Mount Server

On rare occasions, an issue with a server may require you to recover the corrupted BIOS. This procedure is not part of the normal maintenance of a server. After you recover the BIOS, the server boots with the running version of the firmware for that server. This radio button may be dimmed if the BIOS does not require recovery or the option is not available for a particular server.

Before You Begin

Important Remove all attached or mapped USB storage from a server before you attempt to recover the corrupt BIOS on that server. If an external USB drive is attached or mapped from vMedia to the server, BIOS recovery fails.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to recover the BIOS.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Recover Server**.

Step 6 In the **Recover Server** dialog box, do the following:

a) Click **Recover Corrupt BIOS**.
b) Click **OK**.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 In the **Recover Corrupt BIOS** dialog box, do the following:

a) Complete the following fields:

Name	Description
Version To Be Activated drop-down list	Choose the firmware version that you want to activate from the drop-down list.

b) Click **OK**.

Viewing the POST Results for a Rack-Mount Server

You can view any errors collected during the Power On Self-Test process for a server and its adapters.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server for which you want to view the POST results.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **View POST Results**.
The **POST Results** dialog box lists the POST results for the server and its adapters.

Step 6 (Optional) Click the link in the **Affected Object** column to view the properties of that adapter.

Step 7 Click **OK** to close the **POST Results** dialog box.

Issuing an NMI from a Rack-Mount Server

Perform the following procedure if the system remains unresponsive and you need Cisco UCS Manager to issue a Non Maskable Interrupt (NMI) to the BIOS or operating system from the CIMC. This action creates a core dump or stack trace, depending on the operating system installed on the server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Choose the server that you want to issue the NMI.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Server Maintenance**.

Step 6 In the **Maintenance** dialog box, do the following:

a) Click **Diagnostic Interrupt**.

b) Click **OK**.

Cisco UCS Manager sends an NMI to the BIOS or operating system.

CHAPTER 40

Starting the KVM Console

This chapter includes the following sections:

KVM Console

The KVM console is an interface accessible from the Cisco UCS Manager GUI or the KVM Launch Manager that emulates a direct KVM connection. Unlike the KVM dongle, which requires you to be physically connected to the server, the KVM console allows you to connect to the server from a remote location across the network.

You must ensure that either the server or the service profile associated with the server is configured with a CIMC IP address if you want to use the KVM console to access the server. The KVM console uses the CIMC IP address assigned to a server or a service profile to identify and connect with the correct server in a Cisco UCS domain.

Instead of using CD/DVD or floppy drives directly connected to the server, the KVM console uses virtual media, which are actual disk drives or disk image files that are mapped to virtual CD/DVD or floppy drives. You can map any of the following to virtual drives:

- CD/DVD or floppy drives on your computer
- Disk image files on your computer
- CD/DVD or floppy drives on the network
- Disk image files on the network

Recommendations for Using the KVM Console to Install a Server OS

To install an OS from a virtual CD/DVD or floppy drive, you must ensure that the virtual CD/DVD or floppy drive is set as the first boot device in the service profile.

Installing an OS using the KVM console may be slower than using the KVM dongle because the installation files must be downloaded across the network to the server. If you map a disk drive or disk image file from a network share to a virtual drive, the installation may be even slower because the installation files must be downloaded from the network to the KVM console (your computer) and then from the KVM console to the server. When using this installation method, we recommend that you have the installation media as close as possible to the system with the KVM console.

Virtual KVM Console

The KVM console is an interface accessible from CIMC that emulates a direct keyboard, video, and mouse (KVM) connection to the server. It allows you to connect to and control the server from a remote location, and to map physical locations to virtual drives that can by accessed by the server during this KVM session.

Important The KVM console requires JRE (Java Runtime Environment) version 1.5.0 or higher.

KVM Tab

This tab provides command line access to the server. The menu options available in this tab are described below.

Virtual Media Tab

Instead of using CD/DVD or floppy drives physically connected to the server, the KVM console uses virtual media, which are actual disk drives or disk image files that are mapped to virtual CD/DVD or floppy drives on the server. The **Client View** table displays the floppy images, floppy drives, CD/DVD drives, and ISO images that are available to the server.

Name	Description
Mapped column	If the check box in this column is checked, the associated disk drive or image file can be accessed by the server. Clear the check box to disconnect the server from the drive or image file. Each drive or image file can exist either on the users local computer or on the network, and each falls into one of three categories: • Virtual CD/DVD • Removable Media • Floppy—This category includes USB keys or flash drives. You can enable Virtual Media for one drive or image in each of the three categories, but you cannot virtualize multiple drives or images in the same category.
Read Only column	If checked, the server cannot write to the Virtual Media device even if the device has write capability.
Drive column	Displays the path to the device used by the server.
Exit button	Returns to the **KVM** tab.

Name	Description
Create Image button	Opens the **Open** dialog box that lets you navigate to the local folder that you want to map on the server. After the system has created the image, it saves the IMG file on your desktop and adds it to the **Client View** table. Check the check box in the **Mapped** column to complete the mapping process.
Add Image button	Opens the **Open** dialog box that lets you navigate to the ISO or IMG file you want to the server to access. After you select the file, the system adds it to the **Client View** table. Check the check box in the **Mapped** column to complete the mapping process.
Remove Image button	Removes the selected image from the **Client View** table.
Details button	Toggles the display of the **Details** area. This area contains a table showing the three device categories, their mapped status, read and write statistics, and the length of time that the device has been mapped.
USB Reset button	Resets all USB devices connected to the server. **Note** The **Details** area must be visible in order to use this button.

File Menu

Menu Item	Description
Capture to File	Opens the **Save** dialog box that lets you save the current screen as a JPG image. **Note** This option is only available on the **KVM** tab.
Exit	Closes the KVM console.

View Menu on the KVM Tab

Menu Item	Description
Refresh	Updates the console display with the server's current video output.
Full Screen	Expands the KVM console so that it fills the entire screen.
Windowed	Returns the KVM console to Windowed mode where it can be resized.

Menu Item	Description
Fit	Resizes the console window to the minimum size needed to display the video image from the server. This option is only available if the console is in Windowed mode.

Macros Menu on the KVM Tab

Select the keyboard shortcut you want to execute on the remote system.

Tools Menu on the KVM Tab

Menu Item	Description
Session Options	Opens the **Session Options** dialog box that lets you specify: • Whether all keystrokes are passed to the target system when the console is in Windowed mode. The default is no. • The termination key when in single cursor mode. The default is **F12**. • The mouse acceleration to use on the target system. The default is **Windows**.
Single Cursor	Turns on the single cursor feature, which offsets mouse alignment issues encountered on some remote operating systems. When you turn this feature on, the mouse pointer is trapped within the viewer window. To turn the feature off, press the termination key specified in the **Session Options** dialog box.
Stats	Opens the **Stats** dialog box, which displays the: • Frame rate measured in number of frames per second • Bandwidth measured in number of KBs per second • Compression measured in the percentage of compression being used • Packet rate measured in number of packets per second
Session User List	Opens the **Session User List** dialog box that shows all the user IDs that have an active KVM session.

Starting the KVM Console from a Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Choose the server that you want to access through the **KVM Console**.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **KVM Console**.
The **KVM Console** opens in a separate window.

Tip If the Caps Lock key on your keyboard is on when you open a KVM session, and you subsequently turn off your Caps Lock key, the **KVM Console** may continue to act as if Caps Lock is turned on. To synchronize the **KVM Console** and your keyboard, press Caps Lock once without the **KVM Console** in focus and then press Caps Lock again with the **KVM Console** in focus.

Starting the KVM Console from a 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 which contains the service profile for which you want to launch the KVM console.
If the system does not include multitenancy, expand the **root** node.

Step 4 Choose the service profile for which you need KVM access to the associated server.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **KVM Console**.
The KVM console opens in a separate window.

Tip If the Caps Lock key on your keyboard is on when you open a KVM session, and you subsequently turn off your Caps Lock key, the **KVM Console** may continue to act as if Caps Lock is turned on. To synchronize the **KVM Console** and your keyboard, press Caps Lock once without the **KVM Console** in focus and then press Caps Lock again with the **KVM Console** in focus.

Starting the KVM Console from the KVM Launch Manager

The KVM Launch Manager enables you to access a server through the KVM console without logging in to Cisco UCS Manager.

Before You Begin

To access the KVM console for a server through the KVM Launch Manager, you need the following:

- Cisco UCS username and password.
- Name of the service profile associated with the server for which you want KVM access.

Procedure

Step 1 In your web browser, type or select the web link for Cisco UCS Manager GUI.

Example:
The default web link is `http://`*`UCSManager_IP`* or `https://`*`UCSManager_IP`* . In a standalone configuration, *`UCSManager_IP`* is the IP address for the management port on the fabric interconnect. In a cluster configuration, *`UCSManager_IP`* is the IP address assigned to Cisco UCS Manager.

Step 2 On the Cisco UCS Manager launch page, click **Launch KVM Manager**.

Step 3 If a **Security Alert** dialog box appears, click **Yes** to accept the security certificate and continue.

Step 4 On the **UCS - KVM Launch Manager Login** page, do the following:

a) Enter your Cisco UCS username and password.
b) (Optional) If your Cisco UCS implementation includes multiple domains, select the appropriate domain from the **Domain** drop-down list.
c) Click **OK**.

Step 5 In the **Service Profiles** table of the KVM Launch Manager, do the following:

a) Locate the row containing the service profile and associated server for which you need KVM access.
b) In the **Launch KVM** column for that server, click **Launch**.
The KVM console opens in a separate window.

Tip If the Caps Lock key on your keyboard is on when you open a KVM session, and you subsequently turn off your Caps Lock key, the **KVM Console** may continue to act as if Caps Lock is turned on. To synchronize the **KVM Console** and your keyboard, press Caps Lock once without the **KVM Console** in focus and then press Caps Lock again with the **KVM Console** in focus.

CHAPTER 41

CIMC Session Management

This chapter includes the following sections:

CIMC Session Management

You can view and close any KVM, vMedia, and SOL sessions in Cisco UCS Manager. If you have administrator privileges, you can discontinue the KVM, vMedia, and SoL sessions of any user. . Cisco Integrated Management Controller (CIMC) provides session information to Cisco UCS Manager. When Cisco UCS Manager gets an event from CIMC, it updates its session table and displays the information to all users.

The session information consists of:

- Name—The name of the user who launched the session.
- Session ID—The ID associated with the session. The format of the session ID for blades is [unique identifier] _ [chassis id] _ [Blade id]. The format of the session ID for racks is [unique identifier] _ 0 _ [Rack id].
- Type of session—KVM, vMedia, or SoL.
- Privilege level of the user—Read-Write, Read Only, or Granted.
- Administrative state—Active or Inactive. The value is active if the session is active. The value is inactive if the session terminate command has been issued but the session has not been terminated. This situation occurs when FSM of the server is in progress with another operation or when the connectivity to CIMC is lost.
- Source Address—The IP address of the computer from which the session was opened.
- Service Profile—The service profile associated with the session. The service profile attribute value for a CIMC session is displayed only if the session is opened on an IP address that is provided from the service profile.
- Server—The name of the server associated with the session.
- Login time—The date and time the session started.
- Last Update Time—The last time the session information was updated by CIMC.

A new session is generally added when a user connects to KVM, vMedia, or SOL. A Pnuos vMedia session will be displayed in the session table during the server discovery with the user name __vmediausr__.

The CIMC session data is available under the **CIMC Sessions** tab in Cisco UCS Manager GUI. Any CIMC session terminated by the user is audit logged with proper details.

Note To perform the GUI and CLI tasks that are described in this guide, a CIMC image version of 2.1(2a) or above is required for the session management support for the blade servers. The latest CIMC image version of 1.5(1l) and above is required for the rack-servers.

Viewing All Open CIMC Sessions

This task describes one way to view all CIMC sessions opened globally on Cisco UCS Manager. You can view CIMC sessions of all servers opened by local, remote, or IPMI users in a single page.

Procedure

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

Step 2 On the **Admin** tab, click **User Management** > **User Services**.

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Viewing the CIMC Sessions of a Server

This task describes how to view the CIMC sessions of a specific server. You can view the CIMC sessions opened on the server and the service profile.

Procedure

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

Step 2 On the **Equipment** tab, expand **Chassis** > **Chassis Number** > **Servers** > ***Server Number***.

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Viewing the CIMC Sessions of a Service Profile

This task describes how to view the CIMC sessions of a specific service profile.

Note A CIMC session will only be displayed under a service profile if the session was opened on an IP address provided from that service profile.

Procedure

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

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

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Viewing the CIMC Sessions Opened by a Local User

This task describes how to view CIMC sessions opened by a local user.

Procedure

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

Step 2 On the **Admin** tab, expand **User Management** > **User Services** > **Locally Authenticated Users** > ***User Name***.

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Viewing the CIMC Sessions Opened by a Remote User

This task describes how to view CIMC sessions opened by a remote user.

Procedure

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

Step 2 On the **Admin** tab, expand **User Management** > **User Services** > **Remotely Authenticated Users** > ***User Name***.

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Clearing All Open CIMC Sessions

This task describes how to clear all open CIMC sessions. You can clear the CIMC sessions of all servers and service-profiles opened by the local, remote, or IPMI users.

Procedure

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

Step 2 On the **Admin** tab, click **User Management**.

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Step 4 Select the CIMC sessions you want to clear, right-click, and select **Clear CIMC Session**.

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

Clearing the CIMC Sessions of a Server

This task describes how to clear the CIMC session of a server. You can clear one or more CIMC sessions that are opened on a server.

Procedure

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

Step 2 On the **Equipment** tab, expand **Servers** > ***Server Name***.

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Step 4 Select the CIMC sessions that you want to clear, right-click, and select **Clear CIMC Session**.

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

Clearing the CIMC Sessions of a Service Profile

This task describes how to clear the CIMC sessions of a service profile. You can clear one or more CIMC sessions opened with an IP address provided on the service-profile.

Procedure

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

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

Step 3 In the **Work** pane, click the **CIMC Sessions** tab.

Step 4 Select the CIMC sessions that you want to clear, right-click, and select **Clear CIMC Session**.

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

Clearing the CIMC Sessions of a Local User

This task describes how to clear the CIMC sessions of a local user. You can clear one or more CIMC sessions opened by a local user.

Procedure

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

Step 2 On the **Admin** tab, expand **User Services** > **Locally Authenticated Users** > ***User Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 Under the **General** tab, expand the **CIMC Sessions** section.

Step 5 Select the CIMC sessions you want to clear, right-click, and select **Clear CIMC Session**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Clearing the CIMC Sessions of a Remote User

This task describes how to clear the CIMC sessions of a remote user. You can clear one or more CIMC sessions opened by a remote user.

Procedure

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

Step 2 On the **Admin** tab, expand **User Services** > **Remotely Authenticated Users** > ***User Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 Under the **General** tab, expand the **CIMC Sessions** section.

Step 5 Select the CIMC sessions that you want to clear, right-click, and select **Clear CIMC Session**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 42

Managing the I/O Modules

This chapter includes the following sections:

I/O Module Management in Cisco UCS Manager GUI

You can manage and monitor all I/O modules in a Cisco UCS domain through Cisco UCS Manager GUI.

Resetting an I/O Module

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **IO Modules**.

Step 3 Choose the I/O module that you want to reset.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Reset IO Module**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Viewing the POST Results for an I/O Module

You can view any errors collected during the Power On Self-Test process for an I/O module.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **IO Modules**.

Step 3 Choose the I/O module for which you want to view the POST results.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **View POST Results**.
The **POST Results** dialog box lists the POST results for the I/O module.

Step 6 Click **OK** to close the **POST Results** dialog box.

CHAPTER 43

Backing Up and Restoring the Configuration

This chapter includes the following sections:

Backup and Export Configuration

When you perform a backup through Cisco UCS Manager, you take a snapshot of all or part of the system configuration and export the file to a location on your network. You cannot use Cisco UCS Manager to back up data on the servers.

You can perform a backup while the system is up and running. The backup operation only saves information from the management plane. It does not have any impact on the server or network traffic.

Backup Types

You can perform one or more of the following types of backups through Cisco UCS Central:

- **Full state—**A binary file that includes a snapshot of the entire system. You can use the file generated from this backup to restore the system during disaster recovery. This file can restore or rebuild the configuration on the original fabric interconnect, or recreate the configuration on a different fabric interconnect. You cannot use this file for an import.

  Note You can only use a full state backup file to restore a system that is running the same version as the system from which the backup file was exported.

- **All configuration—**An XML file that includes all system and logical configuration settings. You can use the file generated from this backup to import these configuration settings to the original fabric interconnect or to a different fabric interconnect. You cannot use this file for a system restore. This file does not include passwords for locally authenticated users.
- **System configuration—**An XML file that includes all system configuration settings such as usernames, roles, and locales. You can use the file generated from this backup to import these configuration settings to the original fabric interconnect or to a different fabric interconnect. You cannot use this file for a system restore.
- **Logical configuration—**An XML file that includes all logical configuration settings such as service profiles, VLANs, VSANs, pools, and policies. You can use the file generated from this backup to import these configuration settings to the original fabric interconnect or to a different fabric interconnect. You cannot use this file for a system restore.

