



## **Cisco UCS Manager CLI Configuration Guide, Release 1.4**

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## Preface

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This preface includes the following sections:

- [Audience, page xxix](#)
- [New and Changed Information for this Release, page xxix](#)
- [Organization, page xxxii](#)
- [Conventions, page xxxiii](#)
- [Related Documentation, page xxxiv](#)
- [Documentation Feedback , page xxxiv](#)
- [Obtaining Documentation and Submitting a Service Request , page xxxiv](#)

## 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

## 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 *Release Notes for Cisco UCS Manager* available through the [Cisco UCS B-Series Servers Documentation Roadmap](#).

**Table 1: New Features**

<b>Feature</b>	<b>Description</b>	<b>Where Documented</b>
Server BIOS setting enhancements	Enables you to configure additional BIOS settings.	<a href="#">Configuring Server-Related Policies, on page 295</a>
Chassis level power capping	Enables you to set power capping at the chassis level.	<a href="#">Managing Power in Cisco UCS, on page 401</a>
Deferred deployment of service profile changes	Enables you to schedule the deployment of service profile changes that cause the associated server to reboot.	<a href="#">Deferring Deployment of Service Profile Updates, on page 363</a>
Fibre Channel switching support	Enables you to configure the Fibre Channel switching mode for the fabric interconnects.	<a href="#">Configuring the Fabric Interconnects, on page 51</a>
Firmware upgrade enhancements	Adds support for the new method of releasing firmware bundles.	<a href="#">Managing Firmware, on page 159</a>
LDAP enhancements	Provides enhancements to the LDAP integration, including support for LDAP groups.	<a href="#">Configuring Authentication, on page 107</a>
MAC address synchronization	Enhances failover in a cluster configuration by replicating MAC addresses on both the primary and the secondary fabric interconnects.	<a href="#">System Configuration Type, on page 52</a>
Management IP address enhancements	Enables you to configure a static or pooled management IP address on a server and in the service profile associated with a server.	<a href="#">Setting the Management IP Address, on page 287</a>
Multiple simultaneous authorizations	Enables you to configure Cisco UCS Manager to use more than one primary authentication database to authorize remote user logins.	<a href="#">Configuring Authentication, on page 107</a>
Port and port channel types	Adds support for additional types of ports and port channels, including Fibre Channel storage ports, Fibre Channel over Ethernet storage ports, appliance ports for network-attached storage, and Fibre Channel port channels.	<a href="#">Configuring Ports, on page 65</a>
Private VLAN	Enables you to configure private VLANs in the Cisco UCS instance.	<a href="#">Configuring VLANs, on page 227</a>

Feature	Description	Where Documented
Rack-mount server integration	Enables you to integrate and manage Cisco UCS C-series rack-mount servers with Cisco UCS Manager.	<a href="#">Managing Rack-Mount Servers, on page 479</a> Information about how to integrate these servers is available in the hardware installation guide for each server.
SNMP enhancements	Enhances support for SNMP monitoring.	<a href="#">Configuring Communication Services, on page 87</a>
System monitoring documentation enhancements	Enables you to find all documentation related to system monitoring in one part of the configuration guide.	<a href="#">System Monitoring, on page 511</a>
Traffic Monitoring	Provides support for traffic monitoring through SPAN functionality.	<a href="#">Monitoring Traffic, on page 513</a>

**Table 2: Significant Changes in the April 2011 Release**

Feature	Description	Where Documented
Changes to UCS Manager Configuration Guide document versioning	Cisco UCS Manager Configuration Guide, version 1.4 includes version 1.4(1) information as well as all changes from subsequent maintenance releases.	<a href="#">Preface, on page ?</a>
Link to new "Cisco 6100 Series Configuration Limits for Cisco UCS Manager, Release 1.4" document	Enables you to navigate from the Cisco UCS Manager Configuration Guides to the "Cisco 6100 Series Configuration Limits for Cisco UCS Manager, Release 1.4" documentation.	<a href="#">Initial System Setup, on page 51</a>
Configuring Named VLAN chapter renamed	The chapter previously called "Configuring Named VLANs" is now called "Configuring VLANs."	<a href="#">Configuring VLANs, on page 227</a>
VLAN Port Count Limitations	Provides information about the port count limit and which ports contribute to the VLAN port count.	<a href="#">Configuring VLANs, on page 227</a>
VLAN Port Count	Enables you to view the VLAN port count for a fabric interconnect.	<a href="#">Configuring VLANs, on page 227</a>
Change to the range of reserved VLAN IDs	VLAN ID 4048 is now reserved.	<a href="#">Configuring VLANs, on page 227</a>

Feature	Description	Where Documented
LDAP documentation enhancements	Enhancements to existing information for user attributes and configuring LDAP providers.	<a href="#">Configuring Authentication, on page 107</a>
Chassis renumbering	Enables you to renumber chassis.	<a href="#">Managing the Chassis, on page 463</a>

# Organization

This document includes the following parts:

Part	Title	Description
Part 1	Introduction	Contains chapters that provide an overview of Cisco Unified Computing System (Cisco UCS) and Cisco UCS Manager.
Part 2	System Configuration	Contains chapters that describe how to configure fabric interconnects, ports, communication services, primary authentication, and role-based access control configuration, and how to manage firmware and the Capability Catalog on a system.
Part 3	Network Configuration	Contains chapters that describe how to configure named VLANs, LAN pin groups, MAC pools, and Quality of Service (QoS).
Part 4	Storage Configuration	Contains chapters that describe how to configure named VSANs, SAN pin groups, and WWN pools.
Part 5	Server Configuration	Contains chapters that describe how to configure server-related policies, server-related pools, service profiles, and server power usage.
Part 6	System Management	Contains chapters that describe how to manage a Cisco UCS instance, including managing the chassis, servers, and I/O modules, and how to back up and restore the configuration.
Part 7	System Monitoring	Contains chapters that describe how to use Cisco UCS Manager to monitor a Cisco UCS instance, including configuring Call Home, monitoring data traffic, monitoring hardware, configuring statistics-related policies, and configuring faults, events, and logs. For more information about Cisco UCS faults and logs, see the <i>Cisco UCS Manager B-Series Troubleshooting Guide</i> and the <i>Cisco UCS Faults and Error Messages Reference</i> .

# Conventions

This document uses the following conventions:

Convention	Indication
<b>bold</b> font	Commands, keywords, GUI elements, and user-entered text appear in <b>bold</b> font.
<i>italic</i> font	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic</i> 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.
courier font	Terminal sessions and information that the system displays appear in <i>courier</i> font.
<>	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*.


**Tip**

Means *the following information will help you solve a problem*.


**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**

Means *reader be warned*. In this situation, you might perform an action that could result in bodily injury.

---

## Related Documentation

### Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to [ucs-docfeedback@external.cisco.com](mailto:ucs-docfeedback@external.cisco.com). We appreciate your feedback.

### Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.



PART

## Introduction

- Overview of Cisco Unified Computing System, page 3
- Overview of Cisco UCS Manager, page 39
- Overview of Cisco UCS Manager CLI, page 43





# CHAPTER 1

## Overview of Cisco Unified Computing System

---

This chapter includes the following sections:

- [About Cisco Unified Computing System , page 3](#)
- [Unified Fabric, page 4](#)
- [Server Architecture and Connectivity, page 6](#)
- [Traffic Management, page 26](#)
- [Opt-In Features, page 30](#)
- [Virtualization in Cisco UCS , page 33](#)

### 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 instance 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 instance 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 instance 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 VN-Link 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 instance.

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 may 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.

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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. However, after you create the profile, it is no longer connected to the template. If you need to make changes to one or more profiles created from this template, you must change each profile individually.

### 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

## Configuration Policies

### 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.



**Important** Changes to a boot policy may 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 auto-triggered.

### Guidelines

When you create a boot policy, you can add one or more of the following to the boot policy and specify their boot order:

Boot type	Description
SAN boot	<p>Boots from an operating system image on the SAN. You can specify a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.</p> <p>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.</p>
LAN boot	Boots from a centralized provisioning server. It is frequently used to install operating systems on a server from that server.
Local disk boot	<p>If the server has a local drive, boots from that drive.</p> <p><b>Note</b> Cisco UCS Manager does not differentiate between the types of local drives. 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 local drives the server should use as the boot drive.</p>
Virtual media boot	Mimics the insertion of a physical CD-ROM disk (read-only) or floppy disk (read-write) into a server. It is typically used to manually install operating systems on a server.

**Note**

The default boot order is as follows:

- 1 Local disk boot
- 2 LAN boot
- 3 Virtual media read-only boot
- 4 Virtual media read-write boot

## **Chassis Discovery Policy**

The chassis discovery policy determines how the system reacts when you add a new chassis. Cisco UCS Manager uses the settings in the chassis discovery policy to determine the minimum threshold for the number of links between the chassis and the fabric interconnect. However, the configuration in the chassis discovery policy does not prevent you from connecting multiple chassis to the fabric interconnects in a Cisco UCS instance and wiring those chassis with a different number of links.

If you have a Cisco UCS instance that has some chassis wired with 1 link, some with 2 links, and some with 4 links, we recommend that you configure the chassis discovery policy for the minimum number links in the instance so that Cisco UCS Manager can discover all chassis. 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 discovery policy. For example, if the chassis 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 discovery policy works in a multi-chassis Cisco UCS instance:

**Table 3: Chassis Discovery Policy and Chassis Links**

<b>Number of Links Wired for the Chassis</b>	<b>1-Link Chassis Discovery Policy</b>	<b>2-Link Chassis Discovery Policy</b>	<b>4-Link Chassis Discovery Policy</b>
<b>1 link between IOM and fabric interconnects</b>	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 1 link.	Chassis cannot be discovered by Cisco UCS Manager and is not added to the Cisco UCS instance.	Chassis cannot be discovered by Cisco UCS Manager and is not added to the Cisco UCS instance.

<b>Number of Links Wired for the Chassis</b>	<b>1-Link Chassis Discovery Policy</b>	<b>2-Link Chassis Discovery Policy</b>	<b>4-Link Chassis Discovery Policy</b>
<b>2 links between IOM and fabric interconnects</b>	<p>Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 1 link.</p> <p>After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.</p>	<p>Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 2 link.</p>	<p>Chassis cannot be discovered by Cisco UCS Manager and is not added to the Cisco UCS instance.</p>
<b>4 links between IOM and fabric interconnects</b>	<p>Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 1 link.</p> <p>After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.</p>	<p>Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 2 links.</p> <p>After initial discovery, reacknowledge the chassis and Cisco UCS Manager recognizes and uses the additional links.</p>	<p>Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 4 link.</p>

## Dynamic vNIC Connection Policy

This policy determines how the VN-link connectivity between VMs and dynamic vNICs is configured. This policy is required for Cisco UCS instances that include servers with virtual interface card adapters on which you have installed VMs and configured dynamic vNICs.



**Note** If you Vmotion a server that is configured with dynamic vNICs, the dynamic interface used by the vNICs fails and Cisco UCS Manager raises a fault to notify you of that failure.

When the server comes back up, Cisco UCS Manager assigns new dynamic vNICs to the server. If you are monitoring traffic on the dynamic vNIC, you must reconfigure the monitoring source.

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Each Dynamic vNIC connection policy must include an adapter policy and designate the number of vNICs that can be configured for any server associated with a service profile that includes the policy.

## 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:

$$\text{Completion Queues} = \text{Transmit Queues} + \text{Receive Queues}$$

$$\text{Interrupt Count} = (\text{Completion Queues} + 2) \text{ rounded up to nearest power of 2}$$

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

$$\text{Completion Queues} = 1 + 8 = 9$$

$$\text{Interrupt Count} = (9 + 2) \text{ rounded up to the nearest power of 2} = 16$$

### **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.

## Host Firmware Package

This policy enables you to specify a set of firmware versions that make up the host firmware package (also known as the host firmware pack). The host firmware includes the following firmware for server and adapter endpoints:

- **Adapter**
- **BIOS**
- **Board Controller**
- **FC Adapters**
- **HBA Option ROM**
- **Storage Controller**

**Tip**

You can include more than one type of firmware in the same host firmware package. For example, a host firmware package can include both BIOS firmware and storage controller firmware or adapter firmware for two different models of adapters. However, you can only have one firmware version with the same type, vendor, and model number. The system recognizes which firmware version is required for an endpoint and ignores all other firmware versions.

The firmware package is pushed to all servers associated with service profiles that include this policy.

This policy ensures that the host firmware is identical on all servers associated with service profiles which use the same policy. Therefore, if you move the service profile from one server to another, the firmware versions are maintained. Also, if you change the firmware version for an endpoint in the firmware package, new versions are applied to all the affected service profiles immediately, which could cause server reboots.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect.

### Prerequisites

This policy is not dependent upon any other policies. However, you must ensure that the appropriate firmware has been downloaded to the fabric interconnect. If the firmware image is not available when Cisco UCS Manager is associating a server with a service profile, Cisco UCS Manager ignores the firmware upgrade and completes the association.

## 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.

### **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 Stripes**—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.
- **RAID 6 Stripes 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.
- **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.
- **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.

### **Management Firmware Package**

This policy enables you to specify a set of firmware versions that make up the management firmware package (also known as a management firmware pack). The management firmware package includes the Cisco Integrated Management Controller (CIMC) on the server. You do not need to use this package if you upgrade the CIMC directly.

The firmware package is pushed to all servers associated with service profiles that include this policy. This policy ensures that the CIMC firmware is identical on all servers associated with service profiles which use the same policy. Therefore, if you move the service profile from one server to another, the firmware versions are maintained.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect.

This policy is not dependent upon any other policies. However, you must ensure that the appropriate firmware has been downloaded to the fabric interconnect.

## 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 end-points.

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.



### 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 end-point through the subordinate fabric interconnect does not exist.
- The management interface for the subordinate fabric interconnect has failed.
- The path to the end-point through the subordinate fabric interconnect has failed.

## Network Control Policy

This policy configures the network control settings for the Cisco UCS instance, including the following:

- Whether the Cisco Discovery Protocol (CDP) is enabled or disabled
- How the VIF behaves if no uplink port is available in end-host mode
- Whether the server can use different MAC addresses when sending packets to the fabric interconnect

The network control policy also determines the action that Cisco UCS Manager takes on the remote Ethernet interface, vEthernet interface , or vFibreChannel interface when the associated border port fails.

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 vFibreChannel 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 vFibreChannel interfaces that are bound to the remote Ethernet interface are brought down as well.

**Note**

Cisco UCS Manager, version 1.4(2) and earlier did not enforce the **Action on Uplink Fail** property for those types of non-VM-FEX capable converged network adapters mentioned above. If the **Action on Uplink Fail** property was set to link-down, Cisco UCS Manager would ignore this setting and instead issue a warning. Therefore, if your implementation includes one of those converged network adapters 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.

Please note that this configuration may result in an Ethernet teaming driver not being able to detect a link failure when the border port goes down.

## 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 that particular blade server. The server is allocated the maximum amount of power that that blade can reach.

**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.

## Power Policy

The power policy is a global policy that specifies the redundancy for power supplies in all chassis in the Cisco UCS instance. 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*.

## 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.

## 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 hardware installation guide for that server.

## 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.

## 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

## 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.

## 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.

## 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 may 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

## vHBA Template

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

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

## VM Lifecycle Policy

The VM lifecycle policy determines how long Cisco UCS Manager retains offline VMs and offline dynamic vNICs in its database. If a VM or dynamic vNIC remains offline after that period, Cisco UCS Manager deletes the object from its database.

All virtual machines (VMs) on Cisco UCS servers are managed by vCenter. Cisco UCS Manager cannot determine whether an inactive VM is temporarily shutdown, has been deleted, or is in some other state that renders it inaccessible. Therefore, Cisco UCS Manager considers all inactive VMs to be in an offline state.

Cisco UCS Manager considers a dynamic vNIC to be offline when the associated VM is shutdown, or the link between the fabric interconnect and the I/O module fails. On rare occasions, an internal error can also cause Cisco UCS Manager to consider a dynamic vNIC to be offline.

The default VM and dynamic vNIC retention period is 15 minutes. You can set that for any period of time between 1 minute and 7200 minutes (or 5 days).



### Note

The VMs that Cisco UCS Manager displays are for information and monitoring only. You cannot manage VMs through Cisco UCS Manager. Therefore, when you delete a VM from the Cisco UCS Manager database, you do not delete the VM from the server or from vCenter.

## 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.

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.

## vNIC/vHBA Placement Policies

vNIC/vHBA placement policies are used to determine what types of vNICs or vHBAs can be assigned to the physical adapters on a server. Each vNIC/vHBA placement policy contains four virtual network interface connections (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.

If you do not include a vNIC/vHBA placement policy in the service profile or you use the default configuration for a server with two adapters, Cisco UCS Manager defaults to the **All** configuration and equally distributes the vNICs and vHBAs between the adapters.

You can use this policy to assign vNICs or vHBAs to either of the two vCons. Cisco UCS Manager uses the vCon assignment to determine how to assign the vNICs and vHBAs to the physical adapter during service profile association.

- **all**—All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic.
- **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.

## Operational Policies

### Fault Collection Policy

The fault collection policy controls the lifecycle of a fault in a Cisco UCS instance, 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 is cleared if the time between the fault being raised and the condition being cleared is greater than the flapping interval, otherwise, the fault remains raised but its status changes to soaking-clear. 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 fault collection policy.
- 3 If the condition reoccurs during the flapping interval, the fault remains raised and its status changes to flapping. If the condition does not reoccur during the flapping interval, the fault is cleared.
- 4 When a fault is cleared, it is deleted if the clear action is set to delete, or if the fault was previously acknowledged; otherwise, it is retained until either the retention interval expires, or if the fault is acknowledged.
- 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.

### Flow Control Policy

Flow control policies determine whether the uplink Ethernet ports in a Cisco UCS instance 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.

## 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 the 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.

## 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. 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

## 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.

## 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.

## 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.

## 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 pre-assign ranges for servers that will host specific applications. For example, all database servers could be configured within the same range of MAC addresses, UUIDs, and WWNs.

### 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 multi-tenancy 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.

### 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 multi-tenancy, you can use the organizational hierarchy to ensure that MAC pools can only be used by specific applications or business services. Cisco UCS Manager 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.

## 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.

## WWN Pools

A WWN pool is a collection of WWNs for use by the Fibre Channel vHBAs in a Cisco UCS instance. You create separate pools for the following:

- WW node names assigned to the server
- WW port names assigned to the vHBA



### 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 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. For each block or individual WWN, you can assign a boot target.

### 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.

## Management IP Pool

The management IP pool 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 subnet 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.

# 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 instance:

#### 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 have access to the LAN. The number of LAN uplinks should be determined by the aggregate bandwidth needed by all Cisco UCS servers.

FC uplink ports are available on the expansion slots only. You must add more expansion slots to increase number of available FC uplinks. Ethernet uplink ports can exist on the fixed slot and on expansion slots.

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 fabric interconnect. The number of cables determines the number of active uplink ports and the oversubscription ratio. For example, one cable results in 8:1 oversubscription for one I/O module. If two I/O modules are in place, each with one cable, and you have 8 half-width blades, the 8 blades will be sharing two uplinks (one left IOM and one right IOM). This results in 8 blades sharing an aggregate bandwidth of 20 GB of Unified Fabric capacity. If two cables are used, this results in 4:1 oversubscription per IOM (assuming all slots populated with half width blades), and four cables result in 2:1 oversubscription. The lower oversubscription ratio gives you higher performance, but is also more costly as you consume more fabric interconnect ports.

### **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 instance 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

Links on Chassis	Servers Pinned to Link 1	Servers Pinned to Link 2	Servers Pinned to Link 3	Servers Pinned to Link 4
1 link	All server slots	None	None	None
2 links	Slots 1, 3, 5, and 7	Slots 2, 4, 6, and 8	None	None
4 links	Slots 1 and 5	Slots 2 and 6	Slots 3 and 7	Slots 4 and 8

#### 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.

Fabric Interconnect Configured in vNIC	Server Traffic Path
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 instance. 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 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 instance.

Each system class reserves a specific segment of the bandwidth for a specific type of traffic. This 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 4: System Classes**

System Class	Description
Platinum	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.
Gold	
Silver	
Bronze	All properties of these system classes are available for you to assign custom settings and policies.

System Class	Description
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.

## 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 instance 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 instance 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 instance. The personality of the server includes the elements that identify that server and make it unique in the instance. 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 instance 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 instance, 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 instance 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 instance. 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 instance 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.

## Multi-Tenancy

Multi-tenancy allows you to divide up the large physical infrastructure of an instance 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 multi-tenant 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 multi-tenant 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 multi-tenant environment, you can also set up one or more of the following for each organization or for a sub-organization in the same hierarchy:

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

### If You Opt In to Multi-Tenancy

Each Cisco UCS instance is divided into several distinct organizations. The types of organizations you create in a multi-tenancy 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 Multi-Tenancy

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

# Virtualization in Cisco UCS

## Overview of Virtualization

Virtualization allows the creation of multiple virtual machines 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 copying, 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.

## Virtualization in Cisco UCS

Cisco UCS provides hardware-level server virtualization. Hardware-level server virtualization allows a server to be simulated at the physical level and cannot be detected by existing software, including the operating system, drivers, and management tools. If underlying hardware faults require you to recreate the virtual server in another location, the network and existing software remain unaware that the physical server has changed.

Server virtualization allows networks to rapidly adapt to changing business and technical conditions. The lower level integration with the virtualized environment in Cisco UCS improves visibility and control of the virtual machine environment, and enhances the overall agility of the system. In addition, this virtualization ensures that there is no performance penalty or overhead for applications while running.

The virtualized environment available in a Cisco UCS server depends upon the type of adapter installed in the server. For example, a virtual interface card (VIC) adapter provides a unique and flexible virtualized environment and support for virtual machines. The other adapters support the standard integration and virtualized environment with VMware.

## 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

Virtual interface card (VIC) adapters support virtualized environments with VMware. These environments support the standard VMware integration with ESX installed on the server and all virtual machine management performed through the VMware vCenter.

This virtualized adapter supports the following:

- Dynamic vNICs in a virtualized environment with VM software, such as vSphere. This solution enables you to divide a single physical blade server into multiple logical PCIE instances.
- Static vNICs in a single operating system installed on a server.

With a VIC adapter, the solution you choose determines how communication works. This type of adapter supports the following communication solutions:

- Cisco VN-Link in hardware, which is a hardware-based method of handling traffic to and from a virtual machine. Details of how to configure this solution are available in this document.
- Cisco VN-Link in software, which is a software-based method of handling traffic to and from a virtual machine and uses the Nexus 1000v virtual switch. Details of how to configure this solution are available in the Nexus 1000v documentation.
- Single operating system installed on the server without virtualization, which uses the same methods of handling traffic as the other Cisco UCS adapters.