Considerations and Recommendations for Backup Operations

Before you create a backup operation, consider the following:

Backup Locations

The backup location is the destination or folder on the network where you want Cisco UCS Manager to export the backup file. You can maintain only one backup operation for each location where you plan to save a backup file.

Potential to Overwrite Backup Files

If you rerun a backup operation without changing the filename, Cisco UCS Manager overwrites the existing file on the server. To avoid overwriting existing backup files, change the filename in the backup operation or copy the existing file to another location.

Multiple Types of Backups

You can run and export more than one type of backup to the same location. You need to change the backup type before you rerun the backup operation. We recommend that you change the filename for easier identification of the backup type and to avoid overwriting the existing backup file.

Scheduled Backups

You can create a backup operation in advance and leave the admin state disabled until you are ready to run the backup. Cisco UCS Manager does not run the backup operation, save, or export the configuration file until you set the admin state of the backup operation to enabled.

Incremental Backups

You cannot perform incremental backups of Cisco UCS Manager.

Encryption of Full State Backups

Full state backups are encrypted so that passwords and other sensitive information are not exported as clear text.

Scheduled Backups

You can configure policies in Cisco UCS to schedule the following types of backups:

- Full state
- All configuration

You cannot schedule any other type of backup.

Full State Backup Policy

The full state backup policy allows you to schedule regular full state backups of a snapshot of the entire system. You can choose whether to configure the full state backup to occur on a daily, weekly, or biweekly basis.

Cisco UCS Manager maintains a maximum number of backup files on the remote server. The maxfiles parameter is used when Cisco UCS Manager is registered with Cisco UCS Central. The maxfiles parameter is user configurable on Cisco UCS Central and controls the number of backup files stored on Cisco UCS Central.

If Cisco UCS Manager is not registered with Cisco UCS Central, and the user is storing backup files on a remote backup server, the backup files are not managed by Cisco UCS Manager. The remote machine server administrator must monitor the disk usage and rotate the backup files to create space for new backup files.

All Configuration Export Policy

The all configuration backup policy allows you to schedule a regular backup and export of all system and logical configuration settings. This backup does not include passwords for locally authenticated users. You can choose whether to configure the all configuration backup to occur on a daily, weekly, or bi-weekly basis.

Cisco UCS maintains a maximum number of backup files on the remote server. When that number is exceeded, Cisco UCS overwrites the oldest backup file.

Import Configuration

You can import any configuration file that was exported from Cisco UCS. The file does not need to have been exported from the same Cisco UCS.

The import function is available for all configuration, system configuration, and logical configuration files. You can perform an import while the system is up and running. An import operation modifies information on the management plane only. Some modifications caused by an import operation, such as a change to a vNIC assigned to a server, can cause a server reboot or other operations that disrupt traffic.

You cannot schedule an import operation. You can, however, create an import operation in advance and leave the admin state disabled until you are ready to run the import.Cisco UCS will not run the import operation on the configuration file until you set the admin state to enabled.

You can maintain only one import operation for each location where you saved a configuration backup file.

Important When you import configuration from Release 2.1(1) or later to an earlier release, the server firmware may be upgraded or downgraded automatically when the corresponding service profiles use the default host firmware pack. You can, however, modify the Service Profiles to use non-default host firmware before you import the configuration.

Import Methods

You can use one of the following methods to import and update a system configuration through Cisco UCS:

- **Merge—**The information in the imported configuration file is compared with the existing configuration information. If there are conflicts, the import operation overwrites the information on the Cisco UCS domain with the information in the import configuration file.
- **Replace—**The current configuration information is replaced with the information in the imported configuration file one object at a time.

System Restore

You can use the restore function for disaster recovery.

You can restore a system configuration from any full state backup file that was exported from Cisco UCS. The file does not need to have been exported from Cisco UCS on the system that you are restoring. When restoring using a backup file that was exported from a different system, we strongly recommend that you use a system with the same or similar system configuration and hardware, including fabric interconnects, servers, adapters, and I/O module or FEX connectivity. Mismatched hardware and/or system configuration can lead to the restored system not fully functioning. If there is a mismatch between the I/O module links or servers on the two systems, acknowledge the chassis and/or servers after the restore operation.

The restore function is only available for a full state backup file. You cannot import a full state backup file. You perform a restore through the initial system setup.

Note You can only use a full state backup file to restore a system that is running the same version as the system from which the backup file was exported.

Required User Role for Backup and Import Operations

You must have a user account that includes the admin role to create and run backup and import operations.

Configuring Backup Operations

Creating a Backup Operation

Before You Begin

Obtain the backup server IPv4 or IPv6 address and authentication credentials.

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Backup**.

Step 5 In the **Backup Configuration** dialog box, click **Create Backup Operation**.

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

Name	Description
Admin State field	This can be one of the following: • **Enabled**—Cisco UCS Manager runs the backup operation as soon as you click **OK**. • **Disabled**—Cisco UCS Manager does not run the backup operation when you click **OK**. If you select this option, all fields in the dialog box remain visible. However, you must manually run the backup from the **Backup Configuration** dialog box.

Name	Description
Type field	The information saved in the backup configuration file. This can be one of the following: • **Full state—**A binary file that includes a snapshot of the entire system. You can use the file generated from this backup to restore the system during disaster recovery. This file can restore or rebuild the configuration on the original fabric interconnect, or recreate the configuration on a different fabric interconnect. You cannot use this file for an import. **Note** You can only use a full state backup file to restore a system that is running the same version as the system from which the backup file was exported. • **All configuration—**An XML file that includes all system and logical configuration settings. You can use the file generated from this backup to import these configuration settings to the original fabric interconnect or to a different fabric interconnect. You cannot use this file for a system restore. This file does not include passwords for locally authenticated users. • **System configuration—**An XML file that includes all system configuration settings such as usernames, roles, and locales. You can use the file generated from this backup to import these configuration settings to the original fabric interconnect or to a different fabric interconnect. You cannot use this file for a system restore. • **Logical configuration—**An XML file that includes all logical configuration settings such as service profiles, VLANs, VSANs, pools, and policies. You can use the file generated from this backup to import these configuration settings to the original fabric interconnect or to a different fabric interconnect. You cannot use this file for a system restore.
Preserve Identities check box	If this check box is checked, the backup file preserves all identities derived from pools, including the MAC addresses, WWPN, WWNN, and UUIDs.

Name	Description
Location of the Backup File field	Where the backup file should be saved. This can be one of the following: • **Remote File System—**The backup XML file is saved to a remote server. Cisco UCS Manager GUI displays the fields described below that allow you to specify the protocol, host, filename, username, and password for the remote system. • **Local File System—**The backup XML file is saved locally. Cisco UCS Manager GUI displays the **Filename** field with an associated **Browse** button that let you specify the name and location for the backup file. **Note** Once you click **OK**, the location cannot be changed.
Protocol field	The protocol to use when communicating with the remote server. This can be one of the following: • **FTP** • **TFTP** • **SCP** • **SFTP**
Hostname field	The hostname or IP address of the location where the backup file is stored. This can be a server, storage array, local drive, or any read/write media that the fabric interconnect can access through the network. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Remote File field	The full path to the backup configuration file. This field can contain the filename as well as the path. If you omit the filename, the backup procedure assigns a name to the file.
User field	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password field	The password for the remote server username. This field does not apply if the protocol is TFTP. Cisco UCS Manager does not store this password. Therefore, you do not need to enter this password unless you intend to enable and run the backup operation immediately.

Step 7 Click **OK**.

Step 8 If Cisco UCS Manager displays a confirmation dialog box, click **OK**.
If you set the **Admin State** field to enabled, Cisco UCS Manager takes a snapshot of the configuration type that you selected and exports the file to the network location. The backup operation displays in the **Backup Operations** table in the **Backup Configuration** dialog box.

Step 9 (Optional) To view the progress of the backup operation, do the following:

a) If the operation does not display in the **Properties** area, click the operation in the **Backup Operations** table.
b) In the **Properties** area, click the down arrows on the **FSM Details** bar.

The **FSM Details** area expands and displays the operation status.

Step 10 Click **OK** to close the **Backup Configuration** dialog box.
The backup operation continues to run until it is completed. To view the progress, re-open the **Backup Configuration** dialog box.

Running a Backup Operation

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Backup**.

Step 5 In the **Backup Operations** table of the **Backup Configuration** dialog box, click the backup operation that you want to run.
The details of the selected backup operation display in the **Properties** area.

Step 6 In the **Properties** area, complete the following fields:

a) In the **Admin State** field, click the **Enabled** radio button.
b) For all protocols except TFTP, enter the password for the username in the **Password** field.
c) (Optional) Change the content of the other available fields.

Step 7 Click **Apply**.
Cisco UCS Manager takes a snapshot of the configuration type that you selected and exports the file to the network location. The backup operation displays in the **Backup Operations** table in the **Backup Configuration** dialog box.

Step 8 (Optional) To view the progress of the backup operation, click the down arrows on the **FSM Details** bar.
The **FSM Details** area expands and displays the operation status.

Step 9 Click **OK** to close the **Backup Configuration** dialog box.
The backup operation continues to run until it is completed. To view the progress, re-open the **Backup Configuration** dialog box.

Modifying a Backup Operation

You can modify a backup operation to save a file of another backup type to that location or to change the filename and avoid overwriting previous backup files.

Note You can only use a full state backup file to restore a system that is running the same version as the system from which the backup file was exported.

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Backup**.

Step 5 In the **Backup Operations** area of the **Backup Configuration** dialog box, click the backup operation that you want to modify.
The details of the selected backup operation display in the **Properties** area. If the backup operation is in a disabled state, the fields are dimmed.

Step 6 In the **Admin State** field, click the **enabled** radio button.

Step 7 Modify the appropriate fields.
You do not have to enter the password unless you want to run the backup operation immediately.

Step 8 (Optional) If you do not want to run the backup operation immediately, click the **disabled** radio button in the **Admin State** field.

Step 9 Click **OK**.

Deleting One or More Backup Operations

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Backup**.

Step 5 In the **Backup Operations** table of the **Backup Configuration** dialog box, click the backup operations that you want to delete.

Tip You cannot click a backup operation in the table if the admin state of the operation is set to **Enabled.**

Step 6 Click the **Delete** icon in the icon bar of the **Backup Operations** table.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 In the **Backup Configuration** dialog box, click one of the following:

Option	Description
Apply	Deletes the selected backup operations without closing the dialog box.
OK	Deletes the selected backup operations and closes the dialog box.

Configuring Scheduled Backups

Configuring the Full State Backup Policy

Before You Begin

Obtain the backup server IPv4 or IPv6 address and authentication credentials.

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **Backup and Export Policy** tab.

Step 4 In the **Full State Backup Policy** area, complete the following fields:

Name	Description
Hostname field	The hostname or IP address of the location where the policy backup file is stored. This can be a server, storage array, local drive, or any read/write media that the fabric interconnect can access through the network. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.

Name	Description
Protocol field	The protocol to use when communicating with the remote server. This can be one of the following: - **FTP** - **TFTP** - **SCP** - **SFTP**
User field	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password field	The password for the remote server username. This field does not apply if the protocol is TFTP.
Remote File field	The full path to the policy backup file. This field can contain the filename as well as the path. If you omit the filename, the backup procedure assigns a name to the file.
Admin State field	This can be one of the following: - **Enabled**—Cisco UCS Manager backs up all policy information using the schedule specified in the **Schedule** field. - **Disabled**—Cisco UCS Manager does not back up policy information.
Schedule field	The frequency with which Cisco UCS Manager backs up policy information.
Max Files field	The maximum number of backup files that Cisco UCS Manager maintains. This value cannot be changed.
Description field	The description of the backup policy. Enter up to 256 characters. You can use any characters or spaces except \` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 5 Click **Save Changes**.

Configuring the All Configuration Export Policy

Before You Begin

Obtain the backup server IPv4 or IPv6 address and authentication credentials.

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **Backup and Export Policy** tab.

Step 4 In the **All Configuration Export Policy** area, complete the following fields:

Name	Description
Hostname field	The hostname or IP address of the location where the configuration backup file is stored. This can be a server, storage array, local drive, or any read/write media that the fabric interconnect can access through the network. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Protocol field	The protocol to use when communicating with the remote server. This can be one of the following: • **FTP** • **TFTP** • **SCP** • **SFTP**
User field	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password field	The password for the remote server username. This field does not apply if the protocol is TFTP.
Remote File field	The full path to the backup configuration file. This field can contain the filename as well as the path. If you omit the filename, the backup procedure assigns a name to the file.

Name	Description
Admin State field	This can be one of the following: • **Enabled—**Cisco UCS Manager backs up all policy information using the schedule specified in the **Schedule** field. • **Disabled—**Cisco UCS Manager does not back up policy information.
Schedule field	The frequency with which Cisco UCS Manager backs up policy information.
Max Files field	The maximum number of configuration backup files that Cisco UCS Manager maintains. This value cannot be changed.
Description field	The description of the configuration export policy. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).

Step 5 Click **Save Changes**.

Configuring Import Operations

Creating an Import Operation

You cannot import a Full State configuration file. You can import any of the following configuration files:

- All configuration
- System configuration
- Logical configuration

Before You Begin

Collect the following information that you will need to import a configuration file:

- Backup server IP address and authentication credentials
- Fully qualified name of a backup file

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Import Configuration**.

Step 5 In the **Import Configuration** dialog box, click **Create Import Operation**.

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

Name	Description
Admin State field	This can be one of the following: • **Enabled**—Cisco UCS Manager runs the import operation as soon as you click **OK**. • **Disabled**—Cisco UCS Manager does not run the import operation when you click **OK**. If you select this option, all fields in the dialog box remain visible. However, you must manually run the import from the **Import Configuration** dialog box.
Action field	This can be one of the following: • **Merge**—The configuration information is merged with the existing information. If there are conflicts, the system replaces the information on the current system with the information in the import configuration file. • **Replace**—The system takes each object in the import configuration file and overwrites the corresponding object in the current configuration.
Location of the Import File field	Where the backup file that you want to import is located. This can be one of the following: • **Remote File System**—The backup XML file is stored on a remote server. Cisco UCS Manager GUI displays the fields described below that allow you to specify the protocol, host, filename, username, and password for the remote system. • **Local File System**—The backup XML file is stored locally. Cisco UCS Manager GUI displays the **Filename** field with an associated **Browse** button that let you specify the name and location for the backup file to be imported.

Name	Description
Protocol field	The protocol to use when communicating with the remote server. This can be one of the following: • **FTP** • **TFTP** • **SCP** • **SFTP**
Hostname field	The hostname or IP address from which the configuration file should be imported. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Remote File field	The name of the XML configuration file.
User field	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password field	The password for the remote server username. This field does not apply if the protocol is TFTP. Cisco UCS Manager does not store this password. Therefore, you do not need to enter this password unless you intend to enable and run the import operation immediately.

Step 7 Click **OK**.

Step 8 In the confirmation dialog box, click **OK**.
If you set the **Admin State** to enabled, Cisco UCS Manager imports the configuration file from the network location. Depending upon which action you selected, the information in the file is either merged with the existing configuration or replaces the existing configuration. The import operation displays in the **Import Operations** table of the **Import Configuration** dialog box.

Step 9 (Optional) To view the progress of the import operation, do the following:

a) If the operation does not automatically display in the **Properties** area, click the operation in the **Import Operations** table.
b) In the **Properties** area, click the down arrows on the **FSM Details** bar.

The **FSM Details** area expands and displays the operation status.

Step 10 Click **OK** to close the **Import Configuration** dialog box.
The import operation continues to run until it is completed. To view the progress, re-open the **Import Configuration** dialog box.

Running an Import Operation

You cannot import a Full State configuration file. You can import any of the following configuration files:

- All configuration
- System configuration
- Logical configuration

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Import Configuration**.

Step 5 In the **Import Operations** table of the **Import Configuration** dialog box, click the operation that you want to run.
The details of the selected import operation display in the **Properties** area.

Step 6 In the **Properties** area, complete the following fields:

a) In the **Admin State** field, click the **Enabled** radio button.

b) For all protocols except TFTP, enter the password for the username In the **Password** field.

c) (Optional) Change the content of the other available fields.

Step 7 Click **Apply**.
Cisco UCS Manager imports the configuration file from the network location. Depending upon which action you selected, the information in the file is either merged with the existing configuration or replaces the existing configuration. The import operation displays in the **Import Operations** table of the **Import Configuration** dialog box.

Step 8 (Optional) To view the progress of the import operation, click the down arrows on the **FSM Details** bar.
The **FSM Details** area expands and displays the operation status.

Step 9 Click **OK** to close the **Import Configuration** dialog box.
The import operation continues to run until it is completed. To view the progress, re-open the **Import Configuration** dialog box.

Modifying an Import Operation

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Import Configuration**.

Step 5 In the **Import Operations** area of the **Import Configuration** dialog box, click the import operation that you want to modify.
The details of the selected import operation display in the **Properties** area. If the import operation is in a disabled state, the fields are dimmed.

Step 6 In the **Admin State** field, click the **enabled** radio button.

Step 7 Modify the appropriate fields.
You do not have to enter the password unless you want to run the import operation immediately.