### Cisco VN-Link

Cisco Virtual Network Link (VN-Link) is a set of features and capabilities that enable you to individually identify, configure, monitor, migrate, and diagnose virtual machine interfaces in a way that is consistent with the current network operation models for physical servers. VN-Link literally indicates the creation of a logical link between a vNIC on a virtual machine and a Cisco UCS fabric interconnect. This mapping is the logical equivalent of using a cable to connect a NIC with a network port on an access-layer switch.

### VN-Link in Hardware

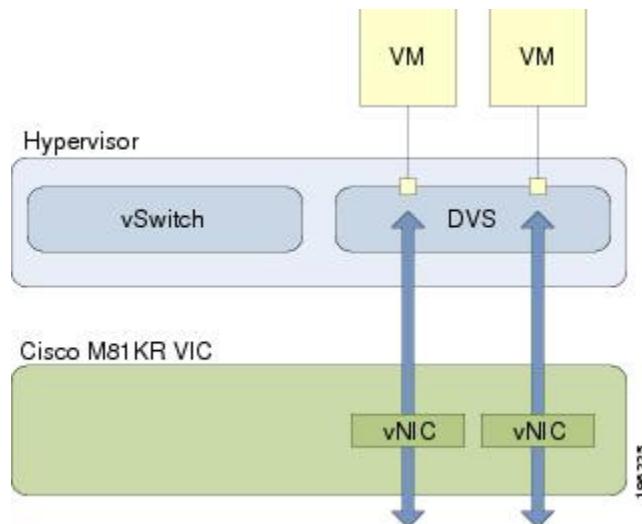
Cisco VN-Link in hardware is a hardware-based method of handling traffic to and from a virtual machine on a server with a VIC adapter. This method is sometimes referred to as pass-through switching. This solution replaces software-based switching with ASIC-based hardware switching and improves performance.

The distributed virtual switch (DVS) framework delivers VN-Link in hardware features and capabilities for virtual machines on Cisco UCS servers with VIC adapters. This approach provides an end-to-end network solution to meet the new requirements created by server virtualization.

With VN-Link in hardware, all traffic to and from a virtual machine passes through the DVS and the hypervisor, and then returns to the virtual machine on the server. Switching occurs in the fabric interconnect (hardware). As a result, network policies can be applied to traffic between virtual machines. This capability provides consistency between physical and virtual servers.

The following figure shows the traffic paths taken by VM traffic on a Cisco UCS server with a VIC adapter:

**Figure 1: Traffic Paths for VM traffic with VN-Link in Hardware**



#### Extension File for Communication with VMware vCenter

For Cisco UCS instances that use VIC adapters to implement VN-Link in hardware, you must create and install an extension file to establish the relationship and communications between Cisco UCS Manager and the VMware vCenter. This extension file is an XML file that contains vital information, including the following:

- Extension key
- Public SSL certificate

If you need to have two Cisco UCS instances share the same set of distributed virtual switches in a vCenter, you can create a custom extension key and import the same SSL certificate in the Cisco UCS Manager for each Cisco UCS instance.

#### Extension Key

The extension key includes the identity of the Cisco UCS instance. By default, this key has the value Cisco UCS GUID, as this value is identical across both fabric interconnects in a cluster configuration.

When you install the extension, vCenter uses the extension key to create a distributed virtual switch (DVS).

#### Public SSL Certificate

Cisco UCS Manager generates a default, self-signed SSL certificate to support communication with vCenter. You can also provide your own custom certificate.

## Custom Extension Files

You can create a custom extension file for a Cisco UCS instance that does not use either or both of the default extension key or SSL certificate. For example, you can create the same custom key in two different Cisco UCS instances when they are managed by the same VMware vCenter instance.


**Important**

You cannot change an extension key that is being used by a DVS or vCenter. If you want to use a custom extension key, we recommend that you create and register the custom key before you create the DVS in Cisco UCS Manager to avoid any possibility of having to delete and recreate the associated DVS.

## Distributed Virtual Switches

Each VMware ESX host has its own software-based virtual switch (vSwitch) in its hypervisor that performs the switching operations between its virtual machines (VMs). The Cisco UCS distributed virtual switch (DVS) is a software-based virtual switch that runs alongside the vSwitch in the ESX hypervisor, and can be distributed across multiple ESX hosts. Unlike vSwitch, which uses its own local port configuration, a DVS associated with multiple ESX hosts uses the same port configuration across all ESX hosts.

After associating an ESX host to a DVS, you can migrate existing VMs from the vSwitch to the DVS, and you can create VMs to use the DVS instead of the vSwitch. With the hardware-based VN-Link implementation, when a VM uses the DVS, all VM traffic passes through the DVS and ASIC-based switching is performed by the fabric interconnect.

In Cisco UCS Manager, DVSes are organized in the following hierarchy:

```
vCenter
  Folder (optional)
    Datacenter
      Folder (required)
        DVS
```

At the top of the hierarchy is the vCenter, which represents a VMware vCenter instance. Each vCenter contains one or more datacenters, and optionally vCenter folders with which you can organize the datacenters. Each datacenter contains one or more required datacenter folders. Datacenter folders contain the DVSes.

## Port Profiles

Port profiles contain the properties and settings used to configure virtual interfaces in Cisco UCS for VN-Link in hardware. The port profiles are created and administered in Cisco UCS Manager. There is no clear visibility into the properties of a port profile from VMware vCenter.

In VMware vCenter, a port profile is represented as a port group. Cisco UCS Manager pushes the port profile names to vCenter, which displays the names as port groups. None of the specific networking properties or settings in the port profile are visible in VMware vCenter.

After a port profile is created, assigned to, and actively used by one or more DVSes, any changes made to the networking properties of the port profile in Cisco UCS Manager are immediately applied to those DVSes.

You must configure at least one port profile client for a port profile, if you want Cisco UCS Manager to push the port profile to VMware vCenter.

## Port Profile Clients

The port profile client determines the DVSes to which a port profile is applied. By default, the port profile client specifies that the associated port profile applies to all DVSes in the vCenter. However, you can configure the client to apply the port profile to all DVSes in a specific datacenter or datacenter folder, or only to one DVS.

## VN-Link in Hardware Considerations

How you configure a Cisco UCS instance for VN-Link in hardware has several dependencies. The information you need to consider before you configure VN-Link in hardware includes the following:

- A Cisco UCS instance can have a maximum of 4 vCenters
- Each vCenter can have a maximum of 8 distributed virtual switches
- Each distributed virtual switch can have a maximum of 4096 ports
- Each port profile can have a maximum of 4096 ports
- Each Cisco UCS instance can have a maximum of 256 port profiles



### Note

The VMware DVS implementation requires that you configure and connect a maximum of two uplinks. To fulfill this configuration requirement, you must create a maximum of two static vNICs in Cisco UCS Manager. These static vNICs only exist to fulfill the VMware vCenter uplinks requirement and do not forward any data traffic.

VMware vCenter cannot support more than two uplinks. If you attempt to create and configure a third static vNIC for VMware vCenter, a configuration error is reported.





# CHAPTER 2

## Overview of Cisco UCS Manager

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This chapter includes the following sections:

- [About Cisco UCS Manager , page 39](#)
- [Tasks You Can Perform in Cisco UCS Manager , page 40](#)
- [Tasks You Cannot Perform in Cisco UCS Manager , page 42](#)
- [Cisco UCS Manager in a High Availability Environment, page 42](#)

## About Cisco UCS Manager

Cisco UCS Manager is the management system for all components in a Cisco UCS instance. 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 instance:

- 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 instance:

- 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 instance. 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 instance.

## Cisco UCS Hardware Management

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

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

### **Server Administration in a Cisco UCS Instance**

A server administrator can use Cisco UCS Manager to perform server management tasks within a Cisco UCS instance, 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 in a Cisco UCS Instance**

A network administrator can use Cisco UCS Manager to perform tasks required to create LAN configuration for a Cisco UCS instance, 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 in a Cisco UCS Instance**

A storage administrator can use Cisco UCS Manager to perform tasks required to create SAN configuration for a Cisco UCS instance, 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 instance

### No Cross-System Management

You cannot use Cisco UCS Manager to manage systems or devices that are outside the Cisco UCS instance 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 3

## Overview of Cisco UCS Manager CLI

---

This chapter includes the following sections:

- [Managed Objects, page 43](#)
- [Command Modes, page 43](#)
- [Object Commands, page 45](#)
- [Complete a Command, page 46](#)
- [Command History, page 46](#)
- [Committing, Discarding, and Viewing Pending Commands, page 46](#)
- [Online Help for the CLI, page 47](#)
- [CLI Session Limits, page 47](#)
- [Web Session Limits, page 47](#)

## Managed Objects

Cisco UCS uses a managed object model, where managed objects are abstract representations of physical or logical entities that can be managed. For example, servers, chassis, I/O cards, and processors are physical entities represented as managed objects, and resource pools, user roles, service profiles, and policies are logical entities represented as managed objects.

Managed objects may have one or more associated properties that can be configured.

## Command Modes

The CLI is organized into a hierarchy of command modes, with the EXEC mode being the highest-level mode of the hierarchy. Higher-level modes branch into lower-level modes. You use `create`, `enter`, and `scope` commands to move from higher-level modes to modes in the next lower level, and you use the `exit` command to move up one level in the mode hierarchy.

**Note**

Most command modes are associated with managed objects, so you must create an object before you can access the mode associated with that object. You use **create** and **enter** commands to create managed objects for the modes being accessed. The **scope** commands do not create managed objects and can only access modes for which managed objects already exist.

Each mode contains a set of commands that can be entered in that mode. Most of the commands available in each mode pertain to the associated managed object. Depending on your assigned role and locale, you may have access to only a subset of the commands available in a mode; commands to which you do not have access are hidden.

The CLI prompt for each mode shows the full path down the mode hierarchy to the current mode. This helps you to determine where you are in the command mode hierarchy, and it can be an invaluable tool when you need to navigate through the hierarchy.

The following table lists the main command modes, the commands used to access each mode, and the CLI prompt associated with each mode.

**Table 5: Main Command Modes and Prompts**

Mode Name	Commands Used to Access	Mode Prompt
EXEC	<b>top</b> command from any mode	#
adapter	<b>scope adapter</b> command from EXEC mode	/adapter #
chassis	<b>scope chassis</b> command from EXEC mode	/chassis #
Ethernet server	<b>scope eth-server</b> command from EXEC mode	/eth-server #
Ethernet uplink	<b>scope eth-uplink</b> command from EXEC mode	/eth-uplink #
fabric-interconnect	<b>scope fabric-interconnect</b> command from EXEC mode	/fabric-interconnect #
Fibre Channel uplink	<b>scope fc-uplink</b> command from EXEC mode	/fc-uplink #
firmware	<b>scope firmware</b> command from EXEC mode	/firmware #
Host Ethernet interface	<b>scope host-eth-if</b> command from EXEC mode	/host-eth-if #
Host Fibre Channel interface	<b>scope host-fc-if</b> command from EXEC mode	/host-fc-if #

Mode Name	Commands Used to Access	Mode Prompt
monitoring	<b>scope monitoring</b> command from EXEC mode	/monitoring #
organization	<b>scope org</b> command from EXEC mode	/org #
security	<b>scope security</b> command from EXEC mode	/security #
server	<b>scope server</b> command from EXEC mode	/server #
service-profile	<b>scope service-profile</b> command from EXEC mode	/service-profile #
system	<b>scope system</b> command from EXEC mode	/system #
virtual HBA	<b>scope vhba</b> command from EXEC mode	/vhba #
virtual NIC	<b>scope vnic</b> command from EXEC mode	/vnic #

## Object Commands

Four general commands are available for object management:

- **create object**
- **delete object**
- **enter object**
- **scope object**

You can use the **scope** command with any managed object, whether a permanent object or a user-instantiated object. The other commands allow you to create and manage user-instantiated objects. For every **create object** command, a corresponding **delete object** and **enter object** command exists.

In the management of user-instantiated objects, the behavior of these commands depends on whether the object exists, as described in the following tables:

**Table 6: Command behavior if the object does not exist**

Command	Behavior
<b>create object</b>	The object is created and its configuration mode, if applicable, is entered.

Command	Behavior
<b>delete object</b>	An error message is generated.
<b>enter object</b>	The object is created and its configuration mode, if applicable, is entered.
<b>scope object</b>	An error message is generated.

**Table 7: Command behavior if the object exists**

Command	Behavior
<b>create object</b>	An error message is generated.
<b>delete object</b>	The object is deleted.
<b>enter object</b>	The configuration mode, if applicable, of the object is entered.
<b>scope object</b>	The configuration mode of the object is entered.

## Complete a Command

You can use the Tab key in any mode to complete a command. Partially typing a command name and pressing Tab causes the command to be displayed in full or to the point where another keyword must be chosen or an argument value must be entered.

## Command History

The CLI stores all commands used in the current session. You can step through the previously used commands by using the Up Arrow or Down Arrow keys. The Up Arrow key steps to the previous command in the history, and the Down Arrow key steps to the next command in the history. If you get to the end of the history, pressing the Down Arrow key does nothing.

All commands in the history can be entered again by simply stepping through the history to recall the desired command and pressing Enter. The command is entered as if you had manually typed it. You can also recall a command and change it before you enter it.

## Committing, Discarding, and Viewing Pending Commands

When you enter a configuration command in the CLI, the command is not applied until you enter the **commit-buffer** command. Until committed, a configuration command is pending and can be discarded by entering a **discard-buffer** command.

You can accumulate pending changes in multiple command modes and apply them together with a single **commit-buffer** command. You can view the pending commands by entering the **show configuration pending** command in any command mode.

**Note**

Committing multiple commands together is not an atomic operation. If any command fails, the successful commands are applied despite the failure. Failed commands are reported in an error message.

While any commands are pending, an asterisk (\*) appears before the command prompt. The asterisk disappears when you enter the **commit-buffer** command, as shown in this example:

```
switch-1# scope chassis 1
switch-1 /chassis # enable locator-led
switch-1 /chassis* # show configuration pending
  scope chassis 1
+   enable locator-led
exit
switch-1 /chassis* # commit-buffer
switch-1 /chassis #
```

## Online Help for the CLI

At any time, you can type the ? character to display the options available at the current state of the command syntax. If you have not typed anything at the prompt, typing ? lists all available commands for the mode you are in. If you have partially typed a command, typing ? lists all available keywords and arguments available at your current position in the command syntax.

## CLI Session Limits

Cisco UCS Manager limits the number of CLI sessions that can be active at one time to 32 total sessions. This value is not configurable.

## 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 from the CLI

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /system/services # <b>scope web-session-limits</b>	Enters system services web session limits mode.
<b>Step 4</b>	UCS-A /system/services/web-session-limits # <b>set total num-of-logins-total</b>	The maximum number of concurrent HTTP and HTTPS sessions allowed for all users within the system.  Enter an integer between 1 and 256.
<b>Step 5</b>	UCS-A /system/services/web-session-limits # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the maximum number of HTTP and HTTPS sessions allowed by the system to 200 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # scope web-session-limits
UCS-A /system/services/web-session-limits* # set total 200
UCS-A /system/services/web-session-limits* # commit-buffer
UCS-A /system/services/web-session-limits #
```



PART



## System Configuration

- Configuring the Fabric Interconnects, page 51
- Configuring Ports, page 65
- Configuring Communication Services, page 87
- Configuring Authentication, page 107
- Configuring Organizations, page 133
- Configuring Role-Based Access Control, page 139
- Managing Firmware, page 159
- Configuring DNS Servers, page 209
- Configuring System-Related Policies, page 211
- Managing Licenses, page 217





# CHAPTER 4

## Configuring the Fabric Interconnects

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This chapter includes the following sections:

- [Initial System Setup, page 51](#)
- [Performing an Initial System Setup for a Standalone Configuration, page 53](#)
- [Initial System Setup for a Cluster Configuration, page 55](#)
- [Enabling a Standalone Fabric Interconnect for Cluster Configuration, page 58](#)
- [Changing the System Name, page 59](#)
- [Changing the Management Subnet of a Cluster, page 59](#)
- [Ethernet Switching Mode, page 60](#)
- [Configuring Ethernet Switching Mode, page 61](#)
- [Fibre Channel Switching Mode, page 62](#)
- [Configuring Fibre Channel Switching Mode, page 62](#)

### Initial System Setup

The first time that you access a fabric interconnect in a Cisco UCS instance, 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 instance 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 may require a third-party tool to support data redundancy.

To use the cluster configuration, the two fabric interconnects must be directly connected 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. This allows 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. The first fabric interconnect to be set up must be enabled for a cluster configuration. Then, when the second fabric interconnect is set up, it detects the first fabric interconnect as a peer fabric interconnect in the cluster.

For more information, refer 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** When the unconfigured system boots, it prompts you for the setup method to be used. Enter **console** to continue the initial setup using the console CLI.
- Step 4** Enter **setup** to continue as an initial system setup.
- Step 5** Enter **y** to confirm that you want to continue the initial setup.
- Step 6** Enter the password for the admin account.
- Step 7** To confirm, re-enter the password for the admin account.
- Step 8** Enter **no** to continue the initial setup for a standalone configuration.
- Step 9** Enter the system name.
- Step 10** Enter the IP address for the management port on the fabric interconnect.
- Step 11** Enter the subnet mask for the management port on the fabric interconnect.
- Step 12** Enter the IP address for the default gateway.
- Step 13** Enter **yes** if you want to specify the IP address for the DNS server, or **no** if you do not.
- Step 14** (Optional) Enter the IP address for the DNS server.
- Step 15** Enter **yes** if you want to specify the default domain name, or **no** if you do not.
- Step 16** (Optional) Enter the default domain name.
- Step 17** Review the setup summary and enter **yes** to save and apply the settings, or enter **no** to go through the Setup wizard again to change some of the settings.  
If you choose to go through the Setup wizard again, it provides the values you previously entered, and the values appear in brackets. To accept previously entered values, press **Enter**.

---

The following example sets up a standalone configuration using the console:

```
Enter the installation method (console/gui)? console
Enter the setup mode (restore from backup or initial setup) [restore/setup]? setup
You have chosen to setup a new switch. Continue? (y/n): y
Enter the password for "admin": adminpassword#958
Confirm the password for "admin": adminpassword#958
Do you want to create a new cluster on this switch (select 'no' for standalone setup or if
you want this switch to be added to an existing cluster)? (yes/no) [n]: no
Enter the system name: foo
Mgmt0 IPv4 address: 192.168.10.10
Mgmt0 IPv4 netmask: 255.255.255.0
IPv4 address of the default gateway: 192.168.10.1
Configure the DNS Server IPv4 address? (yes/no) [n]: yes
    DNS IPv4 address: 20.10.20.10
Configure the default domain name? (yes/no) [n]: yes
    Default domain name: domainname.com
Following configurations will be applied:
    Switch Fabric=A
    System Name=foo
    Management IP Address=192.168.10.10
    Management IP Netmask=255.255.255.0
    Default Gateway=192.168.10.1
    DNS Server=20.10.20.10
    Domain Name=domainname.com
Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no): yes
```

# Initial System Setup for a Cluster Configuration

## Performing an Initial System Setup for the First Fabric Interconnect

### Before You Begin

- 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.

- 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

- 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** When the unconfigured system boots, it prompts you for the setup method to be used. Enter **console** to continue the initial setup using the console CLI.
- Step 4** Enter **setup** to continue as an initial system setup.
- Step 5** Enter **y** to confirm that you want to continue the initial setup.
- Step 6** Enter the password for the admin account.
- Step 7** To confirm, re-enter the password for the admin account.
- Step 8** Enter **yes** to continue the initial setup for a cluster configuration.
- Step 9** Enter the fabric interconnect fabric (either **A** or **B**).
- Step 10** Enter the system name.
- Step 11** Enter the IP address for the management port on the fabric interconnect.
- Step 12** Enter the subnet mask for the management port on the fabric interconnect.
- Step 13** Enter the IP address for the default gateway.
- Step 14** Enter the virtual IP address.
- Step 15** Enter **yes** if you want to specify the IP address for the DNS server, or **no** if you do not.
- Step 16** (Optional) Enter the IP address for the DNS server.
- Step 17** Enter **yes** if you want to specify the default domain name, or **no** if you do not.
- Step 18** (Optional) Enter the default domain name.
- Step 19** Review the setup summary and enter **yes** to save and apply the settings, or enter **no** to go through the Setup wizard again to change some of the settings.  
If you choose to go through the Setup wizard again, it provides the values you previously entered, and the values appear in brackets. To accept previously entered values, press **Enter**.

---

The following example sets up the first fabric interconnect for a cluster configuration using the console:

```

Enter the installation method (console/gui)? console
Enter the setup mode (restore from backup or initial setup) [restore/setup]? setup
You have chosen to setup a new switch. Continue? (y/n): y
Enter the password for "admin": adminpassword%958
Confirm the password for "admin": adminpassword%958
Do you want to create a new cluster on this switch (select 'no' for standalone setup or if
you want this switch to be added to an existing cluster)? (yes/no) [n]: yes
Enter the switch fabric (A/B): A
Enter the system name: foo
Mgmt0 IPv4 address: 192.168.10.10
Mgmt0 IPv4 netmask: 255.255.255.0
IPv4 address of the default gateway: 192.168.10.1
Virtual IPv4 address : 192.168.10.12
Configure the DNS Server IPv4 address? (yes/no) [n]: yes
    DNS IPv4 address: 20.10.20.10
Configure the default domain name? (yes/no) [n]: yes
    Default domain name: domainname.com
Following configurations will be applied:
    Switch Fabric=A
    System Name=foo
    Management IP Address=192.168.10.10
    Management IP Netmask=255.255.255.0
    Default Gateway=192.168.10.1
    Cluster Enabled=yes
    Virtual Ip Address=192.168.10.12
    DNS Server=20.10.20.10
    Domain Name=domainname.com
Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no): yes
```

## Performing an Initial System Setup for the Second Fabric Interconnect

### Before You Begin

**1** Verify the following physical connections on the fabric interconnect:

- A console port on the second 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:

- Password for the admin account of the peer fabric interconnect. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
- Management port IP address in the same subnet as the peer fabric interconnect.

### 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** When the unconfigured system boots, it prompts you for the setup method to be used. Enter **console** to continue the initial setup using the console CLI.

**Note** The fabric interconnect should detect the peer fabric interconnect in the cluster. If it does not, check the physical connections between the L1 and L2 ports, and verify that the peer fabric interconnect has been enabled for a cluster configuration.

**Step 4** Enter **y** to add the subordinate fabric interconnect to the cluster.

**Step 5** Enter the admin password of the peer fabric interconnect.

**Step 6** Enter the IP address for the management port on the subordinate fabric interconnect.

**Step 7** Review the setup summary and enter **yes** to save and apply the settings, or enter **no** to go through the Setup wizard again to change some of the settings.

If you choose to go through the Setup wizard again, it provides the values you previously entered, and the values appear in brackets. To accept previously entered values, press **Enter**.

The following example sets up the second fabric interconnect for a cluster configuration using the console:

```
Enter the installation method (console/gui)? console
Installer has detected the presence of a peer switch. This switch will be added to the
cluster. Continue?[y/n] y
Enter the admin password of the peer switch: adminpassword%958
Mgmt0 IPv4 address: 192.168.10.11
Management Ip Address=192.168.10.11
Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no): yes
```

## Enabling a Standalone Fabric Interconnect for Cluster Configuration

You can add a second fabric interconnect to an existing Cisco UCS instance that uses a single standalone fabric interconnect. To do this, you must enable the standalone fabric interconnect for cluster operation, and then add the second fabric interconnect to the cluster.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>connect local-mgmt</b>	Enters local management mode.
<b>Step 2</b>	UCS-A(local-mgmt) # <b>enable cluster ip-addr</b>	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 <b>yes</b> to confirm.

The following example enables a standalone fabric interconnect with IP address 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.

## Changing the System Name

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A # <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>set name name</b>	Sets the system name.
<b>Step 3</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The name is updated on both fabric interconnects within about 30 seconds after the transaction is committed.

The following example changes the system name and commits the transaction:

```
UCS-A# scope system
UCS-A /system* # set name SanJose5
UCS-A /system* # commit-buffer
UCS-A /system #
```

## Changing the Management Subnet of a Cluster

When changing the management subnet in a cluster configuration, you must change the following three IP addresses simultaneously and you must configure all three in the same subnet:

- Management port IP address for fabric interconnect A
- Management port IP address for fabric interconnect B
- Cluster IP (virtual IP) address

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fabric-interconnect a</b>	Enters fabric interconnect mode for fabric A.
<b>Step 2</b>	UCS-A /fabric-interconnect # <b>set out-of-band ip ip-address netmask netmask gw gateway-ip-address</b>	Sets the IP address, netmask, and gateway IP address of the fabric interconnect.
<b>Step 3</b>	UCS-A /fabric-interconnect # <b>scope fabric-interconnect b</b>	Enters fabric interconnect mode for fabric B.
<b>Step 4</b>	UCS-A /fabric-interconnect # <b>set out-of-band ip ip-address netmask netmask gw gateway-ip-address</b>	Sets the IP address, netmask, and gateway IP address of the fabric interconnect.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /fabric-interconnect # <b>scope system</b>	Enters system mode.
<b>Step 6</b>	UCS-A /system # <b>set virtual-ip vip-address</b>	Sets the virtual IP address for the cluster.
<b>Step 7</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction to the system configuration.

When you commit the transaction, you are disconnected from the management session. Reconnect at the new management IP address.

This example changes both fabric-interconnect IP addresses, changes the virtual IP address, and commits the transaction, disconnecting the session:

```
UCS-A# scope fabric-interconnect a
UCS-A /fabric-interconnect # set out-of-band ip 192.0.2.111 netmask 255.255.255.0 gw 192.0.2.1
UCS-A /fabric-interconnect* # scope fabric-interconnect b
UCS-A /fabric-interconnect* # set out-of-band ip 192.0.2.112 netmask 255.255.255.0 gw
192.0.2.1
UCS-A /fabric-interconnect* # scope system
UCS-A /system* # set virtual-ip 192.0.2.113
UCS-A /system* # commit-buffer
```

## 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 is achieved by pinning (either dynamically pinned or hard pinned) vNICs to uplink ports, which provides redundancy toward the network, and makes the uplink ports appear as server ports to the rest of the fabric. When in end-host mode, the fabric interconnect does not run the Spanning Tree Protocol (STP) and 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 L2 aggregation
- Virtual Switching System (VSS) aggregation layer



#### Note

When end-host mode is enabled, if a vNIC is hard pinned to an uplink port and this uplink port goes down, the system cannot re-pin 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 sequentially. The second fabric interconnect can take several minutes to complete the change in Ethernet switching mode and become system ready. The configuration is retained.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>set mode {end-host   switch}</b>	Sets the fabric interconnect to the specified switching mode.
<b>Step 3</b>	UCS-A /eth-uplink # <b>commit-buffer</b>	Commits the transaction to the system configuration. Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager CLI.

The following example sets the fabric interconnect to end-host mode and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # set mode end-host
Warning: When committed, this change will cause the switch to reboot
UCS-A /eth-uplink* # commit-buffer
UCS-A /eth-uplink #
```

## 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 vHBAs. This 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 is the default Fibre Channel Switching mode.



- 
- Note** When end-host mode is enabled, if a vHBA is hard pinned to a uplink Fibre Channel port and this uplink port goes down, the system cannot re-pin 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 system connected directly to storage), or where a SAN exists (with an upstream MDS).



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

Switch mode is not the default Fibre Channel switching mode. Enabling Fibre Channel switching mode requires a license.

## 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.
-

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>set mode {end-host   switch}</b>	Sets the fabric interconnect to the specified switching mode.
<b>Step 3</b>	UCS-A /fc-uplink # <b>commit-buffer</b>	Commits the transaction to the system configuration. Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager CLI.

The following example sets the fabric interconnect to end-host mode and commits the transaction:

```
UCS-A # scope fc-uplink
UCS-A /fc-uplink # set mode end-host
UCS-A /fc-uplink* # commit-buffer
UCS-A /fc-uplink #
```





# CHAPTER 5

## Configuring Ports

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This chapter includes the following sections:

- [Server and Uplink Ports on the Fabric Interconnect, page 65](#)
- [Server Ports, page 66](#)
- [Uplink Ethernet Ports, page 67](#)
- [Appliance Ports, page 69](#)
- [Fibre Channel Storage and FCoE Ports, page 72](#)
- [Uplink Ethernet Port Channels, page 75](#)
- [Appliance Port Channels, page 77](#)
- [Fibre Channel Port Channels, page 82](#)

## Server and Uplink Ports on the Fabric Interconnect

Each 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 instance 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.

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

Each fabric interconnect can include the following types of ports:

### 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:

- Server
- 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 a 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.

# Server Ports

## Configuring a Server Port

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

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-server</b>	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # <b>scope fabric {a   b}</b>	Enters Ethernet server fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-server/fabric # <b>create interface slot-num port-num</b>	Creates an interface for the specified Ethernet server port.
<b>Step 4</b>	UCS-A /eth-server/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an interface for Ethernet server port 12 on slot 1 of fabric B and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server # scope fabric b
UCS-A /eth-server/fabric # create interface 1 12
UCS-A /eth-server/fabric* # commit-buffer
UCS-A /eth-server/fabric #
```

## Unconfiguring a Server Port

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-server</b>	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # <b>scope fabric {a   b}</b>	Enters Ethernet server fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-server/fabric # <b>delete interface slot-num port-num</b>	Deletes the interface for the specified Ethernet server port.
<b>Step 4</b>	UCS-A /eth-server/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example unconfigures Ethernet server port 12 on slot 1 of fabric B and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server # scope fabric b
UCS-A /eth-server/fabric # delete interface 1 12
UCS-A /eth-server/fabric* # commit-buffer
UCS-A /eth-server/fabric #
```

## Uplink Ethernet Ports

### Configuring an Uplink Ethernet Port

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

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters Ethernet uplink fabric mode for the specified fabric.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>create interface</b> <i>slot-num port-num</i>	Creates an interface for the specified Ethernet uplink port.
<b>Step 4</b>	UCS-A /eth-uplink/fabric # <b>set speed</b> {10gbps   1gbps}	(Optional) Sets the speed for the specified Ethernet uplink port. <b>Note</b> The admin speed is configurable for the first eight ports on a 20-port fabric interconnect and the first 16 ports on a 40-port fabric interconnect.
<b>Step 5</b>	UCS-A /eth-uplink/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an interface for Ethernet uplink port 3 on slot 2 of fabric B, sets the speed to 10 gbps, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric b
UCS-A /eth-uplink/fabric # create interface 2 3
UCS-A /eth-uplink/fabric # set speed 10gbps
UCS-A /eth-uplink/fabric* # commit-buffer
UCS-A /eth-uplink/fabric #
```

## Unconfiguring an Uplink Ethernet Port

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric</b> {a   b}	Enters Ethernet uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>delete interface</b> <i>slot-num port-num</i>	Deletes the interface for the specified Ethernet uplink port.
<b>Step 4</b>	UCS-A /eth-uplink/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example unconfigures Ethernet uplink port 3 on slot 2 of fabric B and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric b
UCS-A /eth-uplink/fabric # delete interface 2 3
UCS-A /eth-uplink/fabric* # commit-buffer
UCS-A /eth-uplink/fabric #
```

# Appliance Ports

## Configuring an Appliance Port

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b}</b>	Enters Ethernet storage mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>create interface slot-num port-num</b>	Creates an interface for the specified appliance port.
<b>Step 4</b>	UCS-A /eth-storage/fabric/interface # <b>set portmode {access   trunk}</b>	(Optional) Specifies whether the port mode is access or trunk. By default, the mode is set to trunk.
<b>Step 5</b>	UCS-A /eth-storage/fabric/interface # <b>set pingroupname pin-group name</b>	(Optional) Specifies the appliance pin target to the specified fabric and port, or fabric and port channel.
<b>Step 6</b>	UCS-A /eth-storage/fabric/interface # <b>set prio sys-class-name</b>	(Optional) Specifies the QoS class for the appliance port. By default, the priority is set to best-effort.  The sys-class-name argument can be one of the following class keywords: <ul style="list-style-type: none"><li>• <b>fc</b>—Use this priority for QoS policies that control vHBA traffic only.</li><li>• <b>platinum</b>—Use this priority for QoS policies that control vNIC traffic only.</li><li>• <b>gold</b>—Use this priority for QoS policies that control vNIC traffic only.</li><li>• <b>silver</b>—Use this priority for QoS policies that control vNIC traffic only.</li><li>• <b>bronze</b>—Use this priority for QoS policies that control vNIC traffic only.</li><li>• <b>best-effort</b>—Do not use this priority. It is reserved for the Basic Ethernet traffic lane. If you assign this priority to a QoS policy and configure another system class as CoS 0, Cisco UCS Manager does not default to this system class. It defaults to the priority with CoS 0 for that traffic.</li></ul>

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 7</b>	UCS-A /eth-storage/fabric/interface # set adminspeed {10gbps   1 gbps}	(Optional) Specifies the admin speed for the interface. By default, the admin speed is set to 10gbps.
<b>Step 8</b>	UCS-A /eth-storage/fabric/interface # commit buffer	Commits the transaction to the system configuration.

The following example creates an interface for an appliance port 2 on slot 3 of fabric B, sets the port mode to access, pins the appliance port to a pin group called pingroup1, sets the QoS class to fc, sets the admin speed to 10 gbps, and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric b
UCS-A /eth-storage/fabric # create interface 3 2
UCS-A /eth-storage/fabric* # set portmode access
UCS-A /eth-storage/fabric* # set pingroupname pingroup1
UCS-A /eth-storage/fabric* # set prio fc
UCS-A /eth-storage/fabric* # set adminspeed 10gbps
UCS-A /eth-storage/fabric* # commit-buffer
UCS-A /eth-storage/fabric #
```

### What to Do Next

Assign a VLAN or target MAC address for the appliance port.

## Assigning a Target MAC Address to an Appliance Port or Appliance Port Channel

The following procedure assigns a target MAC address to an appliance port. To assign a target MAC address to an appliance port channel, scope to the port channel instead of the interface.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope eth-storage	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # scope fabric{a   b}	Enters Ethernet storage mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # scope interface <i>slot-id port-id</i>	Enters Ethernet interface mode for the specified interface. <b>Note</b> To assign a target MAC address to an appliance port channel, use the <b>scope port-channel</b> command instead of <b>scope interface</b> .
<b>Step 4</b>	UCS-A /eth-storage/fabric/interface # create eth-target <i>eth-target name</i>	Specifies the name for the specified MAC address target.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /eth-storage/fabric/interface/eth-target # <b>set mac-address</b> <i>mac-address</i>	Specifies the MAC address in nn:nn:nn:nn:nn:nn format.

The following example assigns a target MAC address for an appliance device on port 3, slot 2 of fabric B and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage* # scope fabric b
UCS-A /eth-storage/fabric* # scope interface 2 3
UCS-A /eth-storage/fabric/interface* # create eth-target macname
UCS-A /eth-storage/fabric/interface* # set mac-address 01:23:45:67:89:ab
UCS-A /eth-storage/fabric/interface* # commit-buffer
UCS-A /eth-storage/fabric #
```

The following example assigns a target MAC address for appliance devices on port channel 13 of fabric B and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage* # scope fabric b
UCS-A /eth-storage/fabric* # scope port-channel 13
UCS-A /eth-storage/fabric/port-channel* # create eth-target macname
UCS-A /eth-storage/fabric/port-channel* # set mac-address 01:23:45:67:89:ab
UCS-A /eth-storage/fabric/port-channel* # commit-buffer
UCS-A /eth-storage/fabric #
```

## Unconfiguring an Appliance Port

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A # <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b}</b>	Enters Ethernet storage mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>delete eth-interface</b> <i>slot-num port-num</i>	Deletes the interface for the specified appliance port.
<b>Step 4</b>	UCS-A /eth-storage/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example unconfigures appliance port 3 on slot 2 of fabric B and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric b
UCS-A /eth-storage/fabric # delete eth-interface 2 3
UCS-A /eth-storage/fabric* # commit-buffer
UCS-A /eth-storage/fabric #
```

# Fibre Channel Storage and FCoE Ports

## Configuring a Fibre Channel Storage or FCoE Port

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage mode.
<b>Step 2</b>	UCS-A /fc-storage # <b>scope fabric {a   b}</b>	Enters Fibre Channel storage mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-storage/fabric # <b>create interface {fc   fcoe} slot-num port-num</b>	Creates an interface for the specified Fibre Channel storage port.
<b>Step 4</b>	UCS-A /fc-storage/fabric # <b>commit-buffer</b>	Commits the transaction.

The following example creates an interface for Fibre Channel storage port 10 on slot 2 of fabric A and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage # scope fabric a
UCS-A /fc-storage/fabric* # create interface fc 2 10
UCS-A /fc-storage/fabric # commit-buffer
```

### What to Do Next

Assign a VSAN.

## Unconfiguring a Fibre Channel Storage or FCoE Port

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage mode.
<b>Step 2</b>	UCS-A /fc-storage # <b>scope fabric {a   b}</b>	Enters Fibre Channel storage mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-storage/fabric # <b>delete interface {fc   fcoe} slot-num port-num</b>	Deletes the interface for the specified Fibre Channel or FCoE storage port.
<b>Step 4</b>	UCS-A /fc-storage/fabric # <b>commit-buffer</b>	Commits the transaction.

The following example unconfigures Fibre Channel storage port 10 on slot 2 of fabric A and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage # scope fabric a
UCS-A /fc-storage/fabric* # delete interface fc 2 10
UCS-A /fc-storage/fabric # commit-buffer
```

## Restoring a Fibre Channel Storage Port Back to an Uplink Fibre Channel Port

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope fc-uplink	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # scope fabric {a   b}	Enters Fibre Channel uplink mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-uplink/fabric # create interface <i>slot-num port-num</i>	Creates an interface for the specified Fibre Channel uplink port.
<b>Step 4</b>	UCS-A /fc-uplink/fabric # commit-buffer	Commits the transaction.

The following example creates an interface for Fibre Channel uplink port 10 on slot 2 of fabric A and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric* # create interface 2 10
UCS-A /fc-uplink/fabric # commit-buffer
```

## Default Zoning

Zoning allows you to set up access control between hosts and storage devices. When a zone is configured or the configuration is updated, this information is propagated to all the other switches in the fabric.

In Cisco UCS, the zoning configuration is inherited from an upstream switch. You cannot configure zoning or view information about your zoning configuration through Cisco UCS Manager. The only configurable zoning option in Cisco UCS Manager is whether the default zone in a VSAN (nodes not assigned to any zone) permits or denies access among its members.

When default zoning is **enabled**, all traffic is permitted among members of the default zone.

When default zoning is **disabled**, all traffic is denied among members of the default zone.

Default zoning is applied on a per-VSAN basis. You cannot enable default zoning at the fabric level.



### Note

Default zoned configurations are not recommended for production deployments, which must always use direct connect Fibre Channel topologies with upstream MDS or Nexus 5000 switches.

## Enabling Default Zoning

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage mode.
<b>Step 2</b>	UCS-A /fc-storage# <b>scope vsan vsan-name vsan-id fcoe-id</b>	Enters Fibre Channel storage VSAN mode.
<b>Step 3</b>	UCS-A /fc-storage/vsan# <b>set default-zoning enabled</b>	Enables default zoning. When default zoning is <b>enabled</b> , all traffic is permitted among members of the default zone.
<b>Step 4</b>	UCS-A /fc-storage/vsan# <b>commit-buffer</b>	Commits the transaction.

The following example enables default zoning for a VSAN called accounting with VSAN ID 2112 and FCoE VSAN ID 4021 and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage # scope vsan accounting 2112 4021
UCS-A /fc-storage/vsan # set default-zoning enabled
UCS-A /fc-storage/vsan* # commit-buffer
UCS-A /fc-storage/vsan #
```

## Disabling Default Zoning

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage mode.
<b>Step 2</b>	UCS-A /fc-storage# <b>scope vsan vsan-name vsan-id fcoe-id</b>	Enters Fibre Channel storage VSAN mode.
<b>Step 3</b>	UCS-A /fc-storage/vsan# <b>set default-zoning disabled</b>	Disables default zoning. When default zoning is <b>disabled</b> , all traffic is denied among members of the default zone.
<b>Step 4</b>	UCS-A /fc-storage/vsan# <b>commit-buffer</b>	Commits the transaction.

The following example disables default zoning for a VSAN called accounting with VSAN ID 2112 and FCoE VSAN ID 4021 and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage # scope vsan accounting 2112 4021
UCS-A /fc-storage # set default-zoning disabled
UCS-A /fc-storage* # commit-buffer
UCS-A /fc-storage #
```

# 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.

## Configuring an Uplink Ethernet Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters Ethernet uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>create port-channel port-num</b>	Creates a port channel on the specified Ethernet uplink port, and enters Ethernet uplink fabric port channel mode.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/port-channel # <b>{enable   disable}</b>	(Optional) Enables or disables the administrative state of the port channel. The port channel is disabled by default.
<b>Step 5</b>	UCS-A /eth-uplink/fabric/port-channel # <b>set name port-chan-name</b>	(Optional) Specifies the name for the port channel.
<b>Step 6</b>	UCS-A /eth-uplink/fabric/port-channel # <b>set flow-control-policy policy-name</b>	(Optional) Assigns the specified flow control policy to the port channel.
<b>Step 7</b>	UCS-A /eth-uplink/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a port channel on port 13 of fabric A, sets the name to portchan13a, enables the administrative state, assigns the flow control policy named flow-con-pol432 to the port channel, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
```

```

UCS-A /eth-uplink/fabric # create port-channel 13
UCS-A /eth-uplink/fabric/port-channel* # enable
UCS-A /eth-uplink/fabric/port-channel* # set name portchan13a
UCS-A /eth-uplink/fabric/port-channel* # set flow-control-policy flow-con-pol432
UCS-A /eth-uplink/fabric/port-channel* # commit-buffer
UCS-A /eth-uplink/fabric/port-channel #

```

## Unconfiguring an Uplink Ethernet Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b }</b>	Enters Ethernet uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>delete port-channel <i>port-num</i></b>	Deletes the port channel on the specified Ethernet uplink port.
<b>Step 4</b>	UCS-A /eth-uplink/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example unconfigures the port channel on port 13 of fabric A and commits the transaction:

```

UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # delete port-channel 13
UCS-A /eth-uplink/fabric* # commit-buffer
UCS-A /eth-uplink/fabric #

```

## Adding a Member Port to an Uplink Ethernet Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b }</b>	Enters Ethernet uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>scope port-channel <i>port-num</i></b>	Enters Ethernet uplink fabric port channel mode for the specified port channel.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/port-channel # <b>create member-port <i>slot-num port-num</i></b>	Creates the specified member port from the port channel and enters Ethernet uplink fabric port channel member port mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /eth-uplink/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds the member port on slot 1, port 7 to the port channel on port 13 of fabric A and commits the transaction.

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # scope port-channel 13
UCS-A /eth-uplink/fabric/port-channel # create member-port 1 7
UCS-A /eth-uplink/fabric/port-channel* # commit-buffer
UCS-A /eth-uplink/fabric/port-channel #
```

## Deleting a Member Port from an Uplink Ethernet Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters Ethernet uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>scope port-channel port-num</b>	Enters Ethernet uplink fabric port channel mode for the specified port channel.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/port-channel # <b>delete member-port slot-num port-num</b>	Deletes the specified member port from the port channel.
<b>Step 5</b>	UCS-A /eth-uplink/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a member port from the port channel on port 13 of fabric A and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # scope port-channel 13
UCS-A /eth-uplink/fabric/port-channel # delete member-port 1 7
UCS-A /eth-uplink/fabric/port-channel* # commit-buffer
UCS-A /eth-uplink/fabric/port-channel #
```

## Appliance Port Channels

An appliance port channel allows you to group several physical appliance ports (link aggregation) 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.

**Note**

Cisco UCS uses static mode, not Link Aggregation Control Protocol (LACP), to group the appliance ports into a port channel.