Step 8 (Optional) If you do not want to run the import operation immediately, click the **disabled** radio button in the **Admin State** field.

Step 9 Click **OK**.

Deleting One or More Import Operations

Procedure

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

Step 2 Click the **All** node.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Import Configuration**.

Step 5 In the **Import Operations** table of the **Backup Configuration** dialog box, click the import operations that you want to delete.

Tip You cannot click an import operation in the table if the admin state of the operation is set to **Enabled.**

Step 6 Click the **Delete** icon in the icon bar of the **Import Operations** table.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Step 8 In the **Import Configuration** dialog box, click one of the following:

Option	Description
Apply	Deletes the selected import operations without closing the dialog box.

Option	Description
OK	Deletes the selected import operations and closes the dialog box.

Restoring the Configuration for a Fabric Interconnect

Before You Begin

Collect the following information that you will need to restore the system configuration:

- Fabric interconnect management port IPv4 address and subnet mask, or IPv6 address and prefix
- Default gateway IPv4 or IPv6 address
- Backup server IPv4 or IPv6 address and authentication credentials
- Fully qualified name of a Full State backup file

Note You must have access to a Full State configuration file to perform a system restore. You cannot perform a system restore with any other type of configuration or backup file.

Procedure

Step 1 Connect to the console port.

Step 2 If the fabric interconnect is off, power on the fabric interconnect.
You will see the power on self-test message as the fabric interconnect boots.

Step 3 At the installation method prompt, enter gui.

Step 4 If the system cannot access a DHCP server, you may be prompted to enter the following information:

- IP address for the management port on the fabric interconnect
- Subnet mask for the management port on the fabric interconnect
- IP address for the default gateway assigned to the fabric interconnect

Step 5 Copy the web link from the prompt into a web browser and go to the Cisco UCS Manager GUI launch page.

Step 6 On the launch page, select **Express Setup**.

Step 7 On the **Express Setup** page, select **Restore From Backup** and click **Submit**.

Step 8 In the **Protocol** area of the **Cisco UCS Manager Initial Setup** page, select the protocol you want to use to upload the full state backup file:

- **SCP**
- **TFTP**

- **FTP**
- **SFTP**

Step 9 In the **Server Information** area, complete the following fields:

Name	Description
Server IP	The IP address of the computer where the full state backup file is located. This can be a server, storage array, local drive, or any read/write media that the fabric interconnect can access through the network.
Backup File Path	The file path where the full state backup file is located, including the folder names and filename.
User ID	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password	The password for the remote server username. This field does not apply if the protocol is TFTP.

Step 10 Click **Submit**.
You can return to the console to watch the progress of the system restore.

The fabric interconnect logs in to the backup server, retrieves a copy of the specified full-state backup file, and restores the system configuration.

For a cluster configuration, you do not need to restore the secondary fabric interconnect. As soon as the secondary fabric interconnect reboots, Cisco UCS Manager sychronizes the configuration with the primary fabric interconnect.

CHAPTER 44

Recovering a Lost Password

This chapter includes the following sections:

Recovering a Lost Password

Password Recovery for the Admin Account

The admin account is the system administrator or superuser account. If an administrator loses the password to this account, you can have a serious security issue. As a result, the procedure to recover the password for the admin account requires you to power cycle all fabric interconnects in a Cisco UCS domain.

When you recover the password for the admin account, you actually change the password for that account. You cannot retrieve the original password for that account.

You can reset the password for all other local accounts through Cisco UCS Manager. However, you must log in to Cisco UCS Manager with an account that includes aaa or admin privileges.

Caution This procedure requires you to power down all fabric interconnects in a Cisco UCS domain. As a result, all data transmission in the Cisco UCS domain is stopped until you restart the fabric interconnects.

Determining the Leadership Role of a Fabric Interconnect

Procedure

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

Step 2 In the **Equipment** tab, expand **Equipment** > **Fabric Interconnects**.

Step 3 Click the fabric interconnect for which you want to identify the role.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **General** tab, click the down arrows on the **High Availability Details** bar to expand that area.

Step 6 View the **Leadership** field to determine whether the fabric interconnect is the primary or subordinate.

Verifying the Firmware Versions on a Fabric Interconnect

You can use the following procedure to verify the firmware versions on all fabric interconnects in a Cisco UCS domain. You can verify the firmware for a single fabric interconnect through the **Installed Firmware** tab for that fabric interconnect.

Procedure

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

Step 2 In the **Equipment** tab, click the **Equipment** node.

Step 3 In the **Work** pane, click the **Firmware Management** tab.

Step 4 In the **Installed Firmware** tab, verify that the following firmware versions for each fabric interconnect match the version to which you updated the firmware:

- Kernel version
- System version

Recovering the Admin Account Password in a Standalone Configuration

This procedure will help you to recover the password that you set for the admin account when you performed an initial system setup on the fabric interconnect. The admin account is the system administrator or superuser account.

Before You Begin

1. Physically connect the console port on the fabric interconnect to a computer terminal or console server
2. Determine the running versions of the following firmware:
    - The firmware kernel version on the fabric interconnect

- The firmware system version

Tip To find this information, you can log in with any user account on the Cisco UCS domain.

Procedure

Step 1 Connect to the console port.

Step 2 Power cycle the fabric interconnect:

a) Turn off the power to the fabric interconnect.
b) Turn on the power to the fabric interconnect.

Step 3 In the console, press one of the following key combinations as it boots to get the `loader` prompt:

- Ctrl+l
- Ctrl+Shift+r

You may need to press the selected key combination multiple times before your screen displays the `loader` prompt.

Step 4 Boot the kernel firmware version on the fabric interconnect.

```
loader >
boot /installables/switch/
kernel_firmware_version
```

Example:

```
loader >
boot /installables/switch/ucs-6100-k9-kickstart.4.1.3.N2.1.0.11.gbin
```

Step 5 Enter config terminal mode.

```
Fabric(boot)#
config terminal
```

Step 6 Reset the admin password.

```
Fabric(boot)(config)#
admin-password
password
```

Choose a strong password that includes at least one capital letter and one number. The password cannot be blank.

The new password displays in clear text mode.

Step 7 Exit config terminal mode and return to the boot prompt.

Step 8 Boot the system firmware version on the fabric interconnect.

```
Fabric(boot)#
load /installables/switch/
system_firmware_version
```

Example:

```
Fabric(boot)#
```

load /installables/switch/`ucs-6100-k9-system.4.1.3.N2.1.0.211.bin`

Step 9 After the system image loads, log in to Cisco UCS Manager.

Recovering the Admin Account Password in a Cluster Configuration

This procedure will help you to recover the password that you set for the admin account when you performed an initial system setup on the fabric interconnects. The admin account is the system administrator or superuser account.

Before You Begin

1. Physically connect a console port on one of the fabric interconnects to a computer terminal or console server
2. Obtain the following information:
   - The firmware kernel version on the fabric interconnect
   - The firmware system version
   - Which fabric interconnect has the primary leadership role and which is the subordinate

Tip To find this information, you can log in with any user account on the Cisco UCS domain.

Procedure

Step 1 Connect to the console port.

Step 2 For the subordinate fabric interconnect:

a) Turn off the power to the fabric interconnect.
b) Turn on the power to the fabric interconnect.
c) In the console, press one of the following key combinations as it boots to get the `loader` prompt:

   - Ctrl+l
   - Ctrl+Shift+r

   You may need to press the selected key combination multiple times before your screen displays the `loader` prompt.

Step 3 Power cycle the primary fabric interconnect:

a) Turn off the power to the fabric interconnect.
b) Turn on the power to the fabric interconnect.

Step 4 In the console, press one of the following key combinations as it boots to get the `loader` prompt:

- Ctrl+l
- Ctrl+Shift+r

You may need to press the selected key combination multiple times before your screen displays the `loader` prompt.

Step 5 Boot the kernel firmware version on the primary fabric interconnect.

```
loader > boot /installables/switch/
kernel_firmware_version
```

Example:

```
loader > boot /installables/switch/ucs-6100-k9-kickstart.4.1.3.N2.1.0.11.gbin
```

Step 6 Enter config terminal mode.

```
Fabric(boot)# config terminal
```

Step 7 Reset the admin password.

```
Fabric(boot)(config)# admin-password password
```

Choose a strong password that includes at least one capital letter and one number. The password cannot be blank.

The new password displays in clear text mode.

Step 8 Exit config terminal mode and return to the boot prompt.

Step 9 Boot the system firmware version on the primary fabric interconnect.

```
Fabric(boot)# load /installables/switch/
system_firmware_version
```

Example:

```
Fabric(boot)# load /installables/switch/ucs-6100-k9-system.4.1.3.N2.1.0.211.bin
```

Step 10 After the system image loads, log in to Cisco UCS Manager.

Step 11 In the console for the subordinate fabric interconnect, do the following to bring it up:

a) Boot the kernel firmware version on the subordinate fabric interconnect.

```
loader > boot /installables/switch/
kernel_firmware_version
```

b) Boot the system firmware version on the subordinate fabric interconnect.

```
Fabric(boot)# load /installables/switch/
system_firmware_version
```

PART VII

System Monitoring

CHAPTER 45

Monitoring Traffic

This chapter includes the following sections:

Traffic Monitoring

Traffic monitoring copies traffic from one or more sources and sends the copied traffic to a dedicated destination port for analysis by a network analyzer. This feature is also known as Switched Port Analyzer (SPAN).

Important You can monitor or use SPAN on port channels only for ingress traffic.

Type of Session

When you create a traffic monitoring session, you can choose either an Ethernet or Fibre Channel destination port to receive the traffic. The type of destination port determines the type of session, which in turn determines the types of available traffic sources. For an Ethernet traffic monitoring session, the destination port must be an unconfigured physical port. For a Fibre Channel traffic monitoring session, the destination port must be a Fibre Channel uplink port.

Traffic Sources

An Ethernet traffic monitoring session can monitor any of the following traffic sources:

- Uplink Ethernet port
- Ethernet port channel
- VLAN
- Service profile vNIC
- Service profile vHBA
- FCoE port
- Port channels
- Unified uplink port

A Fibre Channel traffic monitoring session can monitor any of the following traffic sources:

- Uplink Fibre Channel port
- SAN port channel
- VSAN
- Service profile vHBA
- Fibre Channel storage port

Guidelines and Recommendations for Traffic Monitoring

When configuring or activating traffic monitoring, consider the following guidelines:

- You can create and store up to 16 traffic monitoring sessions, but only two can be active at the same time.
- A traffic monitoring session is disabled by default when created. To begin monitoring traffic, you must activate the session.
- A traffic monitoring session must be unique on any fabric interconnect within the Cisco UCS pod. Therefore, you must create each monitoring session with a unique name and unique VLAN source.
- To monitor traffic from a server, add all vNICs from the service profile corresponding to the server.
- You can monitor Fibre Channel traffic using either a Fibre Channel traffic analyzer or an Ethernet traffic analyzer. When Fibre Channel traffic is monitored using an Ethernet traffic monitoring session, with an Ethernet destination port, the destination traffic will be FCoE.
- Because a traffic monitoring destination is a single physical port, a traffic monitoring session can monitor only a single fabric. To monitor uninterrupted vNIC traffic across a fabric failover, you must create two sessions—one per fabric—and connect two analyzers. Add the vNIC as the traffic source for both sessions.
- All traffic sources must be located within the same switch as the destination port.
- A port configured as a destination port cannot also be configured as a source port.

- A member port of a port channel cannot be configured individually as a source. If the port channel is configured as a source, all member ports are source ports.
- A vHBA can be a source for either an Ethernet or Fibre Channel monitoring session, but it cannot be a source for both simultaneously.
- A server port can be a source only if it is a non-virtualized rack server adapter-facing port.
- A Fibre Channel port on a Cisco UCS 6248 fabric interconnect cannot be configured as a source port.
- If you change the port profile of a virtual machine, any associated vNICs being used as source ports are removed from monitoring, and you must reconfigure the monitoring session.
- If a traffic monitoring session was configured on a dynamic vNIC under a release earlier than Cisco UCS Manager Release 2.0, you must reconfigure the traffic monitoring session after upgrading.
- SPAN traffic is rate-limited to 1 Gbps on Cisco UCS 6200 Series fabric interconnects.

Note Traffic monitoring can impose a significant load on your system resources. To minimize the load, select sources that carry as little unwanted traffic as possible and disable traffic monitoring when it is not needed.

Creating an Ethernet Traffic Monitoring Session

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name***.

Step 3 Right-click ***Fabric_Interconnect_Name*** and choose **Create Traffic Monitoring Session**.

Step 4 In the **Create Traffic Monitoring Session** dialog box, complete the following fields:

Name	Description
Name field	The name of the traffic monitoring session. 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.
Admin State field	Whether traffic will be monitored for the physical port selected in the **Destination** field. This can be one of the following: • **Enabled**—Cisco UCS begins monitoring the port activity as soon as some source components are added to the session. • **Disabled**—Cisco UCS does not monitor the port activity.
Destination drop-down list	Select the physical port whose communication traffic you want to monitor from the navigation tree.

Name	Description
Admin Speed field	The data transfer rate of the port channel to be monitored. The available data rates depend on the fabric interconnect installed in the Cisco UCS domain.

Step 5 Click **OK**.

What to Do Next

- Add traffic sources to the traffic monitoring session.
- Activate the traffic monitoring session.

Setting the Destination for an Existing Ethernet Traffic Monitoring Session

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name*** > ***Monitor_Session_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Set Destination**.

Step 5 In the **Set Destination** dialog box, complete the following fields:

Example:

Name	Description
Destination field	The physical port that is being monitored.
Admin Speed field	The data transfer rate of the port channel to be monitored. The available data rates depend on the fabric interconnect installed in the Cisco UCS domain.

Step 6 Click **OK**.

Clearing the Destination for an Existing Ethernet Traffic Monitoring Session

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name*** > ***Monitor_Session_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Clear Destination**.

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

Creating a Fibre Channel Traffic Monitoring Session

Procedure

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

Step 2 On the **LAN** tab, expand **SAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name***.

Step 3 Right-click ***Fabric_Interconnect_Name*** and choose **Create Traffic Monitoring Session**.

Step 4 In the **Create Traffic Monitoring Session** dialog box, complete the following fields:

Name	Description
Name field	The name of the traffic monitoring session. 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.
Admin State field	Whether traffic will be monitored for the physical port selected in the **Destination** field. This can be one of the following: • **Enabled**—Cisco UCS begins monitoring the port activity as soon as some source components are added to the session. • **Disabled**—Cisco UCS does not monitor the port activity.
Destination drop-down list	Select the physical port whose communication traffic you want to monitor from the navigation tree.

Name	Description
Admin Speed drop-down list	The data transfer rate of the port channel to be monitored. This can be one of the following: • **1 Gbps** • **2 Gbps** • **4 Gbps** • **8 Gbps** • **Auto—**Cisco UCS determines the data transfer rate.

Step 5 Click **OK**.

What to Do Next

- Add traffic sources to the traffic monitoring session.
- Activate the traffic monitoring session.

Setting the Destination for an Existing Fibre Channel Traffic Monitoring Session

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name*** > ***Monitor_Session_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Set Destination**.

Step 5 In the **Set Destination** dialog box, complete the following fields:

Name	Description
Destination drop-down list	Select the physical port whose communication traffic you want to monitor from the navigation tree.

Name	Description
Admin Speed drop-down list	The data transfer rate of the port channel to be monitored. This can be one of the following: • **1 Gbps** • **2 Gbps** • **4 Gbps** • **8 Gbps** • **Auto**—Cisco UCS determines the data transfer rate.

Step 6 Click **OK**.

Clearing the Destination for an Existing Fibre Channel Traffic Monitoring Session

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name*** > ***Monitor_Session_Name***.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Actions** area, click **Clear Destination**.

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

Adding Traffic Sources to a Monitoring Session

You can choose multiple sources from more than one source type to be monitored by a traffic monitoring session. The available sources depend on the components configured in the Cisco UCS domain.

Note This procedure describes how to add sources for Ethernet traffic monitoring sessions. To add sources for a Fibre Channel monitoring session, select the **SAN** tab instead of the **LAN** tab in Step 2.

Before You Begin

A traffic monitoring session must be created.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name***.

Step 3 Expand ***Fabric_Interconnect_Name*** and click the monitor session that you want to configure.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Sources** area, expand the section for the type of traffic source that you want to add.

Step 6 To see the components that are available for monitoring, click the + button in the right-hand edge of the table to open the **Add Monitoring Session Source** dialog box.

Step 7 Select a source component and click **OK**.
You can repeat the preceding three steps as needed to add multiple sources from multiple source types.

Step 8 Click **Save Changes**.

What to Do Next

Activate the traffic monitoring session. If the session is already activated, traffic will be forwarded to the monitoring destination when you add a source.

Activating a Traffic Monitoring Session

Note This procedure describes how to activate an Ethernet traffic monitoring session. To activate a Fibre Channel monitoring session, select the **SAN** tab instead of the **LAN** tab in Step 2.

Before You Begin

A traffic monitoring session must be created.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name***.

Step 3 Expand ***Fabric_Interconnect_Name*** and click the monitor session that you want to activate.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Properties** area, click the **enabled** radio button for **Admin State**.