## Configuring an Appliance Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b }</b>	Enters Ethernet storage fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>create port-channel port-num</b>	Creates a port channel on the specified Ethernet storage port, and enters Ethernet storage fabric port channel mode.
<b>Step 4</b>	UCS-A /eth-storage/fabric/port-channel # <b>{enable   disable}</b>	(Optional) Enables or disables the administrative state of the port channel. The port channel is disabled by default.
<b>Step 5</b>	UCS-A /eth-storage/fabric/port-channel # <b>set name port-chan-name</b>	(Optional) Specifies the name for the port channel.
<b>Step 6</b>	UCS-A /eth-storage/fabric/port-channel # <b>set pingroupname pin-group name</b>	(Optional) Specifies the appliance pin target to the specified fabric and port, or fabric and port channel.
<b>Step 7</b>	UCS-A /eth-storage/fabric/port-channel # <b>set portmode {access   trunk}</b>	(Optional) Specifies whether the port mode is access or trunk. By default, the mode is set to trunk.
<b>Step 8</b>	UCS-A /eth-storage/fabric/port-channel # <b>set prio sys-class-name</b>	(Optional) Specifies the QoS class for the appliance port. By default, the priority is set to best-effort.  The sys-class-name argument can be one of the following class keywords: <ul style="list-style-type: none"><li>• <b>fc</b>—Use this priority for QoS policies that control vHBA traffic only.</li><li>• <b>platinum</b>—Use this priority for QoS policies that control vNIC traffic only.</li><li>• <b>gold</b>—Use this priority for QoS policies that control vNIC traffic only.</li></ul>

	<b>Command or Action</b>	<b>Purpose</b>
		<ul style="list-style-type: none"> <li>• <b>silver</b>—Use this priority for QoS policies that control vNIC traffic only.</li> <li>• <b>bronze</b>—Use this priority for QoS policies that control vNIC traffic only.</li> <li>• <b>best-effort</b>—Do not use this priority. It is reserved for the Basic Ethernet traffic lane. If you assign this priority to a QoS policy and configure another system class as CoS 0, Cisco UCS Manager does not default to this system class. It defaults to the priority with CoS 0 for that traffic.</li> </ul>
<b>Step 9</b>	UCS-A /eth-storage/fabric/port-channel # <b>set speed {1gbps   2gbps   4gbps   8gbps   auto}</b>	(Optional) Specifies the speed for the port channel.
<b>Step 10</b>	UCS-A /eth-storage/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a port channel on port 13 of fabric A and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric a
UCS-A /eth-storage/fabric # create port-channel 13
UCS-A /eth-storage/fabric/port-channel* # enable
UCS-A /eth-storage/fabric/port-channel* # set name portchan13a
UCS-A /eth-storage/fabric/port-channel* # set pingroupname pingroup1
UCS-A /eth-storage/fabric/port-channel* # set portmode access
UCS-A /eth-storage/fabric/port-channel* # set prio fc
UCS-A /eth-storage/fabric/port-channel* # set speed 2gbps
UCS-A /eth-storage/fabric/port-channel* # commit-buffer
UCS-A /eth-storage/fabric/port-channel #
```

## Unconfiguring an Appliance Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b }</b>	Enters Ethernet storage fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>delete port-channel port-num</b>	Deletes the port channel from the specified Ethernet storage port.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /eth-storage/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example unconfigures the port channel on port 13 of fabric A and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric a
UCS-A /eth-storage/fabric # delete port-channel 13
UCS-A /eth-storage/fabric* # commit-buffer
UCS-A /eth-storage/fabric #
```

## Enabling or Disabling an Appliance Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b }</b>	Enters Ethernet storage mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>scope port-channel <i>port-chan-name</i></b>	Enters Ethernet storage port channel mode.
<b>Step 4</b>	UCS-A /eth-storage/fabric/port-channel # <b>{enable   disable }</b>	Enables or disables the administrative state of the port channel. The port channel is disabled by default.
<b>Step 5</b>	UCS-A /eth-storage/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables port channel 13 on fabric A and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric a
UCS-A /eth-storage/fabric # scope port-channel 13
UCS-A /eth-storage/fabric/port-channel* # enable
UCS-A /eth-storage/fabric/port-channel* # commit-buffer
UCS-A /eth-storage/fabric/port-channel #
```

## Adding a Member Port to an Appliance Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b}</b>	Enters Ethernet storage fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>scope port-channel port-num</b>	Enters Ethernet storage fabric port channel mode for the specified port channel.
<b>Step 4</b>	UCS-A /eth-storage/fabric/port-channel # <b>create member-port slot-num port-num</b>	Creates the specified member port from the port channel and enters Ethernet storage fabric port channel member port mode.
<b>Step 5</b>	UCS-A /eth-storage/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds the member port on slot 1, port 7 to the port channel on port 13 of fabric A and commits the transaction.

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric a
UCS-A /eth-storage/fabric # scope port-channel 13
UCS-A /eth-storage/fabric/port-channel # create member-port 1 7
UCS-A /eth-storage/fabric/port-channel* # commit-buffer
UCS-A /eth-storage/fabric/port-channel #
```

## Deleting a Member Port from an Appliance Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b}</b>	Enters Ethernet storage fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>scope port-channel port-num</b>	Enters Ethernet storage fabric port channel mode for the specified port channel.
<b>Step 4</b>	UCS-A /eth-storage/fabric/port-channel # <b>delete member-port slot-num port-num</b>	Deletes the specified member port from the port channel.
<b>Step 5</b>	UCS-A /eth-storage/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a member port from the port channel on port 13 of fabric A and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric a
UCS-A /eth-storage/fabric # scope port-channel 13
UCS-A /eth-storage/fabric/port-channel # delete member-port 1 7
UCS-A /eth-storage/fabric/port-channel* # commit-buffer
UCS-A /eth-storage/fabric/port-channel #
```

## 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 instance. Each Fibre Channel port channel can include a maximum of 16 uplink Fibre Channel ports.

### Configuring 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope fabric {a   b}</b>	Enters Fibre Channel uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-uplink/fabric # <b>create port-channel <i>port-num</i></b>	Creates a port channel on the specified Fibre Channel uplink port, and enters Fibre Channel uplink fabric port channel mode.
<b>Step 4</b>	UCS-A /fc-uplink/fabric/port-channel # <b>{enable   disable}</b>	(Optional) Enables or disables the administrative state of the port channel. The port channel is disabled by default.
<b>Step 5</b>	UCS-A /fc-uplink/fabric/port-channel # <b>set name <i>port-chan-name</i></b>	(Optional) Specifies the name for the port channel.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /fc-uplink/fabric/port-channel # <b>set speed {1gbps   2gbps   4gbps   8gbps   auto}</b>	(Optional) Specifies the speed for the port channel.
<b>Step 7</b>	UCS-A /fc-uplink/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates port channel 13 on fabric A, sets the name to portchan13a, enables the administrative state, sets the speed to 2 Gbps, and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # create port-channel 13
UCS-A /fc-uplink/fabric/port-channel* # enable
UCS-A /fc-uplink/fabric/port-channel* # set name portchan13a
UCS-A /fc-uplink/fabric/port-channel* # set speed 2gbps
UCS-A /fc-uplink/fabric/port-channel* # commit-buffer
UCS-A /fc-uplink/fabric/port-channel #
```

## Unconfiguring a Fibre Channel Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope fabric {a   b}</b>	Enters Fibre Channel uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-uplink/fabric # <b>delete port-channel port-num</b>	Deletes the port channel on the specified Fibre Channel uplink port.
<b>Step 4</b>	UCS-A /fc-uplink/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example unconfigures port channel 13 on fabric A and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # delete port-channel 13
UCS-A /fc-uplink/fabric* # commit-buffer
UCS-A /fc-uplink/fabric #
```

## Enabling or Disabling a Fibre Channel Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope fabric {a   b }</b>	Enters Fibre Channel uplink mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-uplink/fabric # <b>scope port-channel <i>port-chan-name</i></b>	Enters Fibre Channel uplink port channel mode.
<b>Step 4</b>	UCS-A /fc-uplink/fabric/port-channel # <b>{enable   disable }</b>	Enables or disables the administrative state of the port channel. The port channel is disabled by default.

The following example enables port channel 13 on fabric A and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # scope port-channel 13
UCS-A /fc-uplink/fabric/port-channel* # enable
UCS-A /fc-uplink/fabric/port-channel* # commit-buffer
UCS-A /fc-uplink/fabric/port-channel #
```

## Adding a Member Port to a Fibre Channel Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope fabric {a   b }</b>	Enters Fibre Channel uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-uplink/fabric # <b>scope port-channel <i>port-num</i></b>	Enters Fibre Channel uplink fabric port channel mode for the specified port channel.
<b>Step 4</b>	UCS-A /fc-uplink/fabric/port-channel # <b>create member-port <i>slot-num port-num</i></b>	Creates the specified member port from the port channel and enters Fibre Channel uplink fabric port channel member port mode.
<b>Step 5</b>	UCS-A /fc-uplink/fabric/port-channel # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds the member port on slot 1, port 7 to port channel 13 on fabric A and commits the transaction.

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # scope port-channel 13
UCS-A /fc-uplink/fabric # create member-port 1 7
UCS-A /fc-uplink/fabric/port-channel* # commit-buffer
UCS-A /fc-uplink/fabric/port-channel #
```

## Deleting a Member Port from a Fibre Channel Port Channel

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope fc-uplink	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # scope fabric {a   b}	Enters Fibre Channel uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-uplink/fabric # scope port-channel <i>port-num</i>	Enters Fibre Channel uplink fabric port channel mode for the specified port channel.
<b>Step 4</b>	UCS-A /fc-uplink/fabric/port-channel # delete member-port <i>slot-num port-num</i>	Deletes the specified member port from the port channel.
<b>Step 5</b>	UCS-A /fc-uplink/fabric/port-channel # commit-buffer	Commits the transaction to the system configuration.

The following example deletes a member port from port channel 13 on fabric A and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # scope port-channel 13
UCS-A /fc-uplink/fabric # delete member-port 1 7
UCS-A /fc-uplink/fabric/port-channel* # commit-buffer
UCS-A /fc-uplink/fabric/port-channel #
```





# CHAPTER 6

## Configuring Communication Services

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This chapter includes the following sections:

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- [Configuring CIM XML, page 88](#)
- [Configuring HTTP, page 89](#)
- [Unconfiguring HTTP, page 90](#)
- [Configuring HTTPS, page 90](#)
- [Enabling HTTP Redirection, page 97](#)
- [Configuring SNMP, page 97](#)
- [Configuring Telnet, page 104](#)
- [Disabling Communication Services, page 105](#)

### Communication Services

You can use the following communication services to interface third-party applications with Cisco UCS:

Communication Service	Description
CIM XML	<p>This service is disabled by default and is only available in read-only mode. The default port is 5988.</p> <p>This common information model is one of the standards defined by the Distributed Management Task Force.</p>

Communication Service	Description
HTTP	<p>This service is enabled on port 80 by default.</p> <p>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.</p> <p>For security purposes, we recommend that you enable HTTPS and disable HTTP.</p> <p>By default, Cisco UCS redirects any attempt to communicate via HTTP to the HTTPS equivalent. We recommend that you do not change this behavior.</p> <p><b>Note</b> 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 <b>Redirect HTTP to HTTPS</b> in Cisco UCS Manager.</p>
HTTPS	<p>This service is enabled on port 443 by default.</p> <p>With HTTPS, all data is exchanged in encrypted mode through a secure server.</p> <p>For security purposes, we recommend that you only use HTTPS and either disable or redirect HTTP communications.</p>
SMASH CLP	<p>This service is enabled for read-only access and supports a limited subset of the protocols, such as the <b>show</b> command. You cannot disable it.</p> <p>This shell service is one of the standards defined by the Distributed Management Task Force.</p>
SNMP	<p>This service is disabled by default. If enabled, the default port is 161. You must configure the community and at least one SNMP trap.</p> <p>Enable this service only if your system includes integration with an SNMP server.</p>
SSH	<p>This service is enabled on port 22. You cannot disable it, nor can you change the default port.</p> <p>This service provides access to the Cisco UCS Manager CLI.</p>
Telnet	<p>This service is disabled by default.</p> <p>This service provides access to the Cisco UCS Manager CLI.</p>

## Configuring CIM XML

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /system/services # <b>enable cimxml</b>	Enables the CIM XLM service.
<b>Step 4</b>	UCS-A /system/services # <b>set cimxml port port-num</b>	Specifies the port to be used for the CIM XML connection.
<b>Step 5</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables CIM XML, sets the port number to 5988, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # enable cimxml
UCS-A /system/services* # set cimxml port 5988
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

## Configuring HTTP

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>enable http</b>	Enables the HTTP service.
<b>Step 4</b>	UCS-A /system/services # <b>set http port port-num</b>	Specifies the port to be used for the HTTP connection.
<b>Step 5</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables HTTP, sets the port number to 80, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # enable http
UCS-A /system/services* # set http port 80
Warning: When committed, this closes all the web sessions.
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

# Unconfiguring HTTP

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>disable http</b>	Disables the HTTP service.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disables HTTP and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # disable http
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

# 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.

### 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.

## Creating a Key Ring

Cisco UCS Manager supports a maximum of 8 key rings, including the default key ring.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>create keyring keyring-name</b>	Creates and names the key ring.
<b>Step 3</b>	UCS-A /security/keyring # <b>set modulus {mod1024   mod1536   mod2048   mod512}</b>	Sets the SSL key length in bits.
<b>Step 4</b>	UCS-A /security/keyring # <b>commit-buffer</b>	Commits the transaction.

The following example creates a keyring with a key size of 1024 bits:

```
UCS-A# scope security
UCS-A /security # create keyring kr220
UCS-A /security/keyring* # set modulus mod1024
UCS-A /security/keyring* # commit-buffer
UCS-A /security/keyring #
```

### What to Do Next

Create a certificate request for this key ring.

## Creating a Certificate Request for a Key Ring

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope keyring keyring-name</b>	Enters configuration mode for the key ring.
<b>Step 3</b>	UCS-A /security/keyring # <b>create certreq {ip ip-address   subject-name name}</b>	Creates a certificate request using the IP address or name of the fabric interconnect. You are

	<b>Command or Action</b>	<b>Purpose</b>
		prompted to enter a password for the certificate request.
<b>Step 4</b>	UCS-A /security/keyring # <b>commit-buffer</b>	Commits the transaction.
<b>Step 5</b>	UCS-A /security/keyring # <b>show certreq</b>	Displays the certificate request, which you can copy and send to a trust anchor or certificate authority.

The following example creates and displays a certificate request for a key ring:

```
UCS-A# scope security
UCS-A /security # scope keyring kr220
UCS-A /security/keyring # create certreq ip 192.168.200.123 subject-name sjc04
Certificate request password:
Confirm certificate request password:
UCS-A /security/keyring* # commit-buffer
UCS-A /security/keyring # show certreq
Certificate request subject name: sjc04
Certificate request ip address: 192.168.200.123
Request:
-----BEGIN CERTIFICATE REQUEST-----
MIIBfTCB5wIBADARMQ8wDQYDVQQDEwZzYW1jMDQwgZ8wDQYJKoZIhvcNAQEBBQAD
gY0AMIGJAoGBALpKn1t8qMZO4UGqILKFXQQc2c8b/vW2rnRF8OPhKhghLA1YZ1F
JqcYEG5Y11+vgohLBTd45s0GC8m4RTLJWHo4SwccAUXQ5Zngf45YtX1WsylwUWV4
0re/zgTk/WCd56RfOBvWR2Dtztu2pGA14sd761zLxt29K7R8mjz6CAUVAgMBAAGG
LTArBgkqhkiG9w0BCQ4xHjAcMB0GA1UdEQUFBwQMA6CBnNhbWMwNicECsEiXjAN
BgkqhkiG9w0BAQQFAAOBgQCxsN0qUHYGFoQw56RwQuelTNPrndqUwuZH003Teg
nhsyu4satpy1PqVV9viKZ+spvc6x5PWICtWgRhH8BimOb/0OKuG8kwfIGGsED1Av
TTYvUP+BZ9OfiPbRIA718S+v8ndXr1HejiQGx1DNqoN+odCXPC5kjoxD01ZTL09H
BA==

-----END CERTIFICATE REQUEST-----
UCS-A /security/keyring #
```

### What to Do Next

- Copy the text of the certificate request, including the BEGIN and END lines, and save it in a file. Send the file with the certificate request to a trust anchor or certificate authority to obtain a certificate for the key ring.
- Create a trusted point and set the certificate chain for the certificate of trust received from the trust anchor.

## Creating a Trusted Point

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>create trustpoint <i>name</i></b>	Creates and names a trusted point.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /security/trustpoint # set certchain [ <i>certchain</i> ]	Specifies certificate information for this trusted point. If you do not specify certificate information in the command, you are prompted to enter a certificate or a list of trustpoints defining a certification path to the root certificate authority (CA). On the next line following your input, type ENDOFBUF to finish.
<b>Step 4</b>	UCS-A /security/trustpoint # commit-buffer	Commits the transaction.

The following example creates a trusted point and provides a certificate for the trusted point:

```
UCS-A# scope security
UCS-A /security # create trustpoint tPoint10
UCS-A /security/trustpoint* # set certchain
Enter lines one at a time. Enter ENDOFBUF to finish. Press ^C to abort.
Trustpoint Certificate Chain:
> -----BEGIN CERTIFICATE-----
> MIIDMDCCApmpgAwIBAgIBADANBgkqhkiG9w0BAQQFADB0MQswCQYDVQQGEwJVUzEL
> BxMMU2FuIEpv2UsIENBMRUwEwYDVQQKEwxFeGftcGx1IEluYy4xEzARBgNVBAst
> C1R1c3QgR3JvdXAxGTAXBgNVBAMTEHR1c3QuZXhhbXBsZS5jb20xHzAdBgkqhkiG
> 9w0BCQEWEhvzZXJAZXhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
> AoGBAMZw4nTepNIDhVzb0j7Z2Je4xAG56zmSHRMQeOGHemdh66u2/XAoLx7YCcYU
> ZgAMivycSkgb/6CjQtsofvtrmC/eAehuK3/SINv7wd6Vv2pBt6ZpxgD4VBNKOND1
> GMBkPayV1QjbG4MD2dx2+H8EH3LMtdZrgKvPxPTE+bF5wzVNAgMBAAGgJTAjBgkq
> hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcmQwDQYJKoZIhvcNAQEFBQAD
> gYEAG61CaJoJaVMhzC190306Mg51zq1zXcz75+VFj216rH9asckCld3mkOVx5gJU
> Ptt5CVOpNgNLdvbDPssXretyosOhqHmp9+CLv8FDuy1CDYfuaLtv1WvfhevskV0j6
> jtcEMyZ+f7+3yh421ido3nO4MIGeBgNVHSMEgZYwgZOAFL1NjtctEMyZ+f7+3yh42
> lido3nO4oXikdjB0MQswCQYDVQQGEwJVUzELMAkGA1UECBMCQ0ExFDASBgNVBAcT
> C1NhbnRHIEnsYXJhMRswGQYDVQQKExJodW92YSBtXN0ZW1zIEluYy4xFDASBgNV
> BAsTC0VuZ21uZWVyaW5nMQ8wDQYDVQQDEwZ0ZXN0Q0GCAQAwDAYDVR0TBAAwAwEB
> /zANBgkqhkiG9w0BAQFAAOBgQAhWaRwXNR6B4g6Lsnr+fptHv+WWhB5fKqGQqXc
> wR4pYi04z42/j9Ijeh75tCKMhW51az8copP1EBmOcyuhf5C6vasrenn1ddkkYt4
> PR0vxGc40whuiozBolesmsmjBbedUCwQgdFDWhDIZJwK5+N3x/kfa2EHU6id1avt
> 4YL5Jg==
> -----END CERTIFICATE-----
> ENDOFBUF
UCS-A /security/trustpoint* # commit-buffer
UCS-A /security/trustpoint #
```

### What to Do Next

Obtain a key ring certificate from the trust anchor or certificate authority and import it into the key ring.

## Importing a Certificate into a Key Ring

### Before You Begin

- Configure a trusted point that contains the certificate chain for the key ring certificate.
- Obtain a key ring certificate from a trust anchor or certificate authority.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope keyring</b> <i>keyring-name</i>	Enters configuration mode for the key ring that will receive the certificate.
<b>Step 3</b>	UCS-A /security/keyring # <b>set trustpoint</b> <i>name</i>	Specifies the trusted point for the trust anchor or certificate authority from which the key ring certificate was obtained.
<b>Step 4</b>	UCS-A /security/keyring # <b>set cert</b>	Launches a dialog for entering and uploading the key ring certificate.  At the prompt, paste the certificate text that you received from the trust anchor or certificate authority. On the next line following the certificate, type ENDOFBUF to complete the certificate input.
<b>Step 5</b>	UCS-A /security/keyring # <b>commit-buffer</b>	Commits the transaction.

The following example specifies the trust point and imports a certificate into a key ring:

```
UCS-A# scope security
UCS-A /security # scope keyring kr220
UCS-A /security/keyring # set trustpoint tPoint10
UCS-A /security/keyring* # set cert
Enter lines one at a time. Enter ENDOFBUF to finish. Press ^C to abort.
Keyring certificate:
> -----BEGIN CERTIFICATE-----
> MIIB/zCCAwgCAQAwgZkxCzAJBgNVBAYTA1VTMQswCQYDVQQIEwJDQTEVMBMGA1UE
> BxMMU2FuIEpvc2UsIENBMRUwEwYDVQQKEwxFeGFTcGx1IEluYy4xEzARBgNVBAst
> C1Rlc3QgR3JvdXAxGTAXBgNVBAMTEHR1c3QuZXhhbXBsZS5jb20xHzAdBgkqhkiG
> 9w0BCQEWEHVzZXJAZXhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
> AoGBAMZw4nTepNIDhVzb0j7Z2Je4xAG56zmSHRMQeOGHemdh66u2/XAcLx7YCcYU
> ZgAMivvCsKgb/6CjQtsofvtrmC/eAehuK3/SINv7wd6Vv2pBt6ZpXgD4VBNKOND1
> GMbkPayV1QjbG4MD2dx2+H8EH3LMtdZrgKvPxPTE+bF5wZVNAgMBAAGgJTAjBgkq
> hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcmQwDQYJKoZIhvcNAQEFBQAD
> gYEAG61CaJoJaVMhzC190306Mg51zq1zXcz75+VFj2I6rH9ascK1ld3mkOVx5gJU
> Ptt5CVQpNgNLdvbDPSSxretysOhqHmp9+CLv8FDuy1CDYfuaLtv1WvfhevskV0j6
> mK3Ku+YiORnv6DhxroOoqau8r/hyI/L4317IPN1HhOi3ha4=
> -----END CERTIFICATE-----
> ENDOFBUF
UCS-A /security/keyring* # commit-buffer
UCS-A /security/keyring #
```

## 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>enable https</b>	Enables the HTTPS service.
<b>Step 4</b>	UCS-A /system/services # <b>set https port port-num</b>	Specifies the port to be used for the HTTPS connection.
<b>Step 5</b>	UCS-A /system/services # <b>set https keyring keyring-name</b>	Specifies the name of the key ring you created for HTTPS.
<b>Step 6</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables HTTPS, sets the port number to 443, sets the key ring name to kring7984, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # enable https
UCS-A /system/services* # set https port 443
Warning: When committed, this closes all the web sessions.
UCS-A /system/services* # set https keyring kring7984
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

## Deleting a Key Ring

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>delete keyring name</b>	Deletes the named key ring.
<b>Step 3</b>	UCS-A /security # <b>commit-buffer</b>	Commits the transaction.

The following example deletes a key ring:

```
UCS-A# scope security
UCS-A /security # delete keyring key10
UCS-A /security* # commit-buffer
UCS-A /security #
```

## Deleting a Trusted Point

### Before You Begin

Ensure that the trusted point is not used by a key ring.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>delete trustpoint name</b>	Deletes the named trusted point.
<b>Step 3</b>	UCS-A /security # <b>commit-buffer</b>	Commits the transaction.

The following example deletes a trusted point:

```
UCS-A# scope security
UCS-A /security # delete trustpoint tPoint10
UCS-A /security* # commit-buffer
UCS-A /security #
```

## Unconfiguring HTTPS

### Before You Begin

Disable HTTP to HTTPS redirection.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>disable https</b>	Disables the HTTPS service.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disables HTTPS and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
```

```
UCS-A /system/services # disable https
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

## Enabling HTTP Redirection

### Before You Begin

Enable both HTTP and HTTPS.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>enable http-redirect</b>	Enables the HTTP redirect service.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables HTTP to HTTPS redirection and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # enable http-redirect
Warning: When committed, this closes all the web sessions.
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

## 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 8: 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.
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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>enable snmp</b>	Enables SNMP.
<b>Step 3</b>	UCS-A /monitoring # <b>set snmp community</b> <i>community-name</i>	Specifies SNMP community. The community name can be any alphanumeric string up to 32 characters.
<b>Step 4</b>	UCS-A /monitoring # <b>set snmp syscontact</b> <i>system-contact-name</i>	Specifies the system contact person responsible for the SNMP. The system contact name can be any alphanumeric string up to 255 characters, such as an email address or name and telephone number.
<b>Step 5</b>	UCS-A /monitoring # <b>set snmp syslocation</b> <i>system-location-name</i>	Specifies the location of the host on which the SNMP agent (server) runs. The system location name can be any alphanumeric string up to 512 characters.
<b>Step 6</b>	UCS-A /monitoring # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables SNMP, configures an SNMP community named SnmpCommSystem2, configures a system contact named contactperson, configures a contact location named systemlocation, and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # enable snmp
UCS-A /monitoring* # set snmp community SnmpCommSystem2
UCS-A /monitoring* # set snmp syscontact contactperson
UCS-A /monitoring* # set snmp syslocation systemlocation
UCS-A /monitoring* # commit-buffer
UCS-A /monitoring #
```

### What to Do Next

Create SNMP traps and users.

## Creating an SNMP Trap

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>enable snmp</b>	Enables SNMP.
<b>Step 3</b>	UCS-A /monitoring # <b>create snmp-trap</b> { <i>hostname</i>   <i>ip-addr</i> }	Creates an SNMP trap host with the specified hostname or IP address.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /monitoring/snmp-trap # <b>set community</b> <i>community-name</i>	Specifies the SNMP community name to be used for the SNMP trap.
<b>Step 5</b>	UCS-A /monitoring/snmp-trap # <b>set port</b> <i>port-num</i>	Specifies the port to be used for the SNMP trap.
<b>Step 6</b>	UCS-A /monitoring/snmp-trap # <b>set version</b> {v1   v2c   v3}	Specifies the SNMP version and model used for the trap.
<b>Step 7</b>	UCS-A /monitoring/snmp-trap # <b>set notification type</b> {traps   informs}	(Optional) If you select v2c or v3 for the version, the type of trap to send.
<b>Step 8</b>	UCS-A /monitoring/snmp-trap # <b>set v3 privilege</b> {auth   noauth   priv}	(Optional) If you select v3 for the version, the privilege associated with the trap.  This can be: <ul style="list-style-type: none"><li>• auth—Authentication but no encryption</li><li>• noauth—No authentication or encryption</li><li>• priv—Authentication and encryption</li></ul>
<b>Step 9</b>	UCS-A /monitoring/snmp-trap # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables SNMP, creates an SNMP trap, specifies that the trap will use the SnmpCommSystem2 community on port 2, sets the version to v3, sets the notification type to traps, sets the v3 privilege to priv, and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # enable snmp
UCS-A /monitoring* # create snmp-trap 192.168.100.112
UCS-A /monitoring/snmp-trap* # set community SnmpCommSystem2
UCS-A /monitoring/snmp-trap* # set port 2
UCS-A /monitoring/snmp-trap* # set version v3
UCS-A /monitoring/snmp-trap* # set notificationtype traps
UCS-A /monitoring/snmp-trap* # set v3 privilege priv
UCS-A /monitoring/snmp-trap* # commit-buffer
UCS-A /monitoring/snmp-trap #
```

## Deleting an SNMP Trap

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /monitoring # <b>delete snmp-trap</b> <i>{hostname   ip-addr}</i>	Deletes the specified SNMP trap host with the specified hostname or IP address.
<b>Step 3</b>	UCS-A /monitoring # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the SNMP trap at IP address 192.168.100.112 and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # delete snmp-trap 192.168.100.112
UCS-A /monitoring* # commit-buffer
UCS-A /monitoring #
```

## Creating an SNMPv3 User

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>enable snmp</b>	Enables SNMP.
<b>Step 3</b>	UCS-A /monitoring # <b>create snmp-user</b> <i>user-name</i>	Creates the specified SNMPv3 user. An SNMP username cannot be the same as a local username. Choose an SNMP username that does not match a local username.
<b>Step 4</b>	UCS-A /monitoring/snmp-user # <b>set aes-128 {no   yes}</b>	Enables or disables the use of AES-128 encryption.
<b>Step 5</b>	UCS-A /monitoring/snmp-user # <b>set auth {md5   sha}</b>	Specifies the use of MD5 or SHA authentication.
<b>Step 6</b>	UCS-A /monitoring/snmp-user # <b>set password</b>	Specifies the user password. After you enter the <b>set password</b> command, you are prompted to enter and confirm the password.
<b>Step 7</b>	UCS-A /monitoring/snmp-user # <b>set priv-password</b>	Specifies the user privacy password. After you enter the <b>set priv-password</b> command, you are prompted to enter and confirm the privacy password.
<b>Step 8</b>	UCS-A /monitoring/snmp-user # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables SNMP, creates an SNMPv3 user named snmp-user14, disables AES-128 encryption, specifies the use of MD5 authentication, sets the password and privacy password, and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # enable snmp
UCS-A /monitoring* # create snmp-user snmp-user14
UCS-A /monitoring/snmp-user* # set aes-128 no
UCS-A /monitoring/snmp-user* # set auth md5
UCS-A /monitoring/snmp-user* # set password
Enter a password:
Confirm the password:
UCS-A /monitoring/snmp-user* # set priv-password
Enter a password:
Confirm the password:
UCS-A /monitoring/snmp-user* # commit-buffer
UCS-A /monitoring/snmp-user #
```

## Deleting an SNMPv3 User

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>delete snmp-user user-name</b>	Deletes the specified SNMPv3 user.
<b>Step 3</b>	UCS-A /monitoring # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the SNMPv3 user named snmp-user14 and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # delete snmp-user snmp-user14
UCS-A /monitoring* # commit-buffer
UCS-A /monitoring #
```

## Configuring Telnet

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /services # <b>enable telnet-server</b>	Enables the Telnet service.
<b>Step 4</b>	UCS-A /services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables Telnet and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /services # enable telnet-server
UCS-A /services* # commit-buffer
UCS-A /services #
```

## Disabling Communication Services

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>disable service-name</b>	Disables the specified service, where the <i>service-name</i> argument is one of the following keywords: <ul style="list-style-type: none"> <li>• <b>cimxml</b> —Disables CIM XML service</li> <li>• <b>http</b> —Disables HTTP service</li> <li>• <b>https</b> —Disables HTTPS service</li> <li>• <b>telnet-server</b> —Disables Telnet service</li> </ul>
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disables CIM XML and commits the transaction:

```
UCS-A# scope system
UCS-A# scope services
UCS-A /system/services # disable cimxml
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```





# CHAPTER 7

## Configuring Authentication

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This chapter includes the following sections:

- [Authentication Services, page 107](#)
- [Guidelines and Recommendations for Remote Authentication Providers, page 107](#)
- [User Attributes in Remote Authentication Providers, page 108](#)
- [LDAP Group Rule, page 110](#)
- [Configuring LDAP Providers, page 110](#)
- [Configuring RADIUS Providers, page 117](#)
- [Configuring TACACS+ Providers, page 120](#)
- [Configuring Multiple Authentication Systems, page 122](#)
- [Selecting an Authentication Service, page 129](#)

### 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 9: Comparison of User Attributes by Remote Authentication Provider**

Authentication Provider	Custom Attribute	Schema Extension	Attribute ID Requirements
LDAP	<p>Not required if group mapping is used</p> <p>Optional if group mapping is not used</p>	<p>Optional. You can choose to do either of the following:</p> <ul style="list-style-type: none"> <li>• Do not extend the LDAP schema and configure an existing, unused attribute that meets the requirements.</li> <li>• Extend the LDAP schema and create a custom attribute with a unique name, such as CiscoAVPair.</li> </ul>	<p>The Cisco LDAP implementation requires a unicode type attribute.</p> <p>If you choose to create the CiscoAVPair custom attribute, use the following attribute ID: 1.3.6.1.4.1.9.287247.1</p> <p>A sample OID is provided in the following section.</p>

Authentication Provider	Custom Attribute	Schema Extension	Attribute ID Requirements
RADIUS	Optional	<p>Optional. You can choose to do either of the following:</p> <ul style="list-style-type: none"> <li>Do not extend the RADIUS schema and use an existing, unused attribute that meets the requirements.</li> <li>Extend the RADIUS schema and create a custom attribute with a unique name, such as cisco-avpair.</li> </ul>	<p>The vendor ID for the Cisco RADIUS implementation is 009 and the vendor ID for the attribute is 001.</p> <p>The following syntax example shows how to specify multiples user roles and locales if you choose to create the cisco-avpair attribute:  <code>shell:roles="admin,aaa"</code>  <code>shell:locales="L1,abc". Use a comma "," as the delimiter to separate multiple values.</code></p>
TACACS+	Required	<p>Required. You must extend the schema and create a custom attribute with the name cisco-av-pair.</p>	<p>The cisco-av-pair name is the string that provides the attribute ID for the TACACS+ provider.</p> <p>The following syntax example shows how to specify multiples user roles and locales when you create the cisco-av-pair attribute:  <code>cisco-av-pair=shell:roles="admin aaa" shell:locales*L1 abc".</code>  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.</p>

### 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
```

```
1LDAPDisplayName: 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.

## Configuring LDAP Providers

### Configuring Properties for LDAP Providers

The properties that you configure in this task apply to all LDAP provider connections.

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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>set attribute attribute</b>	Restricts database searches to records that contain the specified attribute.
<b>Step 4</b>	UCS-A /security/ldap # <b>set basedn distinguished-name</b>	Restricts database searches to records that contain the specified distinguished name.
<b>Step 5</b>	UCS-A /security/ldap # <b>set filter filter</b>	Restricts database searches to records that contain the specified filter.
<b>Step 6</b>	UCS-A /security/ldap # <b>set timeout seconds</b>	(Optional) Sets the time interval the system waits for a response from the LDAP server before noting the server as down.
<b>Step 7</b>	UCS-A /security/ldap # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the LDAP attribute to CiscoAvPair, the base distinguished name to "DC=cisco-ucsm-aaa3,DC=qalab,DC=com", the filter to sAMAccountName=\$userid, and the timeout interval to 5 seconds, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # set attribute CiscoAvPair
UCS-A /security/ldap* # set basedn "DC=cisco-ucsm-aaa3,DC=qalab,DC=com"
UCS-A /security/ldap* # set filter sAMAccountName=$userid
```

```
UCS-A /security/ldap* # set timeout 5
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

### 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 IP 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.

- 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>create server</b> <i>server-name</i>	Creates an LDAP server instance and enters security LDAP server mode. If SSL is enabled, the <i>server-name</i> , typically an IP address or FQDN, must exactly match a Common Name (CN) in the LDAP server's security certificate. Unless an IP address is specified, a DNS server must be configured in Cisco UCS Manager.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /security/ldap/server # <b>set attribute</b> <i>attr-name</i>	(Optional) Specifies the LDAP attribute that stores the value for user roles and locales.  If you do not specify this property, Cisco UCS Manager uses the default set on the LDAP General tab.
<b>Step 5</b>	UCS-A /security/ldap/server # <b>set basedn</b> <i>basedn-name</i>	(Optional) Specifies the distinguished name in the LDAP hierarchy where the server should begin to search when it receives an authorization request.  This value is restricted to 127 characters. If the basedn length exceeds 127 characters, the login will fail.  If the distinguished name is not set for a specific LDAP provider, it is taken from the general properties set for LDAP providers.
<b>Step 6</b>	UCS-A /security/ldap/server # <b>set binddn</b> <i>binddn-name</i>	(Optional) Specifies the distinguished name (DN) for the LDAP database superuser account.  This value is restricted to 127 characters. If the binddn length exceeds 127 characters, the login will fail.  If you do not specify this property, Cisco UCS Manager uses the default set on the LDAP General tab.
<b>Step 7</b>	UCS-A /security/ldap/server # <b>set filter</b> <i>filter-value</i>	(Optional) Restricts the LDAP search to those usernames that match the defined filter.  If the filter is not set for a specific LDAP provider, it is taken from the general properties set for LDAP providers.
<b>Step 8</b>	UCS-A /security/ldap/server # <b>set password</b>	Specifies the password for the LDAP database superuser account. To set the password, press <b>Enter</b> after typing the <b>set password</b> command and enter the key value at the prompt.
<b>Step 9</b>	UCS-A /security/ldap/server # <b>set order</b> <i>order-num</i>	(Optional) Specifies when in the order this server will be tried.
<b>Step 10</b>	UCS-A /security/ldap/server # <b>set port</b> <i>port-num</i>	(Optional) Specifies the port used to communicate with the LDAP server. The standard port number is 389.
<b>Step 11</b>	UCS-A /security/ldap/server # <b>set ssl</b> { <b>yes</b>   <b>no</b> }	Enables or disables the use of encryption when communicating with the LDAP server. The options are as follows: <ul style="list-style-type: none"><li>• <b>yes</b> —Encryption is required. If encryption cannot be negotiated, the connection fails.</li><li>• <b>no</b> —Encryption is disabled. Authentication information is sent as clear text.</li></ul>

	<b>Command or Action</b>	<b>Purpose</b>
		LDAP uses STARTTLS. This allows encrypted communication using port 389.
<b>Step 12</b>	UCS-A /security/ldap/server # <b>set timeout timeout-num</b>	Specifies the amount of time in seconds that the system should spend trying to contact the LDAP database before it times out.
<b>Step 13</b>	UCS-A /security/ldap/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an LDAP server instance named 10.193.169.246, configures the binddn, password, order, port, and SSL settings, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap* # create server 10.193.169.246
UCS-A /security/ldap/server* # set binddn
"cn=Administrator,cn=Users,DC=cisco-ucsm-aaa3,DC=qalab,DC=com"
UCS-A /security/ldap/server* # set password
Enter the password:
Confirm the password:
UCS-A /security/ldap/server* # set order 2
UCS-A /security/ldap/server* # set port 389
UCS-A /security/ldap/server* # set ssl yes
UCS-A /security/ldap/server* # set timeout 30
UCS-A /security/ldap/server* # commit-buffer
UCS-A /security/ldap/server #
```

### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>scope server ldap-provider</b>	Enters security LDAP provider mode.
<b>Step 4</b>	UCS-A /security/ldap/server # <b>scope ldap-group-rule</b>	Enters LDAP group rule mode.
<b>Step 5</b>	UCS-A /security/ldap/server/ldap-group-rule # <b>set authorization {enable   disable}</b>	Specifies whether Cisco UCS searches LDAP groups when assigning user roles and locales to a remote user. <ul style="list-style-type: none"> <li>• <b>disable</b>—Cisco UCS does not access any LDAP groups.</li> </ul>

	<b>Command or Action</b>	<b>Purpose</b>
		<ul style="list-style-type: none"> <li>• <b>enable</b>—Cisco UCS searches the LDAP provider groups mapped in this Cisco UCS instance. 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.</li> </ul> <p><b>Note</b> 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.</p>
<b>Step 6</b>	UCS-A /security/ldap/server/ldap-group-rule # <b>set member-of-attribute</b> <i>attr-name</i>	Specifies the attribute Cisco UCS uses to determine group membership.
<b>Step 7</b>	UCS-A /security/ldap/server/ldap-group-rule # <b>set traversal</b> {non-recursive   recursive}	<p>Specifies whether Cisco UCS takes the settings for a group member's parent group, if necessary. This can be:</p> <ul style="list-style-type: none"> <li>• <b>non-recursive</b>—Cisco UCS only searches those groups that the user belongs to.</li> <li>• <b>recursive</b>—Cisco UCS searches all the ancestor groups belonging to the user.</li> </ul>
<b>Step 8</b>	UCS-A /security/ldap/server/ldap-group-rule # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the LDAP group rule to enable authorization, sets the member of attribute to ldapdb1, sets the traversal to non-recursive, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # scope server ldapprovider
UCS-A /security/ldap/server # scope ldap-group-rule
UCS-A /security/ldap/server/ldap-group-rule # set authorization enable
UCS-A /security/ldap/server/ldap-group-rule* # set member-of-attribute ldapdb1
UCS-A /security/ldap/server/ldap-group-rule* # set traversal non-recursive
UCS-A /security/ldap/server/ldap-group-rule* # commit-buffer
UCS-A /security/ldap/server/ldap-group-rule #
```

## Deleting an LDAP Provider

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode
<b>Step 3</b>	UCS-A /security/ldap # <b>delete server <i>serv-name</i></b>	Deletes the specified server.
<b>Step 4</b>	UCS-A /security/ldap # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the LDAP server called ldap1 and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # delete server ldap1
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

## 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 UCSM 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 your Cisco UCS Manager instance 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>create ldap-group group-dn</b>	Creates an LDAP group map for the specified DN.
<b>Step 4</b>	UCS-A /security/ldap/ldap-group # <b>create locale locale-name</b>	Maps the LDAP group to the specified locale.
<b>Step 5</b>	UCS-A /security/ldap/ldap-group # <b>create role role-name</b>	Maps the LDAP group to the specified role.
<b>Step 6</b>	UCS-A /security/ldap/ldap-group # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example maps the LDAP group mapped to a DN, sets the locale to pacific, sets the role to admin, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # create ldap-group cn=security,cn=users,dc=lab,dc=com
UCS-A /security/ldap/ldap-group* # create locale pacific
UCS-A /security/ldap/ldap-group* # create role admin
UCS-A /security/ldap/ldap-group* # commit-buffer
UCS-A /security/ldap/ldap-group #
```

### What to Do Next

Set the LDAP group rule.

## Deleting an LDAP Group Map

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>delete ldap-group group-dn</b>	Deletes the LDAP group map for the specified DN.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /security/ldap # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes an LDAP group map and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # delete ldap-group cn=security,cn=users,dc=lab,dc=com
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

## Configuring RADIUS Providers

### Configuring Properties for RADIUS Providers

The properties that you configure in this task apply to all RADIUS provider connections.

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope radius</b>	Enters security RADIUS mode.
<b>Step 3</b>	UCS-A /security/radius # <b>set retries</b> <i>retry-num</i>	(Optional) Sets the number of times to retry communicating with the RADIUS server before noting the server as down.
<b>Step 4</b>	UCS-A /security/radius # <b>set timeout</b> <i>seconds</i>	(Optional) Sets the time interval that the system waits for a response from the RADIUS server before noting the server as down.
<b>Step 5</b>	UCS-A /security/radius # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the RADIUS retries to 4, sets the timeout interval to 30 seconds, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # set retries 4
UCS-A /security/radius* # set timeout 30
UCS-A /security/radius* # commit-buffer
UCS-A /security/radius #
```

## 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 IP 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope radius</b>	Enters security RADIUS mode.
<b>Step 3</b>	UCS-A /security/radius # <b>create server</b> <i>server-name</i>	Creates a RADIUS server instance and enters security RADIUS server mode
<b>Step 4</b>	UCS-A /security/radius/server # <b>set authport</b> <i>authport-num</i>	(Optional) Specifies the port used to communicate with the RADIUS server.
<b>Step 5</b>	UCS-A /security/radius/server # <b>set key</b>	Sets the RADIUS server key. To set the key value, press <b>Enter</b> after typing the <b>set key</b> command and enter the key value at the prompt.
<b>Step 6</b>	UCS-A /security/radius/server # <b>set order</b> <i>order-num</i>	(Optional) Specifies when in the order this server will be tried.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 7</b>	UCS-A /security/radius # <b>set retries</b> <i>retry-num</i>	(Optional) Sets the number of times to retry communicating with the RADIUS server before noting the server as down.
<b>Step 8</b>	UCS-A /security/radius # <b>set timeout</b> <i>seconds</i>	(Optional) Sets the time interval that the system waits for a response from the RADIUS server before noting the server as down.
<b>Step 9</b>	UCS-A /security/radius/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server instance named radiusserv7, sets the authentication port to 5858, sets the key to radiuskey321, sets the order to 2, sets the retries to 4, sets the timeout to 30, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # create server radiusserv7
UCS-A /security/radius/server* # set authport 5858
UCS-A /security/radius/server* # set key
Enter the key: radiuskey321
Confirm the key: radiuskey321
UCS-A /security/radius/server* # set order 2
UCS-A /security/radius/server* # set retries 4
UCS-A /security/radius/server* # set timeout 30
UCS-A /security/radius/server* # commit-buffer
UCS-A /security/radius/server #
```

### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope RADIUS</b>	Enters security RADIUS mode.
<b>Step 3</b>	UCS-A /security/radius # <b>delete server</b> <i>serv-name</i>	Deletes the specified server.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /security/radius # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the RADIUS server called radius1 and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # delete server radius1
UCS-A /security/radius* # commit-buffer
UCS-A /security/radius #
```

## Configuring TACACS+ Providers

### Configuring Properties for TACACS+ Providers

The properties that you configure in this task apply to all TACACS+ provider connections.

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope tacacs</b>	Enters security TACACS+ mode.
<b>Step 3</b>	UCS-A /security/tacacs # <b>set timeout seconds</b>	(Optional) Sets the time interval that the system waits for a response from the TACACS+ server before noting the server as down.
<b>Step 4</b>	UCS-A /security/tacacs # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the TACACS+ timeout interval to 45 seconds and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # set timeout 45
UCS-A /security/tacacs* # commit-buffer
UCS-A /security/tacacs #
```

#### What to Do Next

Create a 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 IP 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope tacacs</b>	Enters security TACACS+ mode.
<b>Step 3</b>	UCS-A /security/tacacs # <b>create server</b> <i>server-name</i>	Creates an TACACS+ server instance and enters security TACACS+ server mode
<b>Step 4</b>	UCS-A /security/tacacs/server # <b>set key</b>	(Optional) Sets the TACACS+ server key. To set the key value, press <b>Enter</b> after typing the <b>set key</b> command and enter the key value at the prompt.
<b>Step 5</b>	UCS-A /security/tacacs/server # <b>set order</b> <i>order-num</i>	(Optional) Specifies when in the order this server will be tried.
<b>Step 6</b>	UCS-A /security/tacacs/server # <b>set port</b> <i>port-num</i>	Specifies the port used to communicate with the TACACS+ server.
<b>Step 7</b>	UCS-A /security/tacacs/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server instance named tacacsserv680, sets the key to tacacskey321, sets the order to 4, sets the authentication port to 5859, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # create server tacacsserv680
UCS-A /security/tacacs/server* # set key
Enter the key: tacacskey321
Confirm the key: tacacskey321
UCS-A /security/tacacs/server* # set order 4
UCS-A /security/tacacs/server* # set port 5859
```