Step 6 Click **Save Changes**.

If a traffic monitoring source is configured, traffic begins to flow to the traffic monitoring destination port.

Deleting a Traffic Monitoring Session

Note This procedure describes how to delete an Ethernet traffic monitoring session. To delete a Fibre Channel monitoring session, select the **SAN** tab instead of the **LAN** tab in Step 2.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **Traffic Monitoring Sessions** > ***Fabric_Interconnect_Name***.

Step 3 Expand ***Fabric_Interconnect_Name*** and click the monitor session that you want to delete.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click the **Delete** icon.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

CHAPTER 46

Monitoring Hardware

This chapter includes the following sections:

Monitoring a Fabric Interconnect

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects**.

Step 3 Click the node for the fabric interconnect that you want to monitor.

Step 4 In the **Work** pane, click one of the following tabs to view the status of the fabric interconnect:

Option	Description
General tab	Provides an overview of the status of the fabric interconnect, including a summary of any faults, a summary of the fabric interconnect properties, and a physical display of the fabric interconnect and its components.

Option	Description
Physical Ports tab	Displays the status of all ports on the fabric interconnect. This tab includes the following subtabs: • **Uplink Ports** tab • **Server Ports** tab • **Fibre Channel Ports** tab • **Unconfigured Ports** tab
Fans tab	Displays the status of all fan modules in the fabric interconnect.
PSUs tab	Displays the status of all power supply units in the fabric interconnect.
Physical Display tab	Provides a graphical view of the fabric interconnect and all ports and other components. If a component has a fault, the fault icon is displayed next to that component.
Faults tab	Provides details of faults generated by the fabric interconnect.
Events tab	Provides details of events generated by the fabric interconnect.
Statistics tab	Provides statistics about the fabric interconnect and its components. You can view these statistics in tabular or chart format.

Monitoring a Chassis

Tip To monitor an individual component in a chassis, expand the node for that component.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Click the chassis that you want to monitor.

Step 4 Click one of the following tabs to view the status of the chassis:

Option	Description
General tab	Provides an overview of the status of the chassis, including a summary of any faults, a summary of the chassis properties, and a physical display of the chassis and its components.

Option	Description
Servers tab	Displays the status and selected properties of all servers in the chassis.
Service Profiles tab	Displays the status of the service profiles associated with servers in the chassis.
IO Modules tab	Displays the status and selected properties of all IO modules in the chassis.
Fans tab	Displays the status of all fan modules in the chassis.
PSUs	Displays the status of all power supply units in the chassis.
Hybrid Display tab	Displays detailed information about the connections between the chassis and the fabric interconnects. The display has an icon for the following: • Each fabric interconnect in the system • The I/O module (IOM) in the selected component, which is shown as an independent unit to make the connection paths easier to see • The selected chassis showing the servers and PSUs
Slots tab	Displays the status of all slots in the chassis.
Installed Firmware tab	Displays the current firmware versions on the IO modules and servers in the chassis. You can also use this tab to update and activate the firmware on those components.
SEL Logs tab	Displays and provides access to the system event logs for the servers in the chassis.
Faults tab	Provides details of faults generated by the chassis.
Events tab	Provides details of events generated by the chassis.
FSM tab	Provides details about and the status of FSM tasks related to the chassis. You can use this information to diagnose errors with those tasks.
Statistics tab	Provides statistics about the chassis and its components. You can view these statistics in tabular or chart format.
Temperatures tab	Provides temperature statistics for the components of the chassis. You can view these statistics in tabular or chart format.
Power tab	Provides power statistics for the components of the chassis. You can view these statistics in tabular or chart format.

Monitoring a Blade Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server that you want to monitor.

Step 4 In the **Work** pane, click one of the following tabs to view the status of the server:

Option	Description
General tab	Provides an overview of the status of the server, including a summary of any faults, a summary of the server properties, and a physical display of the server and its components.

Option	Description
Inventory tab	Provides details about the properties and status of the components of the server on the following subtabs: • **Motherboard—**Information about the motherboard and information about the server BIOS settings. You can also recover corrupt BIOS firmware from this subtab. • **CIMC—**Information about the CIMC and its firmware, and provides access to the SEL for the server. You can also assign a static or pooled management IP address, and update and activate the CIMC firmware from this subtab. • **CPUs—**Information about each CPU in the server. • **Memory—**Information about each memory slot in the server and the DIMM in that slot. • **Adapters—**Information about each adapter installed in the server. • **HBAs—**Properties of each HBA and the configuration of that HBA in the service profile associated with the server. • **NICs—**Properties of each NIC and the configuration of that NIC in the service profile associated with the server. You can expand each row to view information about the associated VIFs and vNICs. • **iSCSI vNICs—**Properties of each iSCSI vNIC and the configuration of that vNIC in the service profile associated with the server. • **Storage—**Properties of the storage controller, the local disk configuration policy in the service profile associated with the server, and for each hard disk in the server. **Tip** If the server contains one or more SATA devices, such as a hard disk drive or solid state drive, Cisco UCS Manager GUI displays the vendor name for the SATA device in the **Vendor** field. However, Cisco UCS Manager CLI displays ATA in the **Vendor** field and includes the vendor information, such as the vendor name, in a **Vendor Description** field. This second field does not exist in Cisco UCS Manager GUI.
Virtual Machines tab	Displays details about any virtual machines hosted on the server.
Installed Firmware tab	Displays the firmware versions on the CIMC, adapters, and other server components. You can also use this tab to update and activate the firmware on those components.
SEL Logs tab	Displays the system event log for the server.
VIF Paths tab	Displays the VIF paths for the adapters on the server.
Faults tab	Displays an overview of the faults generated by the server. You can click any fault to view additional information.

Option	Description
Events tab	Displays an overview of the events generated by the server. You can click any event to view additional information.
FSM tab	Provides details about the current FSM task running on the server, including the status of that task. You can use this information to diagnose errors with those tasks.
Statistics tab	Displays statistics about the server and its components. You can view these statistics in tabular or chart format.
Temperatures tab	Displays temperature statistics for the components of the server. You can view these statistics in tabular or chart format.
Power tab	Displays power statistics for the components of the server. You can view these statistics in tabular or chart format.

Step 5 In the **Navigation** pane, expand ***Server_ID*** > **Adapters** > ***Adapter_ID*** .

Step 6 In the **Work** pane, right-click one or more of the following components of the adapter to open the navigator and view the status of the component:

- Adapters
- DCE interfaces
- HBAs
- NICs

Tip Expand the nodes in the table to view the child nodes. For example, if you expand a NIC node, you can view each VIF created on that NIC.

Monitoring a Rack-Mount Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server that you want to monitor.

Step 4 In the **Work** pane, click one of the following tabs to view the status of the server:

Option	Description
General tab	Provides an overview of the status of the server, including a summary of any faults, a summary of the server properties, and a physical display of the server and its components.

Option	Description
Inventory tab	Provides details about the properties and status of the components of the server on the following subtabs: • **Motherboard—**Information about the motherboard and information about the server BIOS settings. You can also recover corrupt BIOS firmware from this subtab. • **CIMC—**Information about the CIMC and its firmware, and provides access to the SEL for the server. You can also assign a static or pooled management IP address, and update and activate the CIMC firmware from this subtab. • **CPU—**Information about each CPU in the server. • **Memory—**Information about each memory slot in the server and the DIMM in that slot. • **Adapters—**Information about each adapter installed in the server. • **HBAs—**Properties of each HBA and the configuration of that HBA in the service profile associated with the server. • **NICs—**Properties of each NIC and the configuration of that NIC in the service profile associated with the server. You can expand each row to view information about the associated VIFs and vNICs. • **iSCSI vNICs—**Properties of each iSCSI vNIC and the configuration of that vNIC in the service profile associated with the server. • **Storage—**Properties of the storage controller, the local disk configuration policy in the service profile associated with the server, and for each hard disk in the server. **Tip** If the server contains one or more SATA devices, such as a hard disk drive or solid state drive, Cisco UCS Manager GUI displays the vendor name for the SATA device in the **Vendor** field. However, Cisco UCS Manager CLI displays ATA in the **Vendor** field and includes the vendor information, such as the vendor name, in a **Vendor Description** field. This second field does not exist in Cisco UCS Manager GUI.
Virtual Machines tab	Displays details about any virtual machines hosted on the server.
Installed Firmware tab	Displays the firmware versions on the CIMC, adapters, and other server components. You can also use this tab to update and activate the firmware on those components.
SEL Logs tab	Displays the system event log for the server.
VIF Paths tab	Displays the VIF paths for the adapters on the server.
Faults tab	Displays an overview of the faults generated by the server. You can click any fault to view additional information.

Option	Description
Events tab	Displays an overview of the events generated by the server. You can click any event to view additional information.
FSM tab	Provides details about the current FSM task running on the server, including the status of that task. You can use this information to diagnose errors with those tasks.
Statistics tab	Displays statistics about the server and its components. You can view these statistics in tabular or chart format.
Temperatures tab	Displays temperature statistics for the components of the server. You can view these statistics in tabular or chart format.
Power tab	Displays power statistics for the components of the server. You can view these statistics in tabular or chart format.

Step 5 In the **Navigation** pane, expand ***Server_ID*** > **Adapters** > ***Adapter_ID*** .

Step 6 In the **Work** pane, right-click one or more of the following components of the adapter to open the navigator and view the status of the component:

- Adapters
- DCE interfaces
- HBAs
- NICs

Tip Expand the nodes in the table to view the child nodes. For example, if you expand a NIC node, you can view each VIF created on that NIC.

Monitoring an I/O Module

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **IO Modules**.

Step 3 Click the I/O module that you want to monitor.

Step 4 Click one of the following tabs to view the status of the I/O module:

Option	Description
General tab	Provides an overview of the status of the I/O module, including a summary of any faults, a summary of the module properties, and a physical display of the module and its components.

Option	Description
Fabric Ports tab	Displays the status and selected properties of all fabric ports in the I/O module.
Backplane Ports tab	Displays the status and selected properties of all backplane ports in the I/O module.
Faults tab	Provides details of faults generated by the I/O module.
Events tab	Provides details of events generated by the I/O module.
FSM tab	Provides details about and the status of FSM tasks related to the I/O module. You can use this information to diagnose errors with those tasks.
Statistics tab	Provides statistics about the I/O module and its components. You can view these statistics in tabular or chart format.

Monitoring Management Interfaces

Management Interfaces Monitoring Policy

This policy defines how the mgmt0 Ethernet interface on the fabric interconnect should be monitored. If Cisco UCS detects a management interface failure, a failure report is generated. If the configured number of failure reports is reached, the system assumes that the management interface is unavailable and generates a fault. By default, the management interfaces monitoring policy is disabled.

If the affected management interface belongs to a fabric interconnect which is the managing instance, Cisco UCS confirms that the subordinate fabric interconnect's status is up, that there are no current failure reports logged against it, and then modifies the managing instance for the endpoints.

If the affected fabric interconnect is currently the primary inside of a high availability setup, a failover of the management plane is triggered. The data plane is not affected by this failover.

You can set the following properties related to monitoring the management interface:

- Type of mechanism used to monitor the management interface.
- Interval at which the management interface's status is monitored.
- Maximum number of monitoring attempts that can fail before the system assumes that the management is unavailable and generates a fault message.

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Important In the event of a management interface failure on a fabric interconnect, the managing instance may not change if one of the following occurs:

- A path to the endpoint through the subordinate fabric interconnect does not exist.
- The management interface for the subordinate fabric interconnect has failed.
- The path to the endpoint through the subordinate fabric interconnect has failed.

Configuring the Management Interfaces Monitoring Policy

Procedure

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

Step 2 In the **Admin** tab, expand **All** > **Communication Management**.

Step 3 Click **Management Interfaces**.

Step 4 In the **Work** pane, click the **Management Interfaces Monitoring Policy** tab.

Step 5 Complete the following fields:

Name	Description
Admin Status field	Whether the monitoring policy is enabled or disabled for the management interfaces.
Poll Interval field	The number of seconds Cisco UCS should wait between data recordings. Enter an integer between 90 and 300.
Max Fail Report Count field	The maximum number of monitoring attempts that can fail before Cisco UCS assumes that the management interface is unavailable and generates a fault message. Enter an integer between 2 and 5.

Name	Description
Monitoring Mechanism field	The type of monitoring you want Cisco UCS to use. This can be one of the following: • **Mii Status—**Cisco UCS monitors the availability of the Media Independent Interface (MII). If you select this option, Cisco UCS Manager GUI displays the **Media Independent Interface Monitoring** area. • **Ping Arp Targets—**Cisco UCS pings designated targets using the Address Resolution Protocol (ARP). If you select this option, Cisco UCS Manager GUI displays the **ARP Target Monitoring** area. • **Ping Gateway—**Cisco UCS pings the default gateway address specified for this Cisco UCS domain on the **Management Interfaces** tab. If you select this option, Cisco UCS Manager GUI displays the **Gateway Ping Monitoring** area.

Step 6 If you chose **Mii Status** for the monitoring mechanism, complete the following fields in the **Media Independent Interface Monitoring** area:

Name	Description
Retry Interval field	The number of seconds Cisco UCS should wait before requesting another response from the MII if a previous attempt fails. Enter an integer between 3 and 10.
Max Retry Count field	The number of times Cisco UCS polls the MII until the system assumes the interface is unavailable. Enter an integer between 1 and 3.

Step 7 If you chose **Ping Arp Targets** for the monitoring mechanism, complete the following fields in the **ARP Target Monitoring** area:

Name	Description
Target IP 1 field	The first IP address Cisco UCS pings.
Target IP 2 field	The second IP address Cisco UCS pings.
Target IP 3 field	The third IP address Cisco UCS pings.
Number of ARP Requests field	The number of ARP requests Cisco UCS sends to the target IP addresses. Enter an integer between 1 and 5.

Name	Description
Max Deadline Timeout field	The number of seconds Cisco UCS waits for responses from the ARP targets until the system assumes they are unavailable. Enter an integer between 5 and 15.

Type 0.0.0.0 for an IPv4 address to remove the ARP target or :: for an IPv6 address to remove the N-disc target.

Step 8 If you chose **Ping Gateway** for the monitoring mechanism, complete the following fields in the **Gateway Ping Monitoring** area:

Name	Description
Number of Ping Requests field	The number of times Cisco UCS should ping the gateway. Enter an integer between 1 and 5.
Max Deadline Timeout field	The number of seconds Cisco UCS waits for a response from the gateway until Cisco UCS assumes the address is unavailable. Enter an integer between 5 and 15.

Step 9 Click **Save Changes**.

Server Disk Drive Monitoring

The disk drive monitoring for Cisco UCS provides Cisco UCS Manager with blade-resident disk drive status for supported blade servers in a Cisco UCS domain. Disk drive monitoring provides a unidirectional fault signal from the LSI firmware to Cisco UCS Manager to provide status information.

The following server and firmware components gather, send, and aggregate information about the disk drive status in a server:

- Physical presence sensor—Determines whether the disk drive is inserted in the server drive bay.
- Physical fault sensor—Determines the operability status reported by the LSI storage controller firmware for the disk drive.
- IPMI disk drive fault and presence sensors—Sends the sensor results to Cisco UCS Manager.
- Disk drive fault LED control and associated IPMI sensors—Controls disk drive fault LED states (on/off) and relays the states to Cisco UCS Manager.

Support for Disk Drive Monitoring

Disk drive monitoring only supports certain blade servers and a specific LSI storage controller firmware level.

Supported Cisco UCS Servers

Through Cisco UCS Manager, you can monitor disk drives for the following servers:

- B200 M1/M2 blade server
- B250 M1/M2 blade server

Cisco UCS Manager cannot monitor disk drives in any other blade server or rack-mount server.

Note Disk Drive Monitoring behavior and the CIMC sensor values are not consistent with the storage controller reported device status across various UCS servers. This is observed during various operations such as removing or inserting a storage device, or during rebuild operations.

Storage Controller Firmware Level

The storage controller on a supported server must have LSI 1064E firmware.

Cisco UCS Manager cannot monitor disk drives in servers with a different level of storage controller firmware.

Prerequisites for Disk Drive Monitoring

In addition to the supported servers and storage controller firmware version, you must ensure that the following prerequisites have been met for disk drive monitoring to provide useful status information:

- The drive must be inserted in the server drive bay.
- The server must be powered on.
- The server must have completed discovery.
- The results of the BIOS POST complete must be TRUE.

Viewing the Status of a Disk Drive

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to view the status of the disk drive.

Step 4 In the **Work** pane, click the **Inventory** tab.

Step 5 Click the **Storage** subtab.

Step 6 Click the down arrows to expand the **Disks** bar and view the following fields in the **States** section for each disk drive:

Name	Description
Operability field	The operational state of the disk drive. This can be the following: - **Operable—**The disk drive is operable. - **Inoperable—**The disk drive is inoperable, possibly due to a hardware issue such as bad blocks. - **N/A—**The operability of the disk drive cannot be determined. This could be due to the server or firmware not being support for disk drive monitoring, or because the server is powered off. **Note** The **Operability** field may show the incorrect status for several reasons, such as if the disk is part of a broken RAID set or if the BIOS POST (Power On Self Test) has not completed.
Presence field	The presence of the disk drive, and whether it can be detected in the server drive bay, regardless of its operational state. This can be the following: - **Equipped—**A disk drive can be detected in the server drive bay. - **Missing—**No disk drive can be detected in the server drive bay.

Interpreting the Status of a Monitored Disk Drive

Cisco UCS Manager displays the following properties for each monitored disk drive:

- Operability—The operational state of the disk drive.
- Presence—The presence of the disk drive, and whether it can be detected in the server drive bay, regardless of its operational state.

You need to look at both properties to determine the status of the monitored disk drive. The following table shows the likely interpretations of the property values.

Operability Status	Presence Status	Interpretation
Operable	Equipped	No fault condition. The disk drive is in the server and can be used.

Operability Status	Presence Status	Interpretation
Inoperable	Equipped	Fault condition. The disk drive is in the server, but one of the following could be causing an operability problem: • The disk drive is unusable due to a hardware issue such as bad blocks. • There is a problem with the IPMI link to the storage controller.
N/A	Missing	Fault condition. The server drive bay does not contain a disk drive.
N/A	Equipped	Fault condition. The disk drive is in the server, but one of the following could be causing an operability problem: • The server is powered off. • The storage controller firmware is the wrong version and does not support disk drive monitoring. • The server does not support disk drive monitoring.

Note The **Operability** field may show the incorrect status for several reasons, such as if the disk is part of a broken RAID set or if the BIOS POST (Power On Self Test) has not completed.

Managing Transportable Flash Module and Supercapacitor

LSI storage controllers use a Transportable Flash Module (TFM) powered by a supercapacitor to provide RAID cache protection. With Cisco UCS Manager, you can monitor these components to determine the status of the battery backup unit (BBU). The BBU operability status can be one of the following:

- **Operable—**The BBU is functioning successfully.
- **Inoperable—**The TFM or BBU is missing, or the BBU has failed and needs to be replaced.
- **Degraded—**The BBU is predicted to fail.

TFM and supercap functionality is supported beginning with Cisco UCS Manager Release 2.1(2).

TFM and Supercap Guidelines and Limitations

TFM and Supercap Limitations

- The CIMC sensors for TFM and supercap on the Cisco UCS B420 M3 blade server are not polled by Cisco UCS Manager.
- If the TFM and supercap are not installed on the Cisco UCS B420 M3 blade server, or are installed and then removed from the blade server, no faults are generated.
- If the TFM is not installed on the Cisco UCS B420 M3 blade server, but the supercap is installed, Cisco UCS Manager reports the entire BBU system as absent. You should physically check to see if both the TFM and supercap is present on the blade server.

Supported Cisco UCS Servers for TFM and Supercap

The following Cisco UCS servers support TFM and supercap:

- Cisco UCS B420 M3 blade server
- Cisco UCS C22 M3 rack server
- Cisco UCS C24 M3 rack server
- Cisco UCS C220 M3 rack server
- Cisco UCS C240 M3 rack server
- Cisco UCS C420 M3 rack server

Monitoring RAID Battery Status

This procedure applies only to Cisco UCS servers that support RAID configuration and TFM. If the BBU has failed or is predicted to fail, you should replace the unit as soon as possible.

Procedure

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

Step 2 In the **Equipment** pane, expand **Chassis** > ***Chassis Number*** > **Servers** > ***Server Number***.

Step 3 In the **Work** pane, click the **Inventory** tab.

Step 4 Click the **Storage** subtab to view the **RAID Battery (BBU)** area.

Viewing a RAID Battery Fault

Note This applies only to Cisco UCS servers that support RAID configuration and TFM.

Procedure

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

Step 2 In the **Equipment** pane, expand **Chassis** > ***Chassis Number*** > **Servers** > ***Server Number***.

Step 3 In the **Work** pane, click the **Faults** tab.

Step 4 Select the battery to see more information on its condition.

CHAPTER 47

Configuring Statistics-Related Policies

This chapter includes the following sections:

Configuring Statistics Collection Policies

Statistics Collection Policy

A statistics collection policy defines how frequently statistics are to be collected (collection interval) and how frequently the statistics are to be reported (reporting interval). Reporting intervals are longer than collection intervals so that multiple statistical data points can be collected during the reporting interval, which provides Cisco UCS Manager with sufficient data to calculate and report minimum, maximum, and average values.

For NIC statistics, Cisco UCS Manager displays the average, minimum, and maximum of the change since the last collection of statistics. If the values are 0, there has been no change since the last collection.

Statistics can be collected and reported for the following five functional areas of the Cisco UCS system:

- Adapter—statistics related to the adapters
- Chassis—statistics related to the blade chassis
- Host—this policy is a placeholder for future support
- Port—statistics related to the ports, including server ports, uplink Ethernet ports, and uplink Fibre Channel ports
- Server—statistics related to servers

Note Cisco UCS Manager has one default statistics collection policy for each of the five functional areas. You cannot create additional statistics collection policies and you cannot delete the existing default policies. You can only modify the default policies.

Modifying a Statistics Collection Policy

Note Cisco UCS Manager has one default statistics collection policy for each of the five functional areas. You cannot create additional statistics collection policies and you cannot delete the existing default policies. You can only modify the default policies.

Procedure

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

Step 2 In the **Admin** tab, expand **All** > **Stats Management** > **Stats**.

Step 3 Right-click the policy that you want to modify and select **Modify Collection Policy**.

Step 4 In the **Modify Collection Policy** dialog box, complete the following fields:

Name	Description
Name field	The name of the collection policy. This name is assigned by Cisco UCS and cannot be changed.
Collection Interval field	The length of time the fabric interconnect should wait between data recordings. This can be one of the following: • **30 Seconds** • **1 Minute** • **2 Minutes** • **5 Minutes**

Name	Description
Reporting Interval field	The length of time the fabric interconnect should wait before sending any data collected for the counter to Cisco UCS Manager. This can be one of the following: • **2 Minutes** • **15 Minutes** • **30 Minutes** • **60 Minutes** • **2 Hours** • **4 Hours** • **8 Hours** When this time has elapsed, the fabric interconnect groups all data collected since the last time it sent information to Cisco UCS Manager, and it extracts four pieces of information from that group and sends them to Cisco UCS Manager: • The most recent statistic collected • The average of this group of statistics • The maximum value within this group • The minimum value within this group For example, if the collection interval is set to 1 minute and the reporting interval is 15 minutes, the fabric interconnect collects 15 samples in that 15 minute reporting interval. Instead of sending 15 statistics to Cisco UCS Manager, it sends only the most recent recording along with the average, minimum, and maximum values for the entire group.
States Section	
Current Task field	This field shows the task that is executing on behalf of this component. For details, see the associated **FSM** tab. **Note** If there is no current task, this field is not displayed.

Step 5 Click **OK**.

Configuring Statistics Threshold Policies

Statistics Threshold Policy

A statistics threshold policy monitors statistics about certain aspects of the system and generates an event if the threshold is crossed. You can set both minimum and maximum thresholds. For example, you can configure the policy to raise an alarm if the CPU temperature exceeds a certain value, or if a server is overutilized or underutilized.

These threshold policies do not control the hardware or device-level thresholds enforced by endpoints, such as the CIMC. Those thresholds are burned in to the hardware components at manufacture.

Cisco UCS enables you to configure statistics threshold policies for the following components:

- Servers and server components
- Uplink Ethernet ports
- Ethernet server ports, chassis, and fabric interconnects
- Fibre Channel port

Note You cannot create or delete a statistics threshold policy for Ethernet server ports, uplink Ethernet ports, or uplink Fibre Channel ports. You can only configure the existing default policy.

Creating a Server and Server Component Threshold Policy

Tip This procedure documents how to create a server and server component threshold policy on the **Server** tab. You can also create and configure these threshold policies within the appropriate organization in the **Policies** node on the **LAN** tab, **SAN** tab, and under the **Stats Management** node of the **Admin** tab.

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 **Threshold Policies** and choose **Create Threshold Policy**.

Step 5 In the **Define Name and Description** page of the **Create Threshold Policy** wizard, do the following:

a) Complete 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 ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Owner field	This can be one of the following: • **Local**—This policy is available only to service profiles and service profile templates in this Cisco UCS domain. • **Pending Global**—Control of this policy is being transferred to Cisco UCS Central. Once the transfer is complete, this policy will be available to all Cisco UCS domains registered with Cisco UCS Central. • **Global**—This policy is managed by Cisco UCS Central. Any changes to this policy must be made through Cisco UCS Central.

b) Click **Next**.

Step 6 In the **Threshold Classes** page of the **Create Threshold Policy** wizard, do the following:

a) Click **Add**.
b) In the **Choose Statistics Class** dialog box, choose the statistics class for which you want to configure a custom threshold from the **Stat Class** drop-down list.
c) Click **Next**.

Step 7 In the **Threshold Definitions** page, do the following:

a) Click **Add**.
The **Create Threshold Definition** dialog box opens.
b) From the **Property Type** field, choose the threshold property that you want to define for the class.
c) In the **Normal Value** field, enter the desired value for the property type.
d) In the **Alarm Triggers (Above Normal Value)** fields, check one or more of the following check boxes:

- **Critical**
- **Major**
- **Minor**
- **Warning**
- **Condition**

- **Info**

e) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.

f) In the **Alarm Triggers (Below Normal Value)** fields, check one or more of the following check boxes:

- **Info**
- **Condition**
- **Warning**
- **Minor**
- **Major**
- **Critical**

g) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.

h) Click **Finish Stage**.

i) Do one of the following:

- To define another threshold property for the class, repeat Step 7.
- If you have defined all required properties for the class, click **Finish Stage**.

Step 8 In the **Threshold Classes** page of the **Create Threshold Policy** wizard, do one the following:

- To configure another threshold class for the policy, repeat Steps 6 and 7.
- If you have configured all required threshold classes for the policy, click **Finish**.

Step 9 Click **OK**.

Adding a Threshold Class to an Existing Server and Server Component Threshold Policy

Tip This procedure documents how to add a threshold class to a server and server component threshold policy in the **Server** tab. You can also create and configure these threshold policies within the appropriate organization in the **Policies** node on the **LAN** tab, **SAN** tab, and under the **Stats Management** node of the **Admin** tab.

Procedure

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

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

Step 3 Expand the **Threshold Policies** node.

Step 4 Right-click the policy to which you want to add a threshold class and choose **Create Threshold Class**.

Step 5 In the **Choose Statistics Class** page of the **Create Threshold Class** wizard, do the following:

a) From the **Stat Class** drop-down list, choose the statistics class for which you want to configure a custom threshold.
b) Click **Next**.

Step 6 In the **Threshold Definitions** page, do the following:

a) Click **Add**.
The **Create Threshold Definition** dialog box opens.
b) From the **Property Type** field, choose the threshold property that you want to define for the class.
c) In the **Normal Value** field, enter the desired value for the property type.
d) In the **Alarm Triggers (Above Normal Value)** field, check one or more of the following check boxes:

- **Critical**
- **Major**
- **Minor**
- **Warning**
- **Condition**
- **Info**

e) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.
f) In the **Alarm Triggers (Below Normal Value)** field, check one or more of the following check boxes:

- **Info**
- **Condition**
- **Warning**
- **Minor**
- **Major**
- **Critical**

g) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.
h) Click **Finish Stage**.
i) Do one of the following:

- To define another threshold property for the class, repeat Step 6.
- If you have defined all required properties for the class, click **Finish Stage**.

Step 7 In the **Choose Statistics Class** page of the **Create Threshold Class** wizard, do one the following:

- To configure another threshold class for the policy, repeat Steps 5 and 6.
- If you have configured all required threshold classes for the policy, click **Finish**.

Step 8 Click **OK**.

Deleting a Server and Server Component Threshold Policy

Procedure

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

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

Step 3 Expand the **Threshold Policies** node.

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

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

Adding a Threshold Class to the Uplink Ethernet Port Threshold Policy

Tip You cannot create an uplink Ethernet port threshold policy. You can only modify or delete the default policy.

Procedure

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

Step 2 On the **LAN** tab, expand **LAN** > **LAN Cloud**.

Step 3 Expand the **Threshold Policies** node.

Step 4 Right-click **Thr-policy-default** and choose the **Create Threshold Class**.

Step 5 In the **Choose Statistics Class** page of the **Create Threshold Class** wizard, do the following:

a) From the **Stat Class** drop-down list, choose the statistics class for which you want to configure a custom threshold.
b) Click **Next**.

Step 6 In the **Threshold Definitions** page, do the following:

a) Click **Add**.
The **Create Threshold Definition** dialog box opens.
b) From the **Property Type** field, choose the threshold property that you want to define for the class.
c) In the **Normal Value** field, enter the desired value for the property type.
d) In the **Alarm Triggers (Above Normal Value)** field, check one or more of the following check boxes:

- **Critical**
- **Major**
- **Minor**
- **Warning**
- **Condition**

- **Info**

e) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.

f) In the **Alarm Triggers (Below Normal Value)** field, check one or more of the following check boxes:

- **Info**
- **Condition**
- **Warning**
- **Minor**
- **Major**
- **Critical**

g) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.

h) Click **Finish Stage**.

i) Do one of the following:

- To define another threshold property for the class, repeat Step 6.
- If you have defined all required properties for the class, click **Finish Stage**.

Step 7 In the **Create Threshold Class** page of the **Create Threshold Policy** wizard, do one the following:

- To configure another threshold class for the policy, repeat Steps 5 and 6.
- If you have configured all required threshold classes for the policy, click **Finish**.

Adding a Threshold Class to the Ethernet Server Port, Chassis, and Fabric Interconnect Threshold Policy

Tip You cannot create an Ethernet server port, chassis, and fabric interconnect threshold policy. You can only modify or delete the default policy.

Procedure

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

Step 2 In the **LAN** tab, expand **LAN** > **Internal LAN**.

Step 3 Expand the **Threshold Policies** node.

Step 4 Right-click **Thr-policy-default** and choose the **Create Threshold Class**.

Step 5 In the **Choose Statistics Class** page of the **Create Threshold Class** wizard, do the following:

a) From the **Stat Class** drop-down list, choose the statistics class for which you want to configure a custom threshold.

b) Click **Next**.

Step 6 In the **Threshold Definitions** page, do the following:

a) Click **Add**.
The **Create Threshold Definition** dialog box opens.

b) From the **Property Type** field, choose the threshold property that you want to define for the class.
c) In the **Normal Value** field, enter the desired value for the property type.
d) In the **Alarm Triggers (Above Normal Value)** field, check one or more of the following check boxes:

- **Critical**
- **Major**
- **Minor**
- **Warning**
- **Condition**
- **Info**

e) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.
f) In the **Alarm Triggers (Below Normal Value)** field, check one or more of the following check boxes:

- **Info**
- **Condition**
- **Warning**
- **Minor**
- **Major**
- **Critical**

g) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.
h) Click **Finish Stage**.
i) Do one of the following:

- To define another threshold property for the class, repeat Step 6.
- If you have defined all required properties for the class, click **Finish Stage**.

Step 7 In the **Create Threshold Class** page of the **Create Threshold Policy** wizard, do one the following:

- To configure another threshold class for the policy, repeat Steps 5 and 6.
- If you have configured all required threshold classes for the policy, click **Finish**.

Adding a Threshold Class to the Fibre Channel Port Threshold Policy

You cannot create a Fibre Channel port threshold policy. You can only modify or delete the default policy.

Procedure

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

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

Step 3 Expand the **Threshold Policies** node.

Step 4 Right-click **Thr-policy-default** and choose the **Create Threshold Class**.

Step 5 In the **Choose Statistics Class** page of the **Create Threshold Class** wizard, do the following:

a) From the **Stat Class** drop-down list, choose the statistics class for which you want to configure a custom threshold.

b) Click **Next**.

Step 6 In the **Threshold Definitions** page, do the following:

a) Click **Add**.
The **Create Threshold Definition** dialog box opens.

b) From the **Property Type** field, choose the threshold property that you want to define for the class.

c) In the **Normal Value** field, enter the desired value for the property type.

d) In the **Alarm Triggers (Above Normal Value)** field, check one or more of the following check boxes:

- **Critical**
- **Major**
- **Minor**
- **Warning**
- **Condition**
- **Info**

e) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.

f) In the **Alarm Triggers (Below Normal Value)** field, check one or more of the following check boxes:

- **Info**
- **Condition**
- **Warning**
- **Minor**
- **Major**
- **Critical**

g) In the **Up** and **Down** fields, enter the range of values that should trigger the alarm.

h) Click **Finish Stage**.

i) Do one of the following:

- To define another threshold property for the class, repeat Step 6.
- If you have defined all required properties for the class, click **Finish Stage**.

Step 7 In the **Create Threshold Class** page of the **Create Threshold Policy** wizard, do one the following:

- To configure another threshold class for the policy, repeat Steps 5 and 6.
- If you have configured all required threshold classes for the policy, click **Finish**.

CHAPTER 48

Configuring Call Home

This chapter includes the following sections:

Call Home

Call Home provides an email-based notification for critical system policies. A range of message formats are available for compatibility with pager services or XML-based automated parsing applications. You can use this feature to page a network support engineer, email a Network Operations Center, or use Cisco Smart Call Home services to generate a case with the Technical Assistance Center.