```
UCS-A /security/tacacs/server* # commit-buffer
UCS-A /security/tacacs/server #
```

### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope tacacs</b>	Enters security TACACS mode.
<b>Step 3</b>	UCS-A /security/tacacs # <b>delete server serv-name</b>	Deletes the specified server.
<b>Step 4</b>	UCS-A /security/tacacs # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the TACACS server called tacacs1 and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # delete server TACACS1
UCS-A /security/tacacs* # commit-buffer
UCS-A /security/tacacs #
```

## 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

Once provider groups and authentication domains have been configured in Cisco UCS Manager, the following syntax can be used to log in to the system using Cisco UCS Manager CLI: **ucs: auth-domain \ user-name**

When multiple authentication domains and native authentication are configured with a remote authentication service, use one of the following syntax examples to log in with SSH or Putty:

From a Linux terminal:

- **ssh ucs-auth-domain\username@UCSM-ip-address**

```

ssh ucs-example\\jsmith@192.0.20.11
• ssh -l ucs-auth-domain\\username {UCSM-ip-address | UCSM-host-name}
  ssh -l ucs-example\\jsmith 192.0.20.11
• ssh {UCSM-ip-address | UCSM-host-name} -l ucs-auth-domain\\username
  ssh 192.0.20.11 -l ucs-example\\jsmith

```

From a Putty client:

- Login as: **ucs-auth-domain\username**  
Login as: **ucs-example\jsmith**

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>create auth-server-group auth-server-group-name</b>	Creates an LDAP provider group and enters authentication server group security LDAP mode.
<b>Step 4</b>	UCS-A /security/ldap/auth-server-group # <b>create server-ref ldap-provider-name</b>	Adds the specified LDAP provider to the LDAP provider group and enters server reference authentication server group security LDAP mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /security/ldap/auth-server-group/server-ref # <b>set order</b> <i>order-num</i>	Specifies the order in which Cisco UCS uses this provider to authenticate users.  Valid values include no-value and 0-16, with the lowest value indicating the highest priority. Setting the order to no-value is equivalent to giving that server reference the highest priority.
<b>Step 6</b>	UCS-A /security/ldap/auth-server-group/server-ref # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an LDAP provider group called ldapgroup, adds two previously configured providers called ldap1 and ldap2 to the provider group, sets the order, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # create auth-server-group ldapgroup
UCS-A /security/ldap/auth-server-group* # create server-ref ldap1
UCS-A /security/ldap/auth-server-group/server-ref* # set order 1
UCS-A /security/ldap/auth-server-group/server-ref* # up
UCS-A /security/ldap/auth-server-group* # create server-ref ldap2
UCS-A /security/ldap/auth-server-group/server-ref* # set order 2
UCS-A /security/ldap/auth-server-group/server-ref* # commit-buffer
UCS-A /security/ldap/auth-server-group/server-ref #
```

### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope ldap</b>	Enters security LDAP mode.
<b>Step 3</b>	UCS-A /security/ldap # <b>delete auth-server-group</b> <i>auth-server-group-name</i>	Deletes the LDAP provider group.
<b>Step 4</b>	UCS-A /security/ldap # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes an LDAP provider group called ldapgroup and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # delete auth-server-group ldapgroup
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope radius</b>	Enters security RADIUS mode.
<b>Step 3</b>	UCS-A /security/radius # <b>create auth-server-group auth-server-group-name</b>	Creates a RADIUS provider group and enters authentication server group security RADIUS mode.
<b>Step 4</b>	UCS-A /security/RADIUS/auth-server-group # <b>create server-ref radius-provider-name</b>	Adds the specified RADIUS provider to the RADIUS provider group and enters server reference authentication server group security RADIUS mode.
<b>Step 5</b>	UCS-A /security/radius/auth-server-group/server-ref # <b>set order order-num</b>	Specifies the order in which Cisco UCS uses this provider to authenticate users. Valid values include no-value and 0-16, with the lowest value indicating the highest priority. Setting the order to no-value is equivalent to giving that server reference the highest priority.
<b>Step 6</b>	UCS-A /security/radius/auth-server-group/server-ref # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a RADIUS provider group called radiusgroup, adds two previously configured providers called radius1 and radius2 to the provider group, sets the order, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # create auth-server-group radiusgroup
UCS-A /security/radius/auth-server-group* # create server-ref radius1
```

```

UCS-A /security/radius/auth-server-group/server-ref* # set order 1
UCS-A /security/radius/auth-server-group/server-ref* # up
UCS-A /security/radius/auth-server-group* # create server-ref radius2
UCS-A /security/radius/auth-server-group/server-ref* # set order 2
UCS-A /security/radius/auth-server-group/server-ref* # commit-buffer
UCS-A /security/radius/auth-server-group/server-ref #

```

### What to Do Next

Configure an authentication domain or select a default authentication service.

## Deleting a RADIUS Provider Group

Remove the provider group from an authentication configuration.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope radius</b>	Enters security RADIUS mode.
<b>Step 3</b>	UCS-A /security/radius # <b>delete auth-server-group auth-server-group-name</b>	Deletes the RADIUS provider group.
<b>Step 4</b>	UCS-A /security/radius # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a RADIUS provider group called radiusgroup and commits the transaction:

```

UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # delete auth-server-group radiusgroup
UCS-A /security/radius* # commit-buffer
UCS-A /security/radius #

```

## 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 a TACACS provider.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope tacacs</b>	Enters security TACACS mode.
<b>Step 3</b>	UCS-A /security/tacacs # <b>create auth-server-group auth-server-group-name</b>	Creates a TACACS provider group and enters authentication server group security TACACS mode.
<b>Step 4</b>	UCS-A /security/tacacs/auth-server-group # <b>create server-ref tacacs-provider-name</b>	Adds the specified TACACS provider to the TACACS provider group and enters server reference authentication server group security TACACS mode.
<b>Step 5</b>	UCS-A /security/tacacs/auth-server-group/server-ref # <b>set order order-num</b>	Specifies the order in which Cisco UCS uses this provider to authenticate users. Valid values include no-value and 0-16, with the lowest value indicating the highest priority. Setting the order to no-value is equivalent to giving that server reference the highest priority.
<b>Step 6</b>	UCS-A /security/tacacs/auth-server-group/server-ref # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a TACACS provider group called tacacsgroup, adds two previously configured providers called tacacs1 and tacacs2 to the provider group, sets the order, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # create auth-server-group tacacsgroup
UCS-A /security/tacacs/auth-server-group* # create server-ref tacacs1
UCS-A /security/tacacs/auth-server-group/server-ref* # set order 1
UCS-A /security/tacacs/auth-server-group/server-ref* # up
UCS-A /security/tacacs/auth-server-group* # create server-ref tacacs2
UCS-A /security/tacacs/auth-server-group/server-ref* # set order 2
UCS-A /security/tacacs/auth-server-group/server-ref* # commit-buffer
UCS-A /security/tacacs/auth-server-group/server-ref #
```

## What to Do Next

Configure an authentication domain or select a default authentication service.

## Deleting a TACACS Provider Group

Remove the provider group from an authentication configuration.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope tacacs</b>	Enters security TACACS mode.
<b>Step 3</b>	UCS-A /security/tacacs # <b>delete auth-server-group auth-server-group-name</b>	Deletes the TACACS provider group.
<b>Step 4</b>	UCS-A /security/tacacs # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a TACACS provider group called tacacsgroup and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # delete auth-server-group tacacsgroup
UCS-A /security/tacacs* # commit-buffer
UCS-A /security/tacacs #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>create auth-domain domain-name</b>	Creates an authentication domain and enters authentication domain mode.  <b>Note</b> For systems using RADIUS as their preferred 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. Since Cisco UCS inserts 5 characters for formatting, authentication will fail if the domain name and user name combined total more than 27 characters.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /security/auth-domain # <b>create default-auth</b>	Creates a default authentication for the specified authentication domain.
<b>Step 4</b>	UCS-A /security/auth-domain/default-auth # <b>set auth-server-group auth-serv-group-name</b>	(Optional) Specifies the provider group for the specified authentication domain.
<b>Step 5</b>	UCS-A /security/auth-domain/default-auth # <b>set realm {ldap   local   radius   tacacs}</b>	Specifies the realm for the specified authentication domain.
<b>Step 6</b>	UCS-A /security/auth-domain/default-auth # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an authentication domain called domain1 that uses the providers in ldapgroup1, sets the realm type to ldap, and commits the transaction.

```
UCS-A# scope security
UCS-A /security # create auth-domain domain1
UCS-A /security/auth-domain* # create default-auth
UCS-A /security/auth-domain/auth-domain* # set auth-server-group ldapgroup1
UCS-A /security/auth-domain/auth-domain* # set realm ldap
UCS-A /security/auth-domain/auth-domain* # commit-buffer
UCS-A /security/auth-domain/auth-domain #
```

## Selecting an 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security# <b>scope console-auth</b>	Enters console authorization security mode.
<b>Step 3</b>	UCS-A /security/console-auth # <b>set realm auth-type</b>	Specifies the console authentication, where the <i>auth-type</i> argument is one of the following keywords: <ul style="list-style-type: none"> <li>• <b>ldap</b> —Specifies LDAP authentication</li> <li>• <b>local</b> —Specifies local authentication</li> </ul>

	<b>Command or Action</b>	<b>Purpose</b>
		<ul style="list-style-type: none"> <li>• <b>none</b> —Allows local users to log on without specifying a password</li> <li>• <b>radius</b> —Specifies RADIUS authentication</li> <li>• <b>tacacs</b> —Specifies TACACS+ authentication</li> </ul>
<b>Step 4</b>	UCS-A /security/console-auth # <b>set auth-server-group</b> <i>auth-serv-group-name</i>	(Optional) The associated provider group, if any.
<b>Step 5</b>	UCS-A /security/console-auth # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the authentication to LDAP, sets the console authentication provider group to provider1, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope console-auth
UCS-A /security/console-auth # set realm local
UCS-A /security/console-auth # set auth-server-group provider1
UCS-A /security/console-auth* # commit-buffer
UCS-A /security/console-auth #
```

## Selecting the Default Authentication Service

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope default-auth</b>	Enters default authorization security mode.
<b>Step 3</b>	UCS-A /security/default-auth # <b>set realm</b> <i>auth-type</i>	Specifies the default authentication, where the <i>auth-type</i> argument is one of the following keywords: <ul style="list-style-type: none"> <li>• <b>ldap</b> —Specifies LDAP authentication</li> <li>• <b>local</b> —Specifies local authentication</li> <li>• <b>none</b> —Allows local users to log on without specifying a password</li> <li>• <b>radius</b> —Specifies RADIUS authentication</li> <li>• <b>tacacs</b> —Specifies TACACS+ authentication</li> </ul>
<b>Step 4</b>	UCS-A /security/default-auth # <b>set auth-server-group</b> <i>auth-serv-group-name</i>	(Optional) The associated provider group, if any.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /security/default-auth # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the default authentication to LDAP, sets the default authentication provider group to provider1, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope default-auth
UCS-A /security/default-auth # set realm ldap
UCS-A /security/default-auth # set auth-server-group provider1
UCS-A /security/default-auth* # commit-buffer
UCS-A /security/default-auth #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope security	Enters security mode.
<b>Step 2</b>	UCS-A /security # set remote-user default-role {assign-default-role   no-login}	Specifies whether user access to Cisco UCS Manager is restricted based on user roles.
<b>Step 3</b>	UCS-A /security # commit-buffer	Commits the transaction to the system configuration.

The following example sets the role policy for remote users and commits the transaction:

```
UCS-A# scope security
UCS-A /security # set remote-user default-role assign-default-role
UCS-A /security* # commit-buffer
UCS-A /security #
```



# CHAPTER 8

## Configuring Organizations

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This chapter includes the following sections:

- [Organizations in a Multi-Tenancy Environment, page 133](#)
- [Hierarchical Name Resolution in a Multi-Tenancy Environment, page 134](#)
- [Configuring an Organization Under the Root Organization, page 136](#)
- [Configuring an Organization Under an Organization that is not Root, page 136](#)
- [Deleting an Organization, page 137](#)

### Organizations in a Multi-Tenancy Environment

Multi-tenancy allows you to divide up the large physical infrastructure of an instance 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 multi-tenant 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 multi-tenant 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 multi-tenant environment, you can also set up one or more of the following for each organization or for a sub-organization 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.

## Configuring an Organization Under the Root Organization

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>create org</b> <i>org-name</i>	Creates the specified organization under the root organization and enters organization mode for the specified organization.  <b>Note</b> When you move from one organization mode to another, the command prompt does not change.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an organization named Finance under the root organization and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create org Finance
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Configuring an Organization Under an Organization that is not Root

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization.  <b>Note</b> When you move from one organization mode to another, the command prompt does not change.
<b>Step 3</b>	UCS-A /org # <b>create org</b> <i>org-name</i>	Creates the specified organization under the previously configured non-root organization and enters organization mode for the specified organization.
<b>Step 4</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an organization named Finance under the NorthAmerica organization and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope org NorthAmerica
UCS-A /org # create org Finance
```

```
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Deleting an Organization

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>delete org org-name</b>	Deletes the specified organization.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the organization under the root organization named Finance and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete org Finance
UCS-A /org* # commit-buffer
UCS-A /org #
```





# CHAPTER 9

## Configuring Role-Based Access Control

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This chapter includes the following sections:

- [Role-Based Access Control, page 139](#)
- [User Accounts for Cisco UCS Manager , page 139](#)
- [User Roles, page 142](#)
- [User Locales, page 146](#)
- [Configuring User Roles, page 147](#)
- [Configuring Locales, page 149](#)
- [Configuring User Accounts, page 151](#)
- [Monitoring User Sessions, page 158](#)

### 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 Manager

User accounts are used to access the system. Up to 48 user accounts can be configured in each Cisco UCS instance. Each user account must have a unique username and password.

A user account can be set with a SSH public key. The public key can be set in either of the two formats: OpenSSH and SECSH.

### Default User Account

Each Cisco UCS instance has a default user account, admin, which 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.

### Local User Accounts

Local user accounts are 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.

### Remote 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 date available.

---

## Guidelines for Cisco UCS Manager Usernames

The username is also used as the login ID for Cisco UCS Manager. When you assign usernames to Cisco UCS Manager 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 unique username for each user account cannot be all-numeric. You cannot create a local user with an all-numeric username.

- The unique username must start with an alphabetic character. It cannot start with a number or a special character, such as an underscore.

After you create a user account, you cannot change the username. You must delete the user account and create a new one.

## Reserved Words: Local User Accounts

The following words cannot be used when creating a local user account in Cisco UCS Manager.

- root
- bin
- daemon
- adm
- ip
- 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 Manager 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 64 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.

By default, the number of concurrent web sessions allowed by Cisco UCS Manager is set to 32; although 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 allowed for the user who is assigned the role. A user can be assigned one or more roles. A user assigned multiple roles has the combined privileges of all assigned roles. For example, if Role1 has storage related privileges, and Role2 has server related privileges, users who are assigned to both Role1 and Role2 have storage and server related privileges.

A Cisco UCS instance can contain up to 48 user roles, including the default user roles.

All roles include read access to all configuration settings in the Cisco UCS instance. The difference between the read-only role and other roles is that a user who is only assigned the read-only role cannot modify the system state. A user assigned another role can modify the system state in that user's assigned area or areas.

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 assigned to 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 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 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 Manager.

- 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.

**Table 10: User Privileges**

Privilege	Description	Default Role Assignment
aaa	System security and AAA	AAA Administrator
admin	System administration	Administrator
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

<b>Privilege</b>	<b>Description</b>	<b>Default Role Assignment</b>
operations	Logs and Smart Call Home	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-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

Privilege	Description	Default Role Assignment
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 instance can contain up to 48 user locales.

Users with AAA privileges (AAA Administrator role) 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
- 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>create role name</b>	Creates the user role and enters security role mode.
<b>Step 3</b>	UCS-A /security/role # <b>add privilege privilege-name</b>	Adds one or more privileges to the role. <b>Note</b> You can specify more than one <i>privilege-name</i> on the same command line to add multiple privileges to the role, or you can add privileges to the same role using multiple <b>add</b> commands.
<b>Step 4</b>	UCS-A /security/role # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the service-profile-security-admin role, adds the service profile security and service profile security policy privileges to the role, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # create role ls-security-admin
UCS-A /security/role* # add privilege service-profile-security service-profile-security-policy
UCS-A /security/role* # commit-buffer
UCS-A /security/role #
```

## Adding Privileges to a User Role

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope role name</b>	Enters security role mode for the specified role.
<b>Step 3</b>	UCS-A /security/role # <b>add privilege privilege-name</b>	Adds one or more privileges to the existing privileges of the user role. <b>Note</b> You can specify more than one <i>privilege-name</i> on the same command line to add multiple privileges to the role, or you can add privileges to the same role using multiple <b>add privilege</b> commands.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /security/role # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds the server security and server policy privileges to the service-profile-security-admin role and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope role service-profile-security-admin
UCS-A /security/role # add privilege server-security server-policy
UCS-A /security/role* # commit-buffer
UCS-A /security/role #
```

## Removing Privileges from a User Role

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope role name</b>	Enters security role mode for the specified role.
<b>Step 3</b>	UCS-A /security/role # <b>remove privilege privilege-name</b>	Removes one or more privileges from the existing user role privileges.  <b>Note</b> You can specify more than one <i>privilege-name</i> on the same command line to remove multiple privileges from the role, or you can remove privileges from the same role using multiple <b>remove privilege</b> commands.
<b>Step 4</b>	UCS-A /security/role # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example removes the server security and server policy privileges from the service-profile-security-admin role and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope role service-profile-security-admin
UCS-A /security/role # remove privilege server-security server-policy
UCS-A /security/role* # commit-buffer
UCS-A /security/role #
```

## Deleting a User Role

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>delete role name</b>	Deletes the user role.
<b>Step 3</b>	UCS-A /security # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the service-profile-security-admin role and commits the transaction:

```
UCS-A# scope security
UCS-A /security # delete role service-profile-security-admin
UCS-A /security* # commit-buffer
UCS-A /security #
```

## Configuring Locales

### Creating a Locale

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>create locale locale-name</b>	Creates a locale and enters security locale mode.
<b>Step 3</b>	UCS-A /security/locale # <b>create org-ref org-ref-name orgdn orgdn-name</b>	References (binds) an organization to the locale. The <i>org-ref-name</i> argument is the name used to identify the organization reference, and the <i>orgdn-name</i> argument is the distinguished name of the organization being referenced.
<b>Step 4</b>	UCS-A /security/locale # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the western locale, references the finance organization to the locale, names the reference finance-ref, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # create locale western
UCS-A /security/locale* # create org-ref finance-ref orgdn finance
UCS-A /security/locale* # commit-buffer
UCS-A /security/locale #
```

## Adding an Organization to a Locale

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A# <b>scope locale locale-name</b>	Enters security locale mode.
<b>Step 3</b>	UCS-A /security/locale # <b>create org-ref org-ref-name orgdn orgdn-name</b>	References (binds) an organization to the locale. The <i>org-ref-name</i> argument is the name used to identify the organization reference, and the <i>orgdn-name</i> argument is the distinguished name of the organization being referenced.
<b>Step 4</b>	UCS-A /security/locale # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the western locale, adds (references) the marketing organization to the locale, names the reference marketing-ref, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope locale western
UCS-A /security/locale* # create org-ref marketing-ref orgdn marketing
UCS-A /security/locale* # commit-buffer
UCS-A /security/locale #
```

## Deleting an Organization from a Locale

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope locale locale-name</b>	Enters security locale mode.
<b>Step 3</b>	UCS-A /security/locale # <b>delete org-ref org-ref-name</b>	Deletes the organization from the locale.
<b>Step 4</b>	UCS-A /security/locale # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the finance organization from the western locale and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope locale western
UCS-A /security/locale # delete org-ref finance-ref
UCS-A /security/locale* # commit-buffer
UCS-A /security/locale #
```

## Deleting a Locale

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>delete locale <i>locale-name</i></b>	Deletes the locale.
<b>Step 3</b>	UCS-A /security # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the western locale and commits the transaction:

```
UCS-A# scope security
UCS-A /security # delete locale western
UCS-A /security* # commit-buffer
UCS-A /security #
```

## Configuring 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

### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /security # <b>create local-user</b> <i>local-user-name</i>	Creates a user account for the specified local user and enters security local user mode.
<b>Step 3</b>	UCS-A /security/local-user # <b>set account-status</b> {active inactive}	Specifies whether the local user account is enabled or disabled.  If the account status for a local user account is set to inactive, the user is prevented from logging into the system using their existing credentials.
<b>Step 4</b>	UCS-A /security/local-user # <b>set password</b> <i>password</i>	Sets the password for the user account
<b>Step 5</b>	UCS-A /security/local-user # <b>set firstname</b> <i>first-name</i>	(Optional) Specifies the first name of the user.
<b>Step 6</b>	UCS-A /security/local-user # <b>set lastname</b> <i>last-name</i>	(Optional) Specifies the last name of the user.
<b>Step 7</b>	UCS-A /security/local-user # <b>set expiration</b> <i>month day-of-month year</i>	(Optional) Specifies the date that the user account expires. The <i>month</i> argument is the first three letters of the month name.  <b>Note</b> 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 date available.
<b>Step 8</b>	UCS-A /security/local-user # <b>set email</b> <i>email-addr</i>	(Optional) Specifies the user e-mail address.
<b>Step 9</b>	UCS-A /security/local-user # <b>set phone</b> <i>phone-num</i>	(Optional) Specifies the user phone number.
<b>Step 10</b>	UCS-A /security/local-user # <b>set sshkey</b> <i>ssh-key</i>	(Optional) Specifies the SSH key used for passwordless access.
<b>Step 11</b>	UCS-A security/local-user # <b>commit-buffer</b>	Commits the transaction.

The following example creates the user account named kikipopo, enables the user account, sets the password to foo12345, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # create local-user kikipopo
UCS-A /security/local-user* # set account-status active
UCS-A /security/local-user* # set password
Enter a password:
Confirm the password:
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

The following example creates the user account named lincey, enables the user account, sets an OpenSSH key for passwordless access, and commits the transaction.