The Call Home feature can deliver alert messages containing information about diagnostics and environmental faults and events.

The Call Home feature can deliver alerts to multiple recipients, referred to as Call Home destination profiles. Each profile includes configurable message formats and content categories. A predefined destination profile is provided for sending alerts to the Cisco TAC, but you also can define your own destination profiles.

When you configure Call Home to send messages, Cisco UCS Manager executes the appropriate CLI **show** command and attaches the command output to the message.

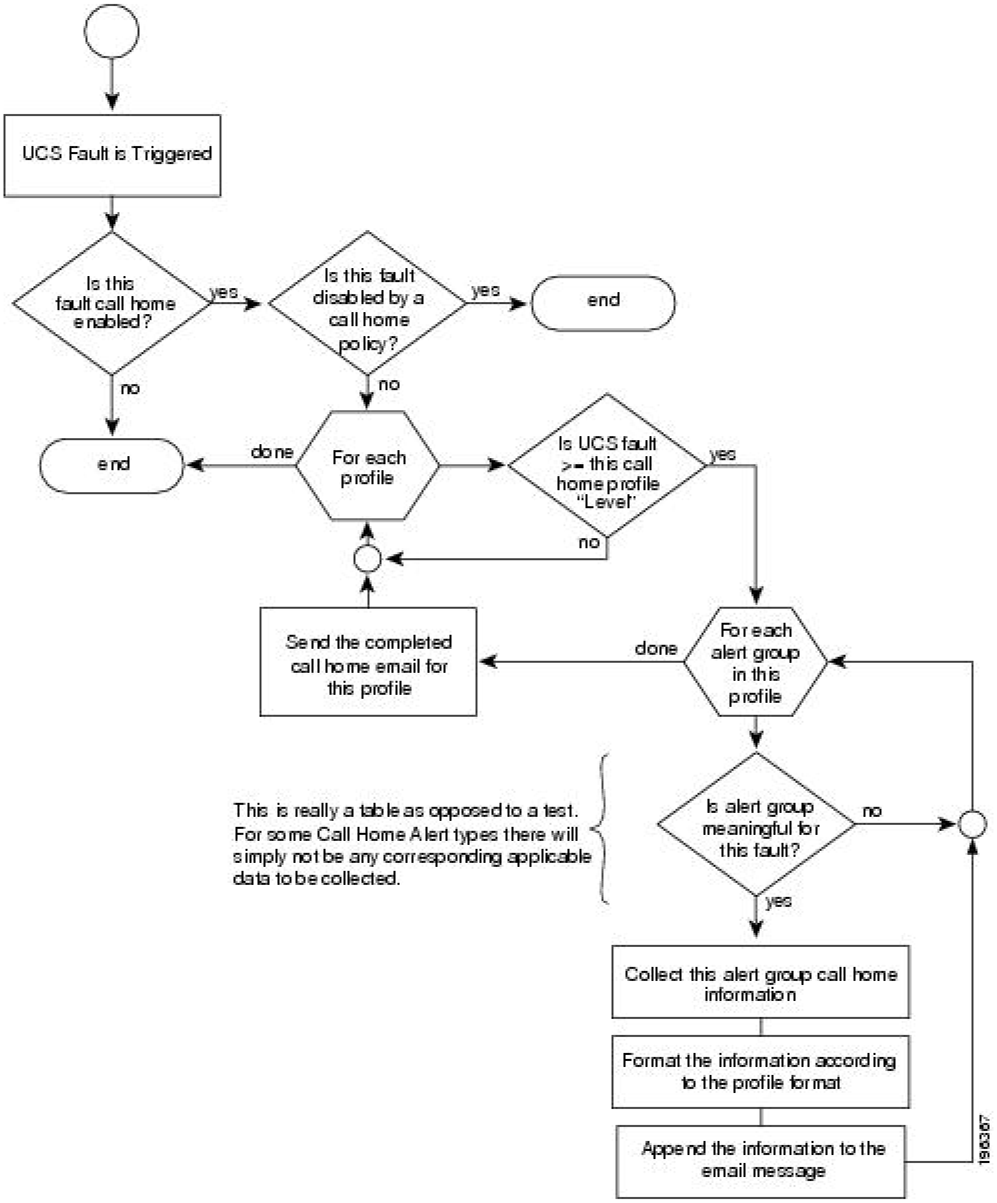
Cisco UCS delivers Call Home messages in the following formats:

- Short text format which provides a one or two line description of the fault that is suitable for pagers or printed reports.
- Full text format which provides fully formatted message with detailed information that is suitable for human reading.
- XML machine readable format that uses Extensible Markup Language (XML) and Adaptive Messaging Language (AML) XML schema definition (XSD). The AML XSD is published on the Cisco.com website. The XML format enables communication with the Cisco Systems Technical Assistance Center.

For information about the faults that can trigger Call Home email alerts, see the *Cisco UCS Faults and Error Messages Reference*.

The following figure shows the flow of events after a Cisco UCS fault is triggered in a system with Call Home configured:

Figure 2: Flow of Events after a Fault is Triggered


UCS Fault is Triggered
Is this fault call home enabled?
yes
no
Is this fault disabled by a call home policy?
yes
end
no
end
done
For each profile
Is UCS fault >= this call home profile "Level"
yes
no
Send the completed call home email for this profile
done
For each alert group in this profile
This is really a table as opposed to a test. For some Call Home Alert types there will simply not be any corresponding applicable data to be collected.
Is alert group meaningful for this fault?
no
yes
Collect this alert group call home information
Format the information according to the profile format
Append the information to the email message
196367

Call Home Considerations and Guidelines

How you configure Call Home depends on how you intend to use the feature. The information you need to consider before you configure Call Home includes the following:

Destination Profile

You must configure at least one destination profile. The destination profile or profiles that you use depend upon whether the receiving entity is a pager, email, or automated service such as Cisco Smart Call Home.

If the destination profile uses email message delivery, you must specify a Simple Mail Transfer Protocol (SMTP) server when you configure Call Home.

Contact Information

The contact email, phone, and street address information should be configured so that the receiver can determine the origin of messages received from the Cisco UCS domain.

Cisco Smart Call Home sends the registration email to this email address after you send a system inventory to begin the registration process.

If an email address includes special characters, such as # (hash), spaces, or & (ampersand), the email server may not be able to deliver email messages to that address. Cisco recommends that you use email addresses which comply with RFC2821 and RFC2822 and include only 7bit ASCII characters.

IP Connectivity to Email Server or HTTP Server

The fabric interconnect must have IP connectivity to an email server or the destination HTTP server. In a cluster configuration, both fabric interconnects must have IP connectivity. This connectivity ensures that the current, active fabric interconnect can send Call Home email messages. The source of these email messages is always the IP address of a fabric interconnect. The virtual IP address assigned Cisco UCS Manager in a cluster configuration is never the source of the email.

Smart Call Home

If Cisco Smart Call Home is used, the following are required:

- An active service contract must cover the device being configured
- The customer ID associated with the Smart Call Home configuration in Cisco UCS must be the CCO (Cisco.com) account name associated with a support contract that includes Smart Call Home

Cisco UCS Faults and Call Home Severity Levels

Because Call Home is present across several Cisco product lines, Call Home has developed its own standardized severity levels. The following table describes how the underlying Cisco UCS fault levels map to the Call Home severity levels. You need to understand this mapping when you configure the Level setting for Call Home profiles.

Table 11: Mapping of Faults and Call Home Severity Levels

Call Home Severity	Cisco UCS Fault	Call Home Meaning
(9) Catastrophic	N/A	Network-wide catastrophic failure.
(8) Disaster	N/A	Significant network impact.
(7) Fatal	N/A	System is unusable.

Call Home Severity	Cisco UCS Fault	Call Home Meaning
(6) Critical	Critical	Critical conditions, immediate attention needed.
(5) Major	Major	Major conditions.
(4) Minor	Minor	Minor conditions.
(3) Warning	Warning	Warning conditions.
(2) Notification	Info	Basic notifications and informational messages. Possibly independently insignificant.
(1) Normal	Clear	Normal event, signifying a return to normal state.
(0) debug	N/A	Debugging messages.

Cisco Smart Call Home

Cisco Smart Call Home is a web application which leverages the Call Home feature of Cisco UCS. Smart Call Home offers proactive diagnostics and real-time email alerts of critical system events, which results in higher network availability and increased operational efficiency. Smart Call Home is a secure connected service offered by Cisco Unified Computing Support Service and Cisco Unified Computing Mission Critical Support Service for Cisco UCS.

Note Using Smart Call Home requires the following:

- A CCO ID associated with a corresponding Cisco Unified Computing Support Service or Cisco Unified Computing Mission Critical Support Service contract for your company.
- Cisco Unified Computing Support Service or Cisco Unified Computing Mission Critical Support Service for the device to be registered.

You can configure and register Cisco UCS Manager to send Smart Call Home email alerts to either the Smart Call Home System or the secure Transport Gateway. Email alerts sent to the secure Transport Gateway are forwarded to the Smart Call Home System using HTTPS.

Note For security reasons, we recommend using the Transport Gateway option. The Transport Gateway can be downloaded from Cisco.

To configure Smart Call Home, you must do the following:

- Enable the Smart Call Home feature.

- Configure the contact information.
- Configure the email information.
- Configure the SMTP server information.
- Configure the default CiscoTAC-1 profile.
- Send a Smart Call Home inventory message to start the registration process.
- Ensure that the CCO ID you plan to use as the Call Home Customer ID for the Cisco UCS domain has the contract numbers from the registration added to its entitlements. You can update the ID in the account properties under Additional Access in the Profile Manager on CCO.

Configuring Call Home

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Admin** area, complete the following fields to enable Call Home:

Name	Description
State field	This can be one of the following: - **Off—**Call Home is not used for this Cisco UCS domain. - **On—**Cisco UCS generates Call Home alerts based on the Call Home policies and profiles defined in the system. **Note** If this field is set to **On**, Cisco UCS Manager GUI displays the rest of the fields on this tab.
Switch Priority drop-down list	This can be one of the following: - **Alerts** - **Critical** - **Debugging** - **Emergencies** - **Errors** - **Information** - **Notifications** - **Warnings**

Name	Description
Throttling field	Whether the system limits the number of duplicate messages received for the same event. This can be one of the following: • **On—**If the number of duplicate messages sent exceeds 30 messages within a 2-hour time frame, then the system discards further messages for that alert type. • **Off—**The system sends all duplicate messages, regardless of how many are encountered.

a) In the **State** field, click **on**.

Note If this field is set to **On**, Cisco UCS Manager GUI displays the rest of the fields on this tab.

b) From the **Switch Priority** drop-down list, select one of the following levels:

- **Alerts**
- **Critical**
- **Debugging**
- **Emergencies**
- **Errors**
- **Information**
- **Notifications**
- **Warnings**

For a large Cisco UCS deployment with several pairs of fabric interconnects, this field enables you to attach significance to messages from one particular Cisco UCS domain, so that message recipients can gauge the priority of the message. This field may not be as useful for a small Cisco UCS deployment, such as a single Cisco UCS domain.

Step 5 In the **Contact Information** area, complete the following fields with the required contact information:

Name	Description
Contact field	The main Call Home contact person. Enter up to 255 ASCII characters.
Phone field	The telephone number for the main contact. Enter the number in international format, starting with a + (plus sign) and a country code. You can use hyphens but not parentheses.

Name	Description
Email field	The email address for the main contact. Cisco Smart Call Home sends the registration email to this email address. **Note** If an email address includes special characters, such as # (hash), spaces, or & (ampersand), the email server may not be able to deliver email messages to that address. Cisco recommends that you use email addresses which comply with RFC2821 and RFC2822 and include only 7bit ASCII characters.
Address field	The mailing address for the main contact. Enter up to 255 ASCII characters.

Step 6 In the **Ids** area, complete the following fields with the identification information that Call Home should use:

Tip If you are not configuring Smart Call Home, this step is optional.

Name	Description
Customer Id field	The CCO ID that includes the contract numbers for the support contract in its entitlements. Enter up to 510 ASCII characters.
Contract Id field	The Call Home contract number for the customer. Enter up to 510 ASCII characters.
Site Id field	The unique Call Home identification number for the customer site. Enter up to 510 ASCII characters.

Step 7 In the **Email Addresses** area, complete the following fields with email information for Call Home alert messages:

Name	Description
From field	The email address that should appear in the From field on Call Home alert messages sent by the system.
Reply To field	The return email address that should appear in the From field on Call Home alert messages sent by the system.

Step 8 In the **SMTP Server** area, complete the following fields with information about the SMTP server where Call Home should send email messages:

Name	Description
Host field	The IP address or hostname of the SMTP server. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Port field	The port number the system should use to talk to the SMTP server. Enter an integer between 1 and 65535. The default is 25.

Step 9 Click **Save Changes**.

Disabling Call Home

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Admin** area, click **off** in the **State** field.

Note If this field is set to **off**, Cisco UCS Manager hides the rest of the fields on this tab.

Step 5 Click **Save Changes**.

Enabling Call Home

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Admin** area, click **on** in the **State** field.

Note If this field is set to **On**, Cisco UCS Manager GUI displays the rest of the fields on this tab.

Step 5 Click **Save Changes**.

What to Do Next

Ensure that Call Home is fully configured.

Configuring System Inventory Messages

Configuring System Inventory Messages

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **System Inventory** tab.

Step 4 In the **Properties** area, complete the following fields:

Name	Description
Send Periodically field	If this field is set to **On**, Cisco UCS sends the system inventory to the Call Home database. When the information is sent depends on the other fields in this area.
Send Interval field	The number of days that should pass between automatic system inventory data collection. Enter an integer between 1 and 30.
Hour of Day to Send field	The hour that the data should be sent using the 24-hour clock format.
Minute of Hour field	The number of minutes after the hour that the data should be sent.
Time Last Sent field	The date and time the information was last sent. **Note** This field is displayed after the first inventory has been sent.
Next Scheduled field	The date and time for the upcoming data collection. **Note** This field is displayed after the first inventory has been sent.

Step 5 Click **Save Changes**.

Sending a System Inventory Message

Use this procedure if you need to manually send a system inventory message outside of the scheduled messages.

Note The system inventory message is sent only to those recipients defined in CiscoTAC-1 profile.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **System Inventory** tab.

Step 4 In the **Actions** area, click **Send System Inventory Now**.
Cisco UCS Manager immediately sends a system inventory message to the recipient configured for Call Home.

Configuring Call Home Profiles

Call Home Profiles

Call Home profiles determine which alerts are sent to designated recipients. You can configure the profiles to send email alerts for events and faults at a desired severity level and for specific alert groups that represent categories of alerts. You can also use these profiles to specify the format of the alert for a specific set of recipients and alert groups.

Alert groups and Call Home profiles enable you to filter the alerts and ensure that a specific profile only receives certain categories of alerts. For example, a data center may have a hardware team that handles issues with fans and power supplies. This hardware team does not care about server POST failures or licensing issues. To ensure that the hardware team only receives relevant alerts, create a Call Home profile for the hardware team and check only the "environmental" alert group.

By default, you must configure the Cisco TAC-1 profile. However, you can also create additional profiles to send email alerts to one or more alert groups when events occur at the level that you specify and provide the recipients with the appropriate amount of information about those alerts.

For example, you may want to configure two profiles for faults with a major severity:

- A profile that sends an alert to the Supervisor alert group in the short text format. Members of this group receive a one- or two-line description of the fault that they can use to track the issue.
- A profile that sends an alert to the CiscoTAC alert group in the XML format. Members of this group receive a detailed message in the machine readable format preferred by the Cisco Systems Technical Assistance Center.

Call Home Alert Groups

An alert group is a predefined subset of Call Home alerts. Alert groups allow you to select the set of Call Home alerts that you want to send to a predefined or custom Call Home profile. Cisco UCS sends Call Home alerts to e-mail destinations in a destination profile only if that Call Home alert belongs to one of the alert groups associated with that destination profile and if the alert has a Call Home message severity at or above the message severity set in the destination profile

Each alert that Cisco UCS generates fits into a category represented by an alert group. The following table describes those alert groups:

Alert Group	Description
Cisco TAC	All critical alerts from the other alert groups destined for Smart Call Home.
Diagnostic	Events generated by diagnostics, such as the POST completion on a server.
Environmental	Events related to power, fan, and environment-sensing elements such as temperature alarms.
Inventory	Events related to the inventory status that is provided whenever a unit is cold booted, or when field replaceable units (FRUs) are inserted or removed. This alert is considered a noncritical event, and the information is used for status and entitlement
License	Events related to Cisco UCS licenses.
Life Cycle	Events related to the life cycle of the configuration of a Cisco UCS domain.
Linecard	Events related to standard or intelligent switching modules.
Supervisor	Events related to supervisor modules.
Syslog port	Events related to the syslog.
System	Events generated by the failure of a software system that is critical to Cisco UCS.
Test	Test messages.

Creating a Call Home Profile

By default, you must configure the Cisco TAC-1 profile. However, you can also create additional profiles to send email alerts to one or more specified groups when events occur at the level that you specify.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Profiles** tab.