```
UCS-A# scope security
UCS-A /security # create local-user lincey
UCS-A /security/local-user* # set account-status active
UCS-A /security/local-user* # set sshkey "ssh-rsa"
AAAAB3NzaC1yc2EAAAIBIwAAAAEAuto9VQ2CmWBI9/S1f30k1CWjnV3lgdXMzOOWU15iPw851kdQqap+NFuNmHcb4K
iaQB8X/PDdmtlxQQcawclj+k8f4VcOelBxlsGk5luq5ls1ob1VOIEwcKEL/h51rdbN1I8y3SS9I/gGiBZ9ARlop9LDpD
m8HPH2LOgyH7Ei1MI8="
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

The following example creates the user account named jforlenz, enables the user account, sets a Secure SSH key for passwordless access, and commits the transaction.

```
UCS-A# scope security
UCS-A /security # create local-user jforlenz
UCS-A /security/local-user* # set account-status active
UCS-A /security/local-user* # set sshkey
Enter lines one at a time. Enter ENDOFBUF to finish. Press ^C to abort.
User's SSH key:
> ----- BEGIN SSH2 PUBLIC KEY -----
>AAAAB3NzaC1yc2EAAAIBIwAAAAEAuto9VQ2CmWBI9/S1f30k1CWjnV3lgdXMzOOWU15iPw8
>51kdQqap+NFuNmHcb4KiaQB8X/PDdmtlxQQcawclj+k8f4VcOelBxlsGk5luq5ls1ob1VO
>IEwcKEL/h51rdbN1I8y3SS9I/gGiBZ9ARlop9LDpDm8HPH2LOgyH7Ei1MI8=
> ----- END SSH2 PUBLIC KEY -----
> ENDOFBUF
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

## Enabling or Disabling a Local 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope local-user</b>	Enters local-user security mode.
<b>Step 3</b>	UCS-A /security/local-user # <b>set account-status {active   inactive}</b>	<p>Specifies whether the local user account is enabled or disabled.</p> <p>The admin user account is always set to active. It cannot be modified.</p> <p><b>Note</b> If you set the account status to inactive, the configuration is not deleted from the database.</p>

The following example enables a local user account called accounting:

```
UCS-A# scope security
UCS-A /security # scope local-user accounting
UCS-A /security/local-user # set account-status active
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>enforce-strong-password {yes   no}</b>	Specifies whether the password strength check is enabled or disabled.

The following example enables the password strength check:

```
UCS-A# scope security
UCS-A /security # set enforce-strong-password yes
UCS-A /security #
```

## Setting Web Session Limits for User Accounts

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>scope web-session-limits</b>	Enters system services web session limits mode.
<b>Step 4</b>	UCS-A /system/services/web-session-limits # <b>set peruser num-of-logins-per-user</b>	Sets the maximum number of concurrent HTTP and HTTPS sessions allowed for each user. Enter an integer between 1 and 256. By default, this value is set to 32.
<b>Step 5</b>	UCS-A /system/services/web-session-limits # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the maximum number of HTTP and HTTPS sessions allowed by each user account to 60 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # scope web-session-limits
UCS-A /system/services/web-session-limits* # set peruser 60
UCS-A /system/services/web-session-limits* # commit-buffer
UCS-A /system/services/web-session-limits #
```

## Assigning a Role to a 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope local-user</b> <i>local-user-name</i>	Enters security local user mode for the specified local user account.
<b>Step 3</b>	UCS-A /security/local-user# <b>create role</b> <i>role-name</i>	Assigns the specified role to the user account . <b>Note</b> The <b>create role</b> command can be entered multiple times to assign more than one role to a user account.
<b>Step 4</b>	UCS-A security/local-user# <b>commit-buffer</b>	Commits the transaction.

The following example assigns the operations role to the kikipopo local user account and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope local-user kikipopo
UCS-A /security/local-user # create role operations
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

## Removing a Role from a 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope local-user</b> <i>local-user-name</i>	Enters security local user mode for the specified local user account.
<b>Step 3</b>	UCS-A /security/local-user# <b>delete role</b> <i>role-name</i>	Removes the specified role from the user account .

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> The <b>delete role</b> command can be entered multiple times to remove more than one role from a user account.
<b>Step 4</b>	UCS-A security/local-user # <b>commit-buffer</b>	Commits the transaction.

The following example removes the operations role from the kikipopo local user account and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope local-user kikipopo
UCS-A /security/local-user # delete role operations
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

## Assigning a Locale to a User Account



**Note** Do not assign locales to users with an admin or aaa role.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope local-user local-user-name</b>	Enters security local user mode for the specified local user account.
<b>Step 3</b>	UCS-A /security/local-user # <b>create locale locale-name</b>	Assigns the specified locale to the user account. <b>Note</b> The <b>create locale</b> command can be entered multiple times to assign more than one locale to a user account.
<b>Step 4</b>	UCS-A security/local-user # <b>commit-buffer</b>	Commits the transaction.

The following example assigns the western locale to the kikipopo local user account and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope local-user kikipopo
UCS-A /security/local-user # create locale western
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

## Removing a Locale from a User Account

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>scope local-user</b> <i>local-user-name</i>	Enters security local user mode for the specified local user account.
<b>Step 3</b>	UCS-A /security/local-user # <b>delete locale</b> <i>locale-name</i>	Removes the specified locale from the user account. <b>Note</b> The <b>delete locale</b> command can be entered multiple times to remove more than one locale from a user account.
<b>Step 4</b>	UCS-A security/local-user # <b>commit-buffer</b>	Commits the transaction.

The following example removes the western locale from the kikipopo local user account and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope local-user kikipopo
UCS-A /security/local-user # delete locale western
UCS-A /security/local-user* # commit-buffer
UCS-A /security/local-user #
```

## Deleting a User Account

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>delete local-user</b> <i>local-user-name</i>	Deletes the local-user account.
<b>Step 3</b>	UCS-A /security # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the foo user account and commits the transaction:

```
UCS-A# scope security
UCS-A /security # delete local-user foo
UCS-A /security* # commit-buffer
UCS-A /security #
```

# Monitoring User Sessions

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope security</b>	Enters security mode.
<b>Step 2</b>	UCS-A /security # <b>show user-session {local   remote} [detail]</b>	Displays session information for all users logged in to the system. An asterisk (*) next to the session ID denotes the current login session.

The following example lists all local users logged in to the system. The asterisk indicates which session is the current login session.

```
UCS-A# scope security
UCS-A /security # show user-session local
Session Id      User          Host           Login Time
-----          -----
pts_25_1_31264*  steve        192.168.100.111  2009-05-09T14:06:59
ttyS0_1_3532    jeff         console        2009-05-02T15:11:08
web_25277_A     faye        192.168.100.112  2009-05-15T22:11:25
```

The following example displays detailed information on all local users logged in to the system:

```
UCS-A# scope security
UCS-A /security # show user-session local detail
Session Id pts_25_1_31264:
  Fabric Id: A
  Term: pts/25
  User: steve
  Host: 64.101.53.93
  Pid: 31264
  Login Time: 2009-05-09T14:06:59

Session Id ttyS0_1_3532:
  Fabric Id: A
  Term: ttys0
  User: jeff
  Host: console
  Pid: 3532
  Login Time: 2009-05-02T15:11:08

Session Id web_25277_A:
  Fabric Id: A
  Term: web_25277
  User: faye
  Host: 192.168.100.112
  Pid: 3518
  Login Time: 2009-05-15T22:11:25
```



# CHAPTER 10

## Managing Firmware

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This chapter includes the following sections:

- [Overview of Firmware, page 159](#)
- [Firmware Image Management, page 160](#)
- [Firmware Versions, page 162](#)
- [Firmware Upgrades, page 163](#)
- [Firmware Downgrades, page 173](#)
- [Completing the Prerequisites for Upgrading the Firmware, page 173](#)
- [Downloading and Managing Firmware Packages, page 178](#)
- [Directly Upgrading Firmware at Endpoints, page 186](#)
- [Updating Firmware through Service Profiles, page 195](#)
- [Managing the Capability Catalog, page 200](#)
- [Updating Management Extensions, page 206](#)

## Overview of Firmware

Cisco UCS uses firmware obtained from and certified by Cisco to support the endpoints in a Cisco UCS instance. Each endpoint is a component in the instance that requires firmware to function. The upgrade order for the endpoints in a Cisco UCS instance depends upon the upgrade path, but includes the following:

- Cisco UCS Manager
- I/O modules
- Fabric interconnects
- Endpoints physically located on adapters, including NIC and HBA firmware, and Option ROM (where applicable) that can be upgraded through firmware packages included in a service profile
- Endpoints physically located on servers, such as the BIOS, storage controller (RAID controller), and Cisco Integrated Management Controller (CIMC) that can be upgraded through firmware packages included in a service profile

See the required order of steps for your upgrade path to determine the appropriate order in which to upgrade the endpoints in your Cisco UCS instance.

**Note**

Beginning with Cisco UCS, Release 1.4(1), Cisco is releasing firmware upgrades in multiple bundles, rather than one large firmware package. For more information see [Firmware Image Management, on page 160](#).

---

Cisco maintains a set of best practices for managing firmware images and updates in this document and in the following technical note: [Unified Computing System Firmware Management Best Practices](#).

This document uses the following definitions for managing firmware:

**Upgrade**

Changes the firmware running on an endpoint to another image, such as a release or patch. Upgrade includes both update and activation.

**Update**

Copies the firmware image to the backup partition on an endpoint.

**Activate**

Sets the firmware in the backup partition as the active firmware version on the endpoint. Activation can require or cause the reboot of an endpoint.

For Management Extensions and Capability Catalog upgrades, update and activate occur simultaneously. You only need to update or activate those upgrades. You do not need to perform both steps.

## Firmware Image Management

Cisco delivers all firmware updates to Cisco UCS components in bundles of images. Cisco UCS firmware updates are available to be downloaded in the following bundles:

**Cisco UCS Infrastructure Software Bundle**

This bundle includes the following firmware images that are required to update the following components:

- Cisco UCS Manager software
- Kernel and system firmware for the fabric interconnects
- I/O module firmware

## Cisco UCS B-Series Blade Server Software Bundle

This bundle includes the following firmware images that are required to update the firmware for the blade servers in a Cisco UCS instance. In addition to the bundles created for a release, these bundles can also be released between infrastructure bundles to enable Cisco UCS Manager to support a blade server that is not included in the most recent infrastructure bundle.

- CIMC firmware
- BIOS firmware
- Board controller firmware
- Third-party firmware images required by the new server

## Cisco UCS C-Series Rack-Mount Server Software Bundle

This bundle includes firmware images that are required to update the following components on rack-mount servers that have been integrated with and are managed by Cisco UCS Manager:

- CIMC
- BIOS
- Adapters
- Storage controllers



**Note** You cannot use this bundle for standalone C-series servers. The firmware management system in those servers cannot interpret the header required by Cisco UCS Manager. For information on how to upgrade standalone C-series servers, see the C-series configuration guides.

Cisco also provides release notes, which you can obtain on the same website from which you obtained the bundles.

## Firmware Image Headers

Every firmware image has a header, which includes the following:

- Checksum
- Version information
- Compatibility information that the system can use to verify the compatibility of component images and any dependencies

## Firmware Image Catalog

Cisco UCS Manager provides you with two views of the catalog of firmware images and their contents that have been downloaded to the fabric interconnect:

## Packages

This view provides you with a read-only representation of the firmware bundles that have been downloaded onto the fabric interconnect. This view is sorted by image, not by the contents of the image. For packages, you can use this view to see which component images are in each downloaded firmware bundle.

## Images

The images view lists the component images available on the system. You cannot use this view to see complete firmware bundles or to group the images by bundle. The information available about each component image includes the name of the component, the image size, the image version, and the vendor and model of the component.

You can use this view to identify the firmware updates available for each component. You can also use this view to delete obsolete and unneeded images. Cisco UCS Manager deletes a package after all images in the package have been deleted.



### Tip

Cisco UCS Manager stores the images in bootflash on the fabric interconnect. In a cluster system, space usage in bootflash on both fabric interconnects is the same, because all images are synchronized between them. If Cisco UCS Manager reports that the bootflash is out of space, delete obsolete images to free up space.

# Firmware Versions

The firmware versions on an endpoint depend upon the type of endpoint. The endpoints physically located on a fabric interconnect have different versions than those physically located on a server or I/O module.

## Firmware Versions in CIMC, I/O Modules, and Adapters

Each CIMC, I/O module, and adapter has two slots for firmware in flash. Each slot holds a version of firmware. One slot is active and the other is the backup slot. A component boots from whichever slot is designated as active.

The following firmware version terminology is used in Cisco UCS Manager:

### Running Version

The running version is the firmware that is active and in use by the endpoint.

### Startup Version

The startup version is the firmware that will be used when the endpoint next boots up. Cisco UCS Manager uses the activate operation to change the startup version.

### Backup Version

The backup version is the firmware in the other slot and is not in use by the endpoint. This version can be firmware that you have updated to the endpoint but have not yet activated, or it can be an older firmware version that was replaced by a recently activated version. Cisco UCS Manager uses the update operation to replace the image in the backup slot.

If the endpoint cannot boot from the startup version, it boots from the backup version.

### Firmware Versions in the Fabric Interconnect and Cisco UCS Manager

You can only activate the fabric interconnect firmware and Cisco UCS Manager on the fabric interconnect. The fabric interconnect and Cisco UCS Manager firmware do not have backup versions, because all the images are stored on the fabric interconnect. As a result, the number of bootable fabric interconnect images is not limited to two, like the server CIMC and adapters. Instead, the number of bootable fabric interconnect images is limited by the available space in the memory of the fabric interconnect and the number of images stored there.

The fabric interconnect and Cisco UCS Manager firmware have running and startup versions of the kernel and system firmware. The kernel and system firmware must run the same versions of firmware.

## Firmware Upgrades

Cisco UCS firmware is upgraded through a combination of the following methods:

- Direct upgrade at the endpoints. For a cluster configuration with two fabric interconnects, a direct upgrade can be minimally disruptive to data traffic. However, it requires that the Cisco UCS instance does not include firmware policies for those endpoints that you upgrade directly. You cannot avoid disruption to traffic in a Cisco UCS instance with only one fabric interconnection.
- Upgrades to server endpoints through service profiles that include a host firmware package, a management firmware package, or both. This method is disruptive to data traffic and should be performed during a maintenance window.



**Note**

---

Direct upgrade is not available for all endpoints, including the server BIOS, storage controller, HBA firmware, and HBA option ROM. You must upgrade those endpoints through the host firmware package included in the service profile associated with the server.

---

### Guidelines and Cautions for Firmware Upgrades

Before you upgrade the firmware for any endpoint in a Cisco UCS instance, consider the following guidelines and cautions:

#### Determine Appropriate Type of Firmware Upgrade for Each Endpoint

Some endpoints, such as adapters and the server CIMC, can be upgraded through either a direct firmware upgrade or a firmware package included in a service profile. The configuration of a Cisco UCS instance determines how you upgrade these endpoints. If the service profiles associated with the servers include a host firmware package, upgrade the adapters for those servers through the firmware package. In the same way, if the service profiles associated with the servers include a management firmware package, upgrade the CIMC for those servers through the firmware package.

Upgrades of a CIMC through a management firmware package or an adapter through a firmware package in the service profile associated with the server take precedence over direct firmware upgrades. You cannot directly upgrade an endpoint if the service profile associated with the server includes a firmware package. To perform a direct upgrade, you must remove the firmware package from the service profile.

## Always Upgrade Cisco UCS Gen-2 Adapters through a Host Firmware Package

You cannot upgrade Cisco UCS Gen-2 adapters directly at the endpoints. You must upgrade the firmware on those adapters through a host firmware package.

### No Server or Chassis Maintenance


**Caution**

Do not remove the hardware that contains the endpoint or perform any maintenance on it until the update process has completed. If the hardware is removed or otherwise unavailable due to maintenance, the firmware update fails. This failure may corrupt the backup partition. You cannot update the firmware on an endpoint with a corrupted backup partition.

### Number of Fabric Interconnects

For a cluster configuration with two fabric interconnects, you can take advantage of the failover between the fabric interconnects and perform a direct firmware upgrade of the endpoints without disrupting data traffic. However, you cannot avoid disrupting data traffic for those endpoints which must be upgraded through a host or management firmware package.

For a standalone configuration with a single fabric interconnect, you can minimize the disruption to data traffic when you perform a direct firmware upgrade of the endpoints. However, you must reboot the fabric interconnect to complete the upgrade and, therefore, cannot avoid disrupting traffic.

### Do Not Activate All Endpoints Simultaneously in Cisco UCS Manager GUI

If you use Cisco UCS Manager GUI to update the firmware, do not select **ALL** from the **Filter** drop-down list in the **Activate Firmware** dialog box to activate all endpoints simultaneously. Many firmware releases and patches have dependencies that require the endpoints to be activated in a specific order for the firmware update to succeed. This order can change depending upon the contents of the release or patch. Activating all endpoints does not guarantee that the updates occur in the required order and can disrupt communications between the endpoints and the fabric interconnects and Cisco UCS Manager. For information about the dependencies in a specific release or patch, see the release notes provided with that release or patch.

### Impact of Activation for Adapters and I/O Modules

During a direct upgrade, you should configure **Set Startup Version Only** for an adapter. With this setting, the activated firmware moves into the pending-next-boot state, and the server is not immediately rebooted. The activated firmware does not become the running version of firmware on the adapter until the server is rebooted. You cannot configure **Set Startup Version Only** for an adapter in the host firmware package.

If a server is not associated with a service profile, the activated firmware moves into the pending-next-boot state. Cisco UCS Manager does not reboot the endpoints or activate the firmware until the server is associated with a service profile. If necessary, you can manually reboot an unassociated server to activate the firmware.

When you configure **Set Startup Version Only** for an I/O module, the I/O module is rebooted when the fabric interconnect in its data path is rebooted. If you do not configure **Set Startup Version Only** for an I/O module, the I/O module reboots and disrupts traffic. In addition, if Cisco UCS Manager detects a protocol and firmware version mismatch between the fabric interconnect and the I/O module, Cisco UCS Manager automatically updates the I/O module with the firmware version that matches the firmware in the fabric interconnect and then activates the firmware and reboots the I/O module again.

## Avoid Replacing RAID-Configured Hard Disks Prior to Upgrade

Under the following circumstances, Cisco UCS Manager may scrub all data on a hard disk as part of the RAID synchronization process during an upgrade of the server firmware:

- The hard disks in the server are configured for RAID.
- One or more of the RAID-configured hard disks in the server are removed.
- The hard disk or disks are replaced with hard disks that are configured with a pre-existing RAID and the local disk configuration policy included in the service profile on the server is not used to configure those hard disks.
- The server firmware is upgraded, causing the server to reboot and Cisco UCS Manager to begin the RAID synchronization process.

If the original hard disks contained vital data that needs to be preserved, avoid inserting new hard disks that are already configured for RAID.

## VLAN 4048 is Reserved in Releases 1.4(1) and Higher

As of Release 1.4(1), VLAN 4048 is a reserved VLAN. If your Cisco UCS instances are configured to use VLAN 4048, you must reconfigure that VLAN to use a different ID before you upgrade.

## Impact of Upgrade to Release 1.3(1i) or Higher

An upgrade from an earlier Cisco UCS firmware release to release 1.3(1i) or higher has the following impact on the Protect Configuration property of the local disk configuration policy the first time servers are associated with service profiles after the upgrade:

### Unassociated Servers

After you upgrade the Cisco UCS instance, the initial server association proceeds without configuration errors whether or not the local disk configuration policy matches the server hardware. Even if you enable the Protect Configuration property, Cisco UCS does not protect the user data on the server if there are configuration mismatches between the local disk configuration policy on the previous service profile and the policy in the new service profile.



**Note** If you enable the Protect Configuration property and the local disk configuration policy encounters mismatches between the previous service profile and the new service profile, all subsequent service profile associations with the server are blocked.

### Associated Servers

Any servers that are already associated with service profiles do not reboot after the upgrade. Cisco UCS Manager does not report any configuration errors if there is a mismatch between the local disk configuration policy and the server hardware.

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.

### **Disable Call Home before Upgrading to Avoid Unnecessary Alerts (Optional)**

When you upgrade a Cisco UCS instance, Cisco UCS Manager restarts the components to complete the upgrade process. This restart causes events that are identical to service disruptions and component failures that trigger Call Home alerts to be sent. If you do not disable Call Home before you begin the upgrade, you can ignore the alerts generated by the upgrade-related component restarts.

### **Cannot Upgrade Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter**

The firmware on the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter (N20-AI0002), Intel-based adapter card, is burned into the hardware at manufacture. You cannot upgrade the firmware on this adapter.

## **Required Order of Components for Firmware Activation**

If you upgrade firmware by individual components in a Cisco UCS instance, activate the updates in the required order for quicker activation and to avoid potential issues with conflicting firmware versions.

### **Required Order when Upgrading from Cisco UCS, Release 1.3(1) and Later**

- 1 (Optional) Call Home—If the Cisco UCS instance includes Call Home or Smart Call Home, disable Call Home if you do not want to receive unnecessary alerts when Cisco UCS Manager restarts components to complete the firmware activation.
- 2 Adapter—if you plan to upgrade the adapters directly, perform this step first. However, if you prefer or if the adapters require it, you can omit this step and upgrade the adapters as part of the last step, in a host firmware package.
- 3 CIMC—if you upgrade the adapters in the host firmware package, perform this step first.
- 4 Cisco UCS Manager.
- 5 I/O module—Activate with Set Startup Version only.
- 6 Fabric interconnect (subordinate)—If you are upgrading a system with a cluster configuration, activate the subordinate fabric interconnect first.
- 7 Fabric interconnect (primary)—If you are upgrading a system with a cluster configuration, activate the primary fabric interconnect second.
- 8 Host firmware package—Must be the last step in the upgrade process. We recommend that you upgrade the board controller firmware during this step to avoid an additional reboot of the server. You must upgrade the following firmware in a host firmware package:
  - BIOS
  - Storage controller
  - Gen 2 adapters
- 9 (Optional) Call Home—if you disabled Call Home before the upgrading the firmware, enable Call Home.

### **Required Order when Upgrading from Cisco UCS, Release 1.0(2) and Later**

- 1 (Optional) Call Home—if the Cisco UCS instance includes Call Home or Smart Call Home, disable Call Home if you do not want to receive unnecessary alerts when Cisco UCS Manager restarts components to complete the firmware activation.