Step 4 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 5 In the **Create Call Home Profile** dialog box, complete the following information fields:

Name	Description
Name field	A user-defined name for this profile. 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.
Level field	Cisco UCS faults that are greater than or equal to this level trigger the profile. This can be one of the following: • **Critical** • **Debug** • **Disaster** • **Fatal** • **Major** • **Minor** • **Normal** • **Notification** • **Warning**
Alert Groups field	The group or groups that are alerted based on this Call Home profile. This can be one or more of the following: • **Cisco Tac—**Cisco TAC recipients • **Diagnostic—**POST completion server failure notification recipients • **Environmental—**Recipients of notifications about problems with PSUs, fans, etc.

Step 6 In the **Email Configuration** area, complete the following fields to configure the email alerts:

Name	Description
Format field	This can be one of the following: • **Xml—**A machine readable format that uses Extensible Markup Language (XML) and Adaptive Messaging Language (AML) XML schema definition (XSD). This format enables communication with the Cisco Systems Technical Assistance Center. • **Full Txt—**A fully formatted message with detailed information that is suitable for human reading. • **Short Txt—**A one or two line description of the fault that is suitable for pagers or printed reports.
Max Message Size field	The maximum message size that is sent to the designated Call Home recipients. Enter an integer between 1 and 5000000. The default is 5000000. For full text and XML messages, the maximum recommended size is 5000000. For short text messages, the maximum recommended size is 100000. For the Cisco TAC alert group, the maximum message size must be 5000000.

Step 7 In the **Recipients** area, do the following to add one or more email recipients for the email alerts:

a) On the icon bar to the right of the table, click **+**.

b) In the **Add Email Recipients** dialog box, enter the email address to which Call Home alerts should be sent in the **Email** field.
After you save this email address, it can be deleted but it cannot be changed.

c) Click **OK**.

Step 8 Click **OK**.

Deleting a Call Home Profile

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Profiles** tab.

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

Step 5 Click **Save Changes**.

Configuring Call Home Policies

Call Home Policies

Call Home policies determine whether or not Call Home alerts are sent for a specific type of fault or system event. By default, Call Home is enabled to send alerts for certain types of faults and system events. However, you can configure Cisco UCS not to process certain types.

To disable alerts for a type of fault or events, you must create a Call Home policy for that type, and you must first create a policy for that type and then disable the policy.

Configuring a Call Home Policy

Tip By default, all Call Home policies are enabled to ensure that email alerts are sent for all critical system events.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 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 5 In the **Create Call Home Policy** dialog box, complete the following fields:

Name	Description
State field	If this field is **Enabled**, the system uses this policy when an error matching the associated cause is encountered. Otherwise, the system ignores this policy even if a matching error occurs. By default, all policies are enabled.
Cause field	The event that triggers the alert. Each policy defines whether an alert is sent for one type of event.

Step 6 Click **OK**.

Step 7 Repeat Steps 6 and 7 if you want to configure a Call Home policy for a different type of fault or event.

Disabling a Call Home Policy

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the policy that you want to disable and choose **Show Navigator**.

Step 5 In the **State** field, click **Disabled**.

Step 6 Click **OK**.

Enabling a Call Home Policy

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the policy that you want to enable and choose **Show Navigator**.

Step 5 In the **State** field, click **Enabled**.

Step 6 Click **OK**.

Deleting a Call Home Policy

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Policies** tab.

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

Step 5 Click **Save Changes**.

Example: Configuring Call Home for Smart Call Home

Configuring Smart Call Home

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **General** tab.

Step 4 In the **Admin** area, do the following to enable Call Home:

a) In the **State** field, click **on**.

Note If this field is set to **On**, Cisco UCS Manager GUI displays the rest of the fields on this tab.

b) From the **Switch Priority** drop-down list, select one of the following urgency levels:

- **Alerts**
- **Critical**
- **Debugging**
- **Emergencies**
- **Errors**
- **Information**
- **Notifications**
- **Warnings**

Step 5 In the **Contact Information** area, complete the following fields with the required contact information:

Name	Description
Contact field	The main Call Home contact person. Enter up to 255 ASCII characters.
Phone field	The telephone number for the main contact. Enter the number in international format, starting with a + (plus sign) and a country code. You can use hyphens but not parentheses.
Email field	The email address for the main contact. Cisco Smart Call Home sends the registration email to this email address. **Note** If an email address includes special characters, such as # (hash), spaces, or & (ampersand), the email server may not be able to deliver email messages to that address. Cisco recommends that you use email addresses which comply with RFC2821 and RFC2822 and include only 7bit ASCII characters.

Name	Description
Address field	The mailing address for the main contact. Enter up to 255 ASCII characters.

Step 6 In the **Ids** area, complete the following fields with the Smart Call Home identification information:

Name	Description
Customer Id field	The CCO ID that includes the contract numbers for the support contract in its entitlements. Enter up to 510 ASCII characters.
Contract Id field	The Call Home contract number for the customer. Enter up to 510 ASCII characters.
Site Id field	The unique Call Home identification number for the customer site. Enter up to 510 ASCII characters.

Step 7 In the **Email Addresses** area, complete the following fields with the email information for Smart Call Home alert messages:

Name	Description
From field	The email address that should appear in the From field on Call Home alert messages sent by the system.
Reply To field	The return email address that should appear in the From field on Call Home alert messages sent by the system.

Step 8 In the **SMTP Server** area, complete the following fields with information about the SMTP server that Call Home should use to send email messages:

Name	Description
Host field	The IP address or hostname of the SMTP server. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Port field	The port number the system should use to talk to the SMTP server. Enter an integer between 1 and 65535. The default is 25.

Step 9 Click **Save Changes**.

Configuring the Default Cisco TAC-1 Profile

The following are the default settings for the CiscoTAC-1 profile:

- Level is normal
- Only the CiscoTAC alert group is selected
- Format is xml
- Maximum message size is 5000000

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **Profiles** tab.

Step 4 Right-click the Cisco TAC-1 profile and choose **Recipient**.

Step 5 In the **Add Email Recipients** dialog box, do the following:

a) In the **Email** field, enter the email address to which Call Home alerts should be sent.
For example, enter callhome@cisco.com.

After you save this email address, it can be deleted but it cannot be changed.

b) Click **OK**.

Configuring System Inventory Messages for Smart Call Home

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **System Inventory** tab.

Step 4 In the **Properties** area, complete the following fields to specify how system inventory messages will be sent to Smart Call Home:

Name	Description
Send Periodically field	If this field is set to **On**, Cisco UCS sends the system inventory to the Call Home database. When the information is sent depends on the other fields in this area.
Send Interval field	The number of days that should pass between automatic system inventory data collection. Enter an integer between 1 and 30.
Hour of Day to Send field	The hour that the data should be sent using the 24-hour clock format.
Minute of Hour field	The number of minutes after the hour that the data should be sent.
Time Last Sent field	The date and time the information was last sent. **Note** This field is displayed after the first inventory has been sent.
Next Scheduled field	The date and time for the upcoming data collection. **Note** This field is displayed after the first inventory has been sent.

Step 5 Click **Save Changes**.

Registering Smart Call Home

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Communication Management** > **Call Home**.

Step 3 In the **Work** pane, click the **System Inventory** tab.

Step 4 In the **Actions** area, click **Send System Inventory Now** to start the registration process.
When Cisco receives the system inventory, a Smart Call Home registration email is sent to the email address that you configured in the **Contact Information** area on the **General** tab.

Step 5 When you receive the registration email from Cisco, do the following to complete registration for Smart Call Home:

a) Click the link in the email.
The link opens the Cisco Smart Call Home portal in your web browser.

b) Log into the Cisco Smart Call Home portal.

c) Follow the steps provided by Cisco Smart Call Home.
After you agree to the terms and conditions, the Cisco Smart Call Home registration for the Cisco UCS domain is complete.

CHAPTER 49

Managing the System Event Log

This chapter includes the following sections:

System Event Log

The system event log (SEL) resides on the CIMC in NVRAM. It records most server-related events, such as over and under voltage, temperature events, fan events, and events from BIOS. The SEL is mainly used for troubleshooting purposes.

The SEL file is approximately 40KB in size, and no further events can be recorded when it is full. It must be cleared before additional events can be recorded.

You can use the SEL policy to backup the SEL to a remote server, and optionally clear the SEL after a backup operation occurs. Backup operations can be triggered based on specific actions, or they can occur at regular intervals. You can also manually backup or clear the SEL.

The backup file is automatically generated. The filename format is sel-*SystemName-ChassisID-ServerID-ServerSerialNumber-Timestamp*; for example, sel-UCS-A-ch01-serv01-QCI12522939-20091121160736.

Viewing the System Event Log for an Individual Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to view the system event log.

Step 4 In the **Work** pane, click the **SEL Logs** tab.
Cisco UCS Manager retrieves the system event log for the server and displays the list of events.

Viewing the System Event Log for the Servers in a Chassis

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis_Name*** .

Step 3 In the **Work** pane, click the **SEL Logs** tab.
Cisco UCS Manager retrieves the system event log for the server and displays the list of events.

Step 4 In the Server table, click the server for which you want to view the system event log.
Cisco UCS Manager retrieves the system event log for the server and displays the list of events.

Configuring the SEL Policy

Procedure

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

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

Step 3 In the **Work** pane, click the **Policies** tab.

Step 4 Click the **SEL Policy** subtab.

Step 5 (Optional) In the **General** area, type a description of the policy in the **Description** field.
The other fields in this area are read-only.

Step 6 In the **Backup Configuration** area, complete the following fields:

Name	Description
Protocol field	The protocol to use when communicating with the remote server. This can be one of the following: • **FTP** • **TFTP** • **SCP** • **SFTP**

Hostname field	The hostname or IP address of the server on which the backup configuration resides. If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
	Note The name of the backup file is generated by Cisco UCS. The name is in the following format:
	`sel-`*`system-name`*`-ch`*`chassis-id`*`-`
	`serv`*`blade-id`*`-`*`blade-serial`*
	`-`*`timestamp`*

Remote Path field	The absolute path to the file on the remote server, if required. If you use SCP, the absolute path is always required. If you use any other protocol, you may not need to specify a remote path if the file resides in the default download folder. For details about how your file server is configured, contact your system administrator.
Backup Interval drop-down list	The time to wait between automatic backups. This can be one of the following: • **Never—**Do not perform any automatic SEL data backups. • **1 Hour** • **2 Hours** • **4 Hours** • **8 Hours** • **24 Hours** • **1 Week** • **1 Month** **Note** If you want the system to create automatic backups, make sure you check the **Timer** check box in the **Action** option box.

Name	Description
Format field	The format to use for the backup file. This can be one of the following: • **Ascii** • **Binary**
Clear on Backup check box	If checked, Cisco UCS clears all system event logs after the backup.
User field	The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP.
Password field	The password for the remote server username. This field does not apply if the protocol is TFTP.
Action option box	For each box that is checked, then the system creates a SEL backup when that event is encountered: • **Log Full—**The log reaches the maximum size allowed. • **On Change of Association—**The association between a server and its service profile changes. • **On Clear—**The user manually clears a system event log. • **Timer—**The time interval specified in the **Backup Interval** drop-down list is reached.
Reset Configuration button	Click this button to reset the background configuration information.

Step 7 Click **Save Changes**.

Managing the System Event Log for a Server

Copying One or More Entries in the System Event Log

This task assumes that you are viewing the system event log for a server from the **SEL Logs** tab for a server or a chassis.

Procedure

Step 1 After Cisco UCS Manager GUI displays the system event log in the **SEL Logs** tab, use your mouse to highlight the entry or entries that you want to copy from the system event log.

Step 2 Click **Copy** to copy the highlighted text to the clipboard.

Step 3 Paste the highlighted text into a text editor or other document.

Printing the System Event Log

This task assumes that you are viewing the system event log for a server from the **SEL Logs** tab for a server or a chassis.

Procedure

Step 1 After Cisco UCS Manager GUI displays the system event log in the **SEL Logs** tab, click **Print**.

Step 2 In the **Print** dialog box, do the following:

a) (Optional) Modify the default printer or any other fields or options.

b) Click **Print**.

Refreshing the System Event Log

This task assumes that you are viewing the system event log for a server from the **SEL Logs** tab for a server or a chassis.

Procedure

After Cisco UCS Manager GUI displays the system event log in the **SEL Logs** tab, click **Refresh**.
Cisco UCS Manager retrieves the system event log for the server and displays the updated list of events.

Manually Backing Up the System Event Log

This task assumes that you are viewing the system event log for a server from the **SEL Logs** tab for a server or a chassis.

Before You Begin

Configure the system event log policy. The manual backup operation uses the remote destination configured in the system event log policy.

Procedure

After Cisco UCS Manager GUI displays the system event log in the **SEL Logs** tab, click **Backup**.
Cisco UCS Manager backs up the system event log to the location specified in the SEL policy.

Manually Clearing the System Event Log

This task assumes that you are viewing the system event log for a server from the **SEL Logs** tab for a server or a chassis.

Procedure

After Cisco UCS Manager GUI displays the system event log in the **SEL Logs** tab, click **Clear**.

Note This action triggers an automatic backup if **Clear** is enabled in the SEL policy **Action** option box.

CHAPTER 50

Configuring Settings for Faults, Events, and Logs

This chapter includes the following sections:

Configuring Settings for the Fault Collection Policy

Global Fault Policy

The global fault policy controls the lifecycle of a fault in a Cisco UCS domain, including when faults are cleared, the flapping interval (the length of time between the fault being raised and the condition being cleared), and the retention interval (the length of time a fault is retained in the system).

A fault in Cisco UCS has the following lifecycle:

1. A condition occurs in the system and Cisco UCS Manager raises a fault. This is the active state.
2. When the fault is alleviated, it enters a flapping or soaking interval that is designed to prevent flapping. Flapping occurs when a fault is raised and cleared several times in rapid succession. During the flapping interval, the fault retains its severity for the length of time specified in the global fault policy.
3. If the condition reoccurs during the flapping interval, the fault returns to the active state. If the condition does not reoccur during the flapping interval, the fault is cleared.
4. The cleared fault enters the retention interval. This interval ensures that the fault reaches the attention of an administrator even if the condition that caused the fault has been alleviated and the fault has not been deleted prematurely. The retention interval retains the cleared fault for the length of time specified in the global fault policy.
5. If the condition reoccurs during the retention interval, the fault returns to the active state. If the condition does not reoccur, the fault is deleted.

Configuring the Global Fault Policy

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Faults, Events, and Audit Log**.

Step 3 Click **Settings**.

Step 4 In the **Work** pane, click the **Global Fault Policy** tab.

Step 5 In the **Global Fault Policy** tab, complete the following fields:

Name	Description
Flapping Interval field	Flapping occurs when a fault is raised and cleared several times in rapid succession. To prevent this, Cisco UCS Manager does not allow a fault to change its state until this amount of time has elapsed since the last state change. If the condition reoccurs during the flapping interval, the fault returns to the active state. If the condition does not reoccur during the flapping interval, the fault is cleared. What happens at that point depends on the setting in the **Clear Action** field. Enter an integer between 5 and 3,600. The default is 10.
Initial Severity field	This can be one of the following: • **Info** • **Condition** • **Warning**
Action on Acknowledgment field	Acknowledged actions are always deleted when the log is cleared. This option cannot be changed.
Clear Action field	The action Cisco UCS Manager takes when a fault is cleared. This can be one of the following: • **Retain**—Cisco UCS Manager GUI displays the **Length of time to retain cleared faults** section. • **Delete**—Cisco UCS Manager immediately deletes all fault messages as soon as they are marked as cleared.
Clear Interval field	Whether Cisco UCS Manager automatically clears faults after a certain length of time. This can be one of the following: • **Never**—Cisco UCS Manager does not automatically clear any faults. • **other**—Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field.

Name	Description
dd:hh:mm:ss field	The number of days, hours, minutes, and seconds that should pass before Cisco UCS Manager automatically marks that fault as cleared. What happens then depends on the setting in the **Clear Action** field.
Length of Time to Retain Cleared Faults Section	
Retention Interval field	If the **Clear Action** field is set to **Retain**, this is the length of time Cisco UCS Manager retains a fault once it is marked as cleared. This can be one of the following: • **Forever**—Cisco UCS Manager leaves all cleared fault messages on the fabric interconnect regardless of how long they have been in the system. • **other**—Cisco UCS Manager GUI displays the **dd:hh:mm:ss** field.
dd:hh:mm:ss field	The number of days, hours, minutes, and seconds that should pass before Cisco UCS Manager deletes a cleared fault message.

Step 6 Click **Save Changes**.

Configuring Fault Suppression

Fault Suppression

Fault suppression allows you to suppress SNMP trap and Call Home notifications during a planned maintenance time. You can create a fault suppression task to prevent notifications from being sent whenever a transient fault is raised or cleared.

Faults remain suppressed until the time duration has expired, or the fault suppression tasks have been manually stopped by the user. After the fault suppression has ended, Cisco UCS Manager will send notifications for any outstanding suppressed faults that have not been cleared.

Fault suppression uses the following:

Fixed Time Intervals or Schedules

You can use the following to specify the maintenance window during which you want to suppress faults.

- Fixed time intervals allow you to create a start time and a duration when fault suppression is active. Fixed time intervals cannot be reused.
- Schedules are used for one time occurrences or recurring time periods and can be saved and reused.

Suppression Policies

These policies define which causes and types of faults you want to suppress. Only one policy can be assigned to a task. The following policies are defined by Cisco UCS Manager:

- **default-chassis-all-maint—**Suppresses faults for the chassis and all components installed into the chassis, including all blade servers, power supplies, fan modules, and IOMs.

  This policy applies only to chassis.

- **default-chassis-phys-maint—**Suppresses faults for the chassis and all fan modules and power supplies installed into the chassis.

  This policy applies only to chassis.

- **default-fex-all-maint—**Suppresses faults for the FEX and all power supplies, fan modules, and IOMs in the FEX.

  This policy applies only to FEXes.

- **default-fex-phys-maint—**Suppresses faults for the FEX and all fan modules and power supplies in the FEX.

  This policy applies only to FEXes.

- **default-server-maint—**Suppresses faults for blade servers and/or rack servers.

  This policy applies to chassis, organizations, and service profiles.

  Note When applied to a chassis, only blade servers are affected.

- **default-iom-maint—**Suppresses faults for IOMs in a chassis or FEX.

  This policy applies only to chassis, FEXes, and IOMs.

Suppression Tasks

You can use these tasks to connect the schedule or fixed time interval and the suppression policy to a component.

Note After you create a suppression task, you can edit the fixed time interval or schedule of the task in both the Cisco UCS Manager GUI and Cisco UCS Manager CLI. However, you can only change between using a fixed time interval and using a schedule in the Cisco UCS Manager CLI.

Viewing Suppressed Faults

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Faults, Events, and Audit Log**.

Step 3 Click **Faults**.

Step 4 In the **Work** pane, choose the **suppressed** icon in the **Show:** field.
To view only the suppressed faults, deselect the other icons in the **Show:** field.

Configuring Fault Suppression for a Chassis

Configuring Fault Suppression Tasks for a Chassis

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Click the chassis for which you want to create a fault suppression task.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Start Fault Suppression**.

Tip To configure fault suppression tasks for multiple chassis, use the Ctrl key to select multiple chassis in the **Navigation** pane. Right-click one of the selected chassis and choose **Start Fault Suppression**.

Step 6 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.

Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval**—Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule**—Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	Choose the suppression policy from the drop-down list: • **default-chassis-all-maint**—Suppresses faults for the chassis and all components installed into the chassis, including all blade servers, power supplies, fan modules, and IOMs. • **default-chassis-phys-maint**—Suppresses faults for the chassis and all fan modules and power supplies installed into the chassis. • **default-server-maint**—Suppresses faults for blade servers and/or rack servers. **Note** When applied to a chassis, only blade servers are affected. • **default-iom-maint**—Suppresses faults for IOMs in a chassis or FEX.

Step 7 Click **OK**.

Deleting Fault Suppression Tasks for a Chassis

This procedure deletes all fault suppression tasks for a chassis. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for a Chassis, on page 759.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Click the chassis for which you want to delete all fault suppression tasks.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Stop Fault Suppression**.

Tip To delete fault suppression tasks for multiple chassis, use the Ctrl key to select multiple chassis in the **Navigation** pane. Right-click one of the selected chassis and choose **Stop Fault Suppression**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Viewing Fault Suppression Tasks for a Chassis

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis**.

Step 3 Click the chassis for which you want to view fault suppression task properties.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Configuring Fault Suppression for an I/O Module

Configuring Fault Suppression Tasks for an IOM

Procedure

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

Step 2 (Optional) To select IOM modules in a chassis, on the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **IO Modules**.

Step 3 (Optional) To select IOM modules in a FEX, on the **Equipment** tab, expand **Equipment** > **FEX** > ***FEX Number*** > **IO Modules**.

Step 4 Click the IOM for which you want to create a fault suppression task.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Start Fault Suppression**.

Tip To configure fault suppression tasks for multiple IOMs, use the Ctrl key to select multiple IOMs in the **Navigation** pane. Right-click one of the selected IOMs and choose **Start Fault Suppression**.

You can select IOMs in either chassis, FEXes, or both.

Step 7 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.
Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval—**Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule—**Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	The following suppression policy is selected by default: • **default-iom-maint—**Suppresses faults for IOMs in a chassis or FEX.

Step 8 Click **OK**.

Deleting Fault Suppression Tasks for an IOM

This procedure deletes all fault suppression tasks for an IOM. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for an IOM, on page 761.

Procedure

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

Step 2 (Optional) To select IOM modules in a chassis, on the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **IO Modules**.

Step 3 (Optional) To select IOM modules in a FEX, on the **Equipment** tab, expand **Equipment** > **FEX** > ***FEX Number*** > **IO Modules**.

Step 4 Click the IOM for which you want to delete all fault suppression tasks.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Stop Fault Suppression**.

Tip To delete fault suppression tasks for multiple IOMs, use the Ctrl key to select multiple IOMs in the **Navigation** pane. Right-click one of the selected IOMs and choose **Stop Fault Suppression**.

You can select IOMs in either chassis, FEXes, or both.

Step 7 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Viewing Fault Suppression Tasks for an IOM

Procedure

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

Step 2 (Optional) To select IOM modules in a chassis, on the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **IO Modules**.

Step 3 (Optional) To select IOM modules in a FEX, on the **Equipment** tab, expand **Equipment** > **FEX** > ***FEX Number*** > **IO Modules**.

Step 4 Click the IOM for which you want to view fault suppression task properties.

Step 5 In the **Work** pane, click the **General** tab.

Step 6 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Configuring Fault Suppression for a FEX

Configuring Fault Suppression Tasks for a FEX

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **FEX**.

Step 3 Click the FEX for which you want to create a fault suppression task.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Start Fault Suppression**.

Tip To configure fault suppression tasks for multiple FEXes, use the Ctrl key to select multiple FEXes in the **Navigation** pane. Right-click one of the selected FEXes and choose **Start Fault Suppression**.

Step 6 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.
Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval**—Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule**—Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	Choose the suppression policy from the drop-down list: • **default-fex-all-maint**—Suppresses faults for the FEX and all power supplies, fan modules, and IOMs in the FEX. • **default-fex-phys-maint**—Suppresses faults for the FEX and all fan modules and power supplies in the FEX. • **default-iom-maint**—Suppresses faults for IOMs in a chassis or FEX.

Step 7 Click **OK**.

Viewing Fault Suppression Tasks for a FEX

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **FEX**.

Step 3 Click the FEX for which you want to view fault suppression task properties.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Deleting Fault Suppression Tasks for a FEX

This procedure deletes all fault suppression tasks for a FEX. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for a FEX, on page 763.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **FEX**.

Step 3 Click the FEX for which you want to delete all fault suppression tasks.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Stop Fault Suppression**.

Tip To delete fault suppression tasks for multiple FEXes, use the Ctrl key to select multiple FEXes in the **Navigation** pane. Right-click one of the selected FEXes and choose **Stop Fault Suppression**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Fault Suppression for a Server

Configuring Fault Suppression Tasks for a Blade Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to create a fault suppression task.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Start Fault Suppression**.

Tip To configure fault suppression tasks for multiple blade servers, use the Ctrl key to select multiple blade servers in the **Navigation** pane. Right-click one of the selected servers and choose **Start Fault Suppression**.

Step 6 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.
Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval—**Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule—**Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	The following suppression policy is selected by default: • **default-server-maint—**Suppresses faults for blade servers and/or rack servers.

Step 7 Click **OK**.

Configuring Fault Suppression Tasks for a Rack Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server for which you want to create a fault suppression task.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Start Fault Suppression**.

Tip To configure fault suppression tasks for multiple rack servers, use the Ctrl key to select multiple rack servers in the **Navigation** pane. Right-click one of the selected servers and choose **Start Fault Suppression**.

Step 6 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.
Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval—**Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule—**Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	The following suppression policy is selected by default: • **default-server-maint—**Suppresses faults for blade servers and/or rack servers.

Step 7 Click **OK**.

Deleting Fault Suppression Tasks for a Blade Server

This procedure deletes all fault suppression tasks for a blade server. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for a Blade Server, on page 767.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to delete all fault suppression tasks.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Stop Fault Suppression**.

Tip To delete fault suppression tasks for multiple blade servers, use the Ctrl key to select multiple blade servers in the **Navigation** pane. Right-click one of the selected servers and choose **Stop Fault Suppression**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting Fault Suppression Tasks for a Rack Server

This procedure deletes all fault suppression tasks for a rack server. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for a Rack Server, on page 767.

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server for which you want to delete all fault suppression tasks.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Stop Fault Suppression**.

Tip To delete fault suppression tasks for multiple rack servers, use the Ctrl key to select multiple rack servers in the **Navigation** pane. Right-click one of the selected servers and choose **Stop Fault Suppression**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Viewing Fault Suppression Tasks for a Blade Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Chassis** > ***Chassis Number*** > **Servers**.

Step 3 Click the server for which you want to view fault suppression task properties.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Viewing Fault Suppression Tasks for a Rack Server

Procedure

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

Step 2 On the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**.

Step 3 Click the server for which you want to view fault suppression task properties.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Configuring Fault Suppression for a Service Profile

Configuring Fault Suppression Tasks for a 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 Click the service profile for which you want to create a fault suppression task.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Start Fault Suppression**.

Tip To configure fault suppression tasks for multiple service profiles, use the Ctrl key to select multiple service profiles in the **Navigation** pane. Right-click one of the selected service profiles and choose **Start Fault Suppression**.

Step 6 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.
Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval**—Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule**—Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	The following suppression policy is selected by default: • **default-server-maint**—Suppresses faults for blade servers and/or rack servers.

Step 7 Click **OK**.

Deleting Fault Suppression Tasks for a Service Profile

This procedure deletes all fault suppression tasks for a service profile. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for a Service Profile, on page 769.

Procedure

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

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

Step 3 Click the service profile for which you want to delete all fault suppression tasks.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Stop Fault Suppression**.

Tip To delete fault suppression tasks for multiple service profiles, use the Ctrl key to select multiple service profiles in the **Navigation** pane. Right-click one of the selected service profiles and choose **Stop Fault Suppression**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Viewing Fault Suppression Tasks for a 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 Click the service profile for which you want to view fault suppression task properties.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Configuring Fault Suppression for an Organization

Configuring Fault Suppression Tasks for an Organization

Procedure

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

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

Step 3 Click the organization for which you want to create a fault suppression task.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Start Fault Suppression**.

Step 6 In the **Start Fault Suppression** dialog box, complete the following fields:

Name field	The name of the fault suppression task. 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.
Select Fixed Time Interval/Schedule field	When the fault suppression task will run. This can be one of the following: • **Fixed Time Interval**—Choose this option to specify the start time and duration for the fault suppression task. Specify the day and time the fault suppression task should start in the **Start Time** field. Click the down arrow at the end of this field to select the start time from a pop-up calendar. Specify the length of time this task should run in the **Task Duration** field. To specify that this task should run until it is manually stopped, enter 00:00:00:00 in this field. • **Schedule**—Choose this option to configure the start time and duration using a pre-defined schedule. Choose the schedule from the **Schedule** drop-down list. To create a new schedule, click **Create Schedule**.
Policy drop-down list	The following suppression policy is selected by default: • **default-server-maint**—Suppresses faults for blade servers and/or rack servers.

Step 7 Click **OK**.

Deleting Fault Suppression Tasks for an Organization

This procedure deletes all fault suppression tasks for an organization. To delete individual tasks, use the **Delete** button on the **Suppression Tasks** dialog box. See Viewing Fault Suppression Tasks for an Organization, on page 771.

Procedure

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

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

Step 3 Click the organization for which you want to delete all fault suppression tasks.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Stop Fault Suppression**.

Step 6 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Viewing Fault Suppression Tasks for an Organization

Procedure

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

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

Step 3 Click the organization for which you want to view fault suppression task properties.

Step 4 In the **Work** pane, click the **General** tab.

Step 5 In the **Actions** area, click **Suppression Task Properties**.
In the **Suppression Tasks** dialog box, you can add new fault suppression tasks, delete existing fault suppression tasks, or modify existing fault suppression tasks.

Configuring Settings for the Core File Exporter

Core File Exporter

Cisco UCS uses the Core File Exporter to export core files as soon as they occur to a specified location on the network through TFTP. This functionality allows you to export the tar file with the contents of the core file.

Configuring the Core File Exporter

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Faults, Events, and Audit Log**.

Step 3 Click **Settings**.

Step 4 In the **Work** pane, click the **TFTP Core Exporter** tab.

Step 5 On the **TFTP Core Exporter** tab, complete the following fields:

Name	Description
Admin State field	This can be one of the following: • **Enabled**—If an error causes the server to perform a core dump, Cisco UCS sends the core dump file via FTP to a given location. When this option is selected, Cisco UCS Manager GUI displays the other fields in this area that enable you to specify the FTP export options. • **Disabled**—Core dump files are not automatically exported.

Name	Description
Description field	A user-defined description of the core file. Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), > (greater than), < (less than), or ' (single quote).
Port field	The port number to use when exporting the core dump file via TFTP.
Hostname field	The hostname or IP address to connect with via TFTP. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.
Path field	The path to use when storing the core dump file on the remote system.

Step 6 Click **Save Changes**.

Disabling the Core File Exporter

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Faults, Events, and Audit Log**.

Step 3 Click **Settings**.

Step 4 In the **Work** pane, click the **Settings** tab.

Step 5 In the **TFTP Core Exporter** area, click the **disabled** radio button in the **Admin State** field.

Step 6 Click **Save Changes**.

Configuring the Syslog

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Faults, Events, and Audit Log**.

Step 3 Click **Syslog**.

Step 4 In the **Work** pane, click the **Syslog** tab.

Step 5 In the **Local Destinations** area, complete the following fields:

Name	Description
Console Section	
Admin State field	Whether Cisco UCS displays Syslog messages on the console. This can be one of the following: • **Enabled—**Syslog messages are displayed on the console as well as added to the log. • **Disabled—**Syslog messages are added to the log but not displayed on the console.
Level field	If this option is **enabled**, select the lowest message level that you want displayed. Cisco UCS displays that level and above on the console. This can be one of the following: • **Emergencies** • **Alerts** • **Critical**
Monitor Section	
Admin State field	Whether Cisco UCS displays Syslog messages on the monitor. This can be one of the following: • **Enabled—**Syslog messages are displayed on the monitor as well as added to the log. • **Disabled—**Syslog messages are added to the log but not displayed on the monitor. If **Admin State** is enabled, Cisco UCS Manager GUI displays the rest of the fields in this section.

Name	Description
Level drop-down list	If this option is **enabled**, select the lowest message level that you want displayed. The system displays that level and above on the monitor. This can be one of the following: • **Emergencies** • **Alerts** • **Critical** • **Errors** • **Warnings** • **Notifications** • **Information** • **Debugging**
File Section	
Admin State field	Whether Cisco UCS stores messages in a system log file on the fabric interconnect. This can be one of the following: • **Enabled—**Messages are saved in the log file. • **Disabled—**Messages are not saved. If **Admin State** is enabled, Cisco UCS Manager GUI displays the rest of the fields in this section.
Level drop-down list	Select the lowest message level that you want the system to store. Cisco UCS stores that level and above in a file on the fabric interconnect. This can be one of the following: • **Emergencies** • **Alerts** • **Critical** • **Errors** • **Warnings** • **Notifications** • **Information** • **Debugging**

Name	Description
Name field	The name of the file in which the messages are logged. This name can be up to 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period). The default is messages.
Size field	The maximum size, in bytes, the file can be before Cisco UCS Manager begins to write over the oldest messages with the newest ones. Enter an integer between 4096 and 4194304.

Step 6 In the **Remote Destinations** area, complete the following fields to configure up to three external logs that can store messages generated by the Cisco UCS components:

Name	Description
Admin State field	This can be one of the following: • **Enabled** • **Disabled** If **Admin State** is enabled, Cisco UCS Manager GUI displays the rest of the fields in this section.
Level drop-down list	Select the lowest message level that you want the system to store. The system stores that level and above in the remote file. This can be one of the following: • **Emergencies** • **Alerts** • **Critical** • **Errors** • **Warnings** • **Notifications** • **Information** • **Debugging**
Hostname field	The hostname or IP address on which the remote log file resides. **Note** If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to **local**, configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to **global**, configure a DNS server in Cisco UCS Central.

Name	Description
Facility drop-down list	This can be one of the following: • **Local0** • **Local1** • **Local2** • **Local3** • **Local4** • **Local5** • **Local6** • **Local7**

Step 7 In the **Local Sources** area, complete the following fields:

Name	Description
Faults Admin State field	If this field is **Enabled**, Cisco UCS logs all system faults.
Audits Admin State field	If this field is **Enabled**, Cisco UCS logs all audit log events.
Events Admin State field	If this field is **Enabled**, Cisco UCS logs all system events.

Step 8 Click **Save Changes**.

Viewing the Audit Logs

You can view, export, print or refresh the audit logs displayed on this **Audit Logs** page.

Procedure

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

Step 2 On the **Admin** tab, expand **All** > **Faults, Events, and Audit Log**.

Step 3 Click **Audit Logs**.

Step 4 The **Work** pane displays the audit logs.

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