- 2 Adapter—if you plan to upgrade the adapters directly, perform this step first. However, if you prefer or if the adapters require it, you can omit this step and upgrade the adapters as part of the last step, in a host firmware package.
- 3 BMC—if you upgrade the adapters in the host firmware package, perform this step first.
- 4 Cisco UCS Manager.
- 5 I/O module—Activate with Set Startup Version only.
- 6 Fabric interconnect (subordinate)—If you are upgrading a system with a cluster configuration, activate the subordinate fabric interconnect first.
- 7 Fabric interconnect (primary)—If you are upgrading a system with a cluster configuration, activate the primary fabric interconnect second
- 8 Host firmware package—Must be the last step in the upgrade process. We recommend that you upgrade the board controller firmware during this step to avoid an additional reboot of the server. You must upgrade the following firmware in a host firmware package:
  - BIOS
  - Storage controller
  - Gen 2 adapters
- 9 (Optional) Call Home—if you disabled Call Home before the upgrading the firmware, enable Call Home.

#### **Required Order when Upgrading from Cisco UCS, Release 1.0(1)**

- 1 (Optional) Call Home—if the Cisco UCS instance includes Call Home or Smart Call Home, disable Call Home if you do not want to receive unnecessary alerts when Cisco UCS Manager restarts components to complete the firmware activation.
- 2 Adapter (interface card)—If you plan to upgrade the adapters directly, perform this step first. However, if you prefer, you can omit this step and upgrade the adapters as part of the last step, in a host firmware package.
- 3 BMC—if you upgrade the adapters in the host firmware package, perform this step first.
- 4 I/O module—Activate with Set Startup Version only.
- 5 Fabric interconnect (subordinate)—If you are upgrading a system with a cluster configuration, activate the subordinate fabric interconnect first.
- 6 Fabric interconnect (primary)—If you are upgrading a system with a cluster configuration, activate the primary fabric interconnect second
- 7 Cisco UCS Manager.
- 8 Host firmware package—Must be the last step in the upgrade process. We recommend that you upgrade the board controller firmware during this step to avoid an additional reboot of the server. You must upgrade the following firmware in a host firmware package:
  - BIOS
  - Storage controller
  - Gen 2 adapters

- 9 (Optional) Call Home—If you disabled Call Home before the upgrading the firmware, enable Call Home.

## Required Order for Adding Support for Previously Unsupported Servers

From Cisco UCS, Release 1.4(1) and later, the method for adding support for previously unsupported type of servers, such as a new blade server or a rack-mount server, to an existing Cisco UCS instance requires the following additional steps after you upgrade your existing firmware to the new release.

### **Adding Support for a Previously Unsupported Cisco UCS Blade Server**

After you upgrade the firmware for the existing components, you can add support for a previously unsupported server that was released between infrastructure bundle releases. When you add the first server of a previously unsupported type of blade server, you must perform the steps to enable Cisco UCS Manager to support that type of server in the following order:

- 1 Insert the blade server into the chassis as described in the server installation guide. Cisco UCS Manager cannot discover the server as it is unsupported, and the finite state machine (FSM) for the discovery fails with an unsupported server error.
- 2 Obtain the B-Series server bundle for the new blade server from [Cisco.com](#) and download it to the fabric interconnect.
- 3 Activate the Capability Catalog image from the server bundle.
- 4 Activate the Management Extension from the server bundle.
- 5 Wait for Cisco UCS Manager to retry discovery of the new server. If server discovery does not begin within a few minutes, acknowledge the server.


**Note**


---

You only need to perform these steps for the first server of a previously unsupported type of blade server. Cisco UCS Manager discovers all subsequent servers of that type automatically.

---

### **Integrating a Cisco UCS Rack-Mount Server**

After you upgrade the firmware for the existing components, you can integrate a Cisco UCS rack-mount server. When you integrate a rack-mount server, you must perform the steps in the following order:

- 1 If you have not already done so, configure the rack server discovery policy in Cisco UCS Manager.
- 2 Follow the instructions in the server installation guide for installing and integrating a rack-mount server in a system managed by Cisco UCS Manager.
- 3 Wait for Cisco UCS Manager to discover the new server. If server discovery does not begin within a few minutes, acknowledge the server.

## Direct Firmware Upgrade at Endpoints

If you follow the correct procedure and apply the upgrades in the correct order, a direct firmware upgrade and the activation of the new firmware version on the endpoints is minimally disruptive to traffic in a Cisco UCS instance.

You can directly upgrade the firmware on the following endpoints:

- Adapters
- CIMCs
- I/O modules
- Board controllers
- Cisco UCS Manager
- Fabric interconnects

The adapter and board controller firmware can also be upgraded through the host firmware package in the service profile. If you use a host firmware package to upgrade this firmware, you can reduce the number of times a server needs to be rebooted during the firmware upgrade process.



**Note**

Upgrades of a CIMC through a management firmware package or an adapter through a firmware package in the service profile associated with the server take precedence over direct firmware upgrades. You cannot directly upgrade an endpoint if the service profile associated with the server includes a firmware package. To perform a direct upgrade, you must remove the firmware package from the service profile.

## Stages of a Direct Firmware Upgrade

Cisco UCS Manager separates the direct upgrade process into two stages to ensure that you can push the firmware to an endpoint while the system is running without affecting uptime on the server or other endpoints.

### Update

During this stage, the system copies the selected firmware version from the primary fabric interconnect to the backup partition in the endpoint and verifies that the firmware image is not corrupt. The update process always overwrites the firmware in the backup slot.

The update stage applies only to the following endpoints:

- Adapters
- CIMCs
- I/O modules



**Caution**

Do not remove the hardware that contains the endpoint or perform any maintenance on it until the update process has completed. If the hardware is removed or otherwise unavailable due to maintenance, the firmware update fails. This failure may corrupt the backup partition. You cannot update the firmware on an endpoint with a corrupted backup partition.

### Activate

During this stage, the system sets the specified image version (normally the backup version) as the startup version and, if you do not specify **Set Startup Version Only**, immediately reboots the endpoint. When the

endpoint is rebooted, the backup partition becomes the active partition, and the active partition becomes the backup partition. The firmware in the new active partition becomes the startup version and the running version.

The following endpoints only require activation because the specified firmware image already exists on the endpoint:

- Cisco UCS Manager
- Fabric interconnects
- Board controllers on those servers that support them

When the firmware is activated, the endpoint is rebooted and the new firmware becomes the active kernel version and system version. If the endpoint cannot boot from the startup firmware, it defaults to the backup version and raises a fault.



#### Caution

When you configure **Set Startup Version Only** for an I/O module, the I/O module is rebooted when the fabric interconnect in its data path is rebooted. If you do not configure **Set Startup Version Only** for an I/O module, the I/O module reboots and disrupts traffic. In addition, if Cisco UCS Manager detects a protocol and firmware version mismatch between the fabric interconnect and the I/O module, Cisco UCS Manager automatically updates the I/O module with the firmware version that matches the firmware in the fabric interconnect and then activates the firmware and reboots the I/O module again.

## Outage Impacts of Direct Firmware Upgrades

When you perform a direct firmware upgrade on an endpoint, you can disrupt traffic or cause an outage in one or more of the endpoints in the Cisco UCS instance.

### Outage Impact of a Fabric Interconnect Firmware Upgrade

When you upgrade the firmware for a fabric interconnect, you cause the following outage impacts and disruptions:

- The fabric interconnect reboots.
- The corresponding I/O modules reboot.

### Outage Impact of a Cisco UCS Manager Firmware Upgrade

A firmware upgrade to Cisco UCS Manager causes the following disruptions:

- Cisco UCS Manager GUI—All users logged in to Cisco UCS Manager GUI are logged out and their sessions ended.  
Any unsaved work in progress is lost.
- Cisco UCS Manager CLI—All users logged in through telnet are logged out and their sessions ended. Console sessions are not ended.

### Outage Impact of an I/O Module Firmware Upgrade

When you upgrade the firmware for an I/O module, you cause the following outage impacts and disruptions:

- For a standalone configuration with a single fabric interconnect, data traffic is disrupted when the I/O module reboots. For a cluster configuration with two fabric interconnects, data traffic fails over to the other I/O module and the fabric interconnect in its data path.
- If you activate the new firmware as the startup version only, the I/O module reboots when the corresponding fabric interconnect is rebooted.
- If you activate the new firmware as the running and startup version, the I/O module reboots immediately.
- An I/O module can take up to ten minutes to become available after a firmware upgrade.

### **Outage Impact of a CIMC Firmware Upgrade**

When you upgrade the firmware for a CIMC in a server, you impact only the CIMC and internal processes. You do not interrupt server traffic. This firmware upgrade causes the following outage impacts and disruptions to the CIMC:

- Any activities being performed on the server through the KVM console and vMedia are interrupted.
- Any monitoring or IPMI polling is interrupted.

### **Outage Impact of an Adapter Firmware Upgrade**

If you activate the firmware for an adapter and do not configure the **Set Startup Version Only** option, you cause the following outage impacts and disruptions:

- The server reboots.
- Server traffic is disrupted.

## **Firmware Upgrades through Service Profiles**

You can use service profiles to upgrade the server and adapter firmware, including the BIOS on the server, by defining the following policies and including them in the service profile associated with a server:

- Host Firmware Package policy
- Management Firmware Package policy



**Note**

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You cannot upgrade the firmware on an I/O module, fabric interconnect, or Cisco UCS Manager through service profiles. You must upgrade the firmware on those endpoints directly.

---

### **Host Firmware Package**

This policy enables you to specify a set of firmware versions that make up the host firmware package (also known as the host firmware pack). The host firmware includes the following firmware for server and adapter endpoints:

- **Adapter**
- **BIOS**

- **Board Controller**
- **FC Adapters**
- **HBA Option ROM**
- **Storage Controller**

**Tip**

You can include more than one type of firmware in the same host firmware package. For example, a host firmware package can include both BIOS firmware and storage controller firmware or adapter firmware for two different models of adapters. However, you can only have one firmware version with the same type, vendor, and model number. The system recognizes which firmware version is required for an endpoint and ignores all other firmware versions.

The firmware package is pushed to all servers associated with service profiles that include this policy.

This policy ensures that the host firmware is identical on all servers associated with service profiles which use the same policy. Therefore, if you move the service profile from one server to another, the firmware versions are maintained. Also, if you change the firmware version for an endpoint in the firmware package, new versions are applied to all the affected service profiles immediately, which could cause server reboots.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect.

### **Prerequisites**

This policy is not dependent upon any other policies. However, you must ensure that the appropriate firmware has been downloaded to the fabric interconnect. If the firmware image is not available when Cisco UCS Manager is associating a server with a service profile, Cisco UCS Manager ignores the firmware upgrade and completes the association.

## **Management Firmware Package**

This policy enables you to specify a set of firmware versions that make up the management firmware package (also known as a management firmware pack). The management firmware package includes the Cisco Integrated Management Controller (CIMC) on the server. You do not need to use this package if you upgrade the CIMC directly.

The firmware package is pushed to all servers associated with service profiles that include this policy. This policy ensures that the CIMC firmware is identical on all servers associated with service profiles which use the same policy. Therefore, if you move the service profile from one server to another, the firmware versions are maintained.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect.

This policy is not dependent upon any other policies. However, you must ensure that the appropriate firmware has been downloaded to the fabric interconnect.

## **Stages of a Firmware Upgrade through Service Profiles**

You can use the host and management firmware package policies in service profiles to upgrade server and adapter firmware.

**Caution**

If you modify a host firmware package by adding an endpoint or changing firmware versions for an existing endpoint, Cisco UCS Manager upgrades the endpoints and reboots all servers associated with that firmware package as soon as the changes are saved, disrupting data traffic to and from the servers.

**New Service Profile**

For a new service profile, this upgrade takes place over the following stages:

**Firmware Package Policy Creation**

During this stage, you create the host and/or management firmware packages and include them in the appropriate firmware policies.

**Service Profile Association**

During this stage, you include the firmware packages in a service profile, and then associate the service profile with a server. The system pushes the selected firmware versions to the endpoints. For a host firmware package, the server is rebooted to ensure that the endpoints are running the versions specified in the firmware package.

**Existing Service Profile**

If the service profile is already associated with a server, Cisco UCS Manager upgrades the firmware as soon as you save the changes to the host firmware packages. For a host firmware package, Cisco UCS Manager reboots the server as soon as the change is saved.

## **Firmware Downgrades**

You downgrade firmware in a Cisco UCS instance in the same way that you upgrade firmware. The package or version that you select when you update the firmware determines whether you are performing an upgrade or a downgrade.

## **Completing the Prerequisites for Upgrading the Firmware**

### **Prerequisites for Upgrading and Downgrading Firmware**

All endpoints in a Cisco UCS instance must be fully functional and all processes must be complete before you begin a firmware upgrade or downgrade on those endpoints. You cannot upgrade or downgrade an endpoint that is not in a functional state. For example, the firmware on a server that has not been discovered cannot be upgraded or downgraded. An incomplete process, such as an FSM that has failed after the maximum number of retries, can cause the upgrade or downgrade on an endpoint to fail. If an FSM is in progress, Cisco UCS Manager queues up the update and activation and runs them when the FSM has completed successfully.

Before you upgrade or downgrade firmware in a Cisco UCS instance, complete the following prerequisites:

- Back up the configuration into an All Configuration backup file.
- For a cluster configuration, verify that the high availability status of the fabric interconnects shows that both are up and running.

- For a standalone configuration, verify that the Overall Status of the fabric interconnect is Operable.
- Verify that all servers, I/O modules, and adapters are fully functional. An inoperable server cannot be upgraded.
- Verify that all servers have been discovered. They do not need to be powered on or associated with a service profile.

## Creating an All Configuration Backup File

This procedure assumes that you do not have an existing backup operation for an All Configuration backup file.

### Before You Begin

Obtain the backup server IP address and authentication credentials.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system# <b>create backup URL all-configuration enabled</b>	Creates an enabled All Configuration backup operation that runs as soon as you enter the <b>commit-buffer</b> command. The <b>all-configuration</b> option backs up the server, fabric, and system related configuration. Specify the URL for the backup file using one of the following syntax: <ul style="list-style-type: none"> <li>• <b>ftp:// username@hostname / path</b></li> <li>• <b>scp:// username@hostname / path</b></li> <li>• <b>sftp:// username@hostname / path</b></li> <li>• <b>tftp:// hostname : port-num / path</b></li> </ul>
<b>Step 3</b>	UCS-A /system# <b>commit-buffer</b>	Commits the transaction.

The following example uses SCP to create an All Configuration backup file on the host named host35 and commits the transaction:

```
UCS-A# scope system
UCS-A /system* # create backup scp://user@host35/backups/all-config.bak all-configuration
enabled
Password:
UCS-A /system* # commit-buffer
UCS-A /system #
```

## Verifying the Operability of a Fabric Interconnect

If your Cisco UCS instance is running in a high availability cluster configuration, you must verify the operability of both fabric interconnects.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fabric-interconnect {a   b}</b>	Enters fabric interconnect mode for the specified fabric interconnect.
<b>Step 2</b>	UCS-A /fabric-interconnect# <b>show</b>	Displays information about the fabric interconnect. Verify that the operability of the fabric interconnects is in the Operable state. If the operability is not in the Operable state, run a <b>show tech-support</b> command and contact Cisco Technical Support. Do not proceed with the firmware upgrade. For more information about the <b>show tech-support</b> command, see the <i>Cisco UCS Troubleshooting Guide</i> .

The following example displays that the operability for both fabric interconnects is in the Operable state:

```
UCS-A# scope fabric-interconnect a
UCS-A /fabric-interconnect # show
Fabric Interconnect:
  ID OOB IP Addr      OOB Gateway      OOB Netmask      Operability
  -- -----
  A  192.168.100.10   192.168.100.20  255.255.255.0   Operable

UCS-A /fabric-interconnect # exit
UCS-A# scope fabric-interconnect b
UCS-A /fabric-interconnect # show
Fabric Interconnect:
  ID OOB IP Addr      OOB Gateway      OOB Netmask      Operability
  -- -----
  B  192.168.100.11   192.168.100.20  255.255.255.0   Operable
```

## Verifying the High Availability Status and Roles of a Cluster Configuration

The high availability status is the same for both fabric interconnects in a cluster configuration.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>show cluster state</b>	Displays the operational state and leadership role for both fabric interconnects in a high availability cluster. Verify that both fabric interconnects (A and B) are in the Up state and HA is in the Ready state. If the fabric interconnects are not in the Up state or HA is not in the Ready state, run a <b>show tech-support</b> command and contact Cisco Technical Support. Do not proceed with the firmware upgrade. For more information about the <b>show tech-support</b> command, see the <i>Cisco UCS Troubleshooting Guide</i> . Also note which fabric interconnect has the primary role and which has the subordinate role; you will need to know this information to upgrade the firmware on the fabric interconnects.

The following example displays that both fabric interconnects are in the Up state, HA is in the Ready state, fabric interconnect A has the primary role, and fabric interconnect B has the subordinate role:

```
UCS-A# show cluster state
Cluster Id: 0x4432f72a371511de-0xb97c000de1blada4

A: UP, PRIMARY
B: UP, SUBORDINATE

HA READY
```

## Verifying the Status of an I/O Module

If your Cisco UCS is running in a high availability cluster configuration, you must verify the status for both I/O modules in all chassis.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-id</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope iom</b> <i>iom-id</i>	Enters chassis I/O module mode for the selected I/O module.
<b>Step 3</b>	UCS-A # <b>show</b>	Shows the status of the specified I/O module on the specified chassis.  Verify that the overall status of the I/O module is in the Operable state. If the overall status is not in the Operable state, run a <b>show tech-support</b> command and contact Cisco Technical Support. Do not proceed with the firmware upgrade. For more information about the <b>show tech-support</b> command, see the <i>Cisco UCS Troubleshooting Guide</i> .

The following example displays that the overall status for both I/O modules on chassis 1 is in the Operable state:

```
UCS-A# scope chassis 1
UCS-A /chassis # scope iom 1
UCS-A /chassis/iom # show
IOM:
ID      Side   Fabric ID Overall Status
----- -----
1       Left    A        Operable

UCS-A /chassis/iom # exit
UCS-A /chassis # scope iom 2
UCS-A /chassis/iom # show
IOM:
ID      Side   Fabric ID Overall Status
----- -----
2       Right   B        Operable
```

## Verifying the Status of a Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-id / server-id</b>	Enters chassis server mode for the specified server in the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>show status detail</b>	Shows the status detail of the server. Verify that the overall status of the server is Ok, Unavailable, or any value that does not indicate a failure. If the overall status is in a state that indicates a failure, such as Discovery Failed, the endpoints on that server cannot be upgraded.

The following example displays that the overall status for server 7 on chassis 1 is in the Ok state:

```
UCS-A# scope server 1/7
UCS-A /chassis/server # show status detail
Server 1/7:
    Slot Status: Equipped
    Conn Path: A,B
    Conn Status: A,B
    Managing Instance: B
    Availability: Unavailable
    Admin State: In Service
    Overall Status: Ok
    Oper Qualifier: N/A
    Discovery: Complete
    Current Task:
```

## Verifying the Status of Adapters on Servers in a Chassis

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-id / server-id</b>	Enters chassis server mode for the specified server in the specified chassis
<b>Step 2</b>	UCS-A /chassis/server # <b>show adapter status</b>	Displays the status of the adapter. Verify that the overall status of the adapter is in the Operable state. If the overall status of the adapter is in any state other than Operable, you cannot upgrade it. However, you can proceed with the upgrade for the other adapters in the Cisco UCS instance.

The following example displays that the overall status for the adapter in server 7 on chassis 1 is in the Operable state:

```
UCS-A# scope server 1/7
UCS-A /chassis/server # show adapter status
Server 1/1:
    Overall Status
    -----
    Operable
```

## Downloading and Managing Firmware Packages

### Obtaining Software Bundles from Cisco

#### Before You Begin

Determine which of the following software bundles you need to update the Cisco UCS instance:

- Cisco UCS Infrastructure Software Bundle—Required for all Cisco UCS instances.
- Cisco UCS B-Series Blade Server Software Bundle—Required for all Cisco UCS instances that include blade servers.
- Cisco UCS C-Series Rack-Mount Server Software Bundle—Only required for Cisco UCS instances that include integrated rack-mount servers. This bundle contains firmware to enable Cisco UCS Manager to manage those servers and is not applicable to standalone C-Series rack-mount servers.

#### Procedure

---

**Step 1** In a web browser, navigate to <http://www.cisco.com>.

**Step 2** Under **Support**, click **Download Software**.

**Step 3** Click **Unified Computing and Servers**.

**Step 4** If prompted, enter your Cisco.com username and password to log in.

**Step 5** Navigate to the software bundles you need, as follows:

Bundle	Navigation Path
Cisco UCS Infrastructure Software Bundle	Click <b>Cisco UCS Infrastructure and UCS Manager Software &gt; Unified Computing System (UCS) Infrastructure Software Bundle</b> .
Cisco UCS B-Series Blade Server Software Bundle	Click <b>Cisco UCS B-Series Blade Server Software &gt; Unified Computing System (UCS) Server Software Bundle</b> .
Cisco UCS C-Series Rack-Mount Server Software Bundle	Click <b>Cisco UCS C-Series Rack-Mount UCS-Managed Server Software &gt; Unified Computing System (UCS) Server Software Bundle</b> .

**Tip** The Unified Computing System (UCS) Documentation Roadmap Bundle, which is accessible through these paths, is a downloadable ISO image of all Cisco UCS documentation.

**Step 6** On the first page from which you download a software bundle, click the **Release Notes** link to download the latest version of the Release Notes.

**Step 7** For each software bundle that you want to download, do the following:

- Click the link for the release you want to download.

The release number is followed by a number and a letter in parentheses. The number identifies the maintenance release level, and the letter differentiates between patches of that maintenance release. For more information about what is in each maintenance release and patch, see the latest version of the Release Notes.

- Click one of the following buttons and follow the instructions provided:

- **Download Now**—Allows you to download the software bundle immediately.
- **Add to Cart**—Adds the software bundle to your cart to be downloaded at a later time.

- Follow the prompts to complete your download of the software bundle(s).

**Step 8** Read the Release Notes before upgrading your Cisco UCS instance.

---

### What to Do Next

Download the software bundles to the fabric interconnect.

## Downloading Firmware Images to the Fabric Interconnect from a Remote Location



**Note**

In a cluster setup, the image file for the firmware bundle is downloaded to both fabric interconnects, regardless of which fabric interconnect is used to initiate the download. Cisco UCS Manager maintains all firmware packages and images in both fabric interconnects in sync. If one fabric interconnect is down, the download still finishes successfully. The images are synced to the other fabric interconnect when it comes back online.

### Before You Begin

Obtain the required firmware bundles from Cisco.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A# <b>firmware # download image URL</b>	Downloads the firmware bundle for Cisco UCS. Using the download path provided by Cisco, specify the URL with one of the following syntax: <ul style="list-style-type: none"> <li>• <b>ftp:// server-ip-addr / path</b></li> <li>• <b>scp:// username@server-ip-addr / path</b></li> <li>• <b>sftp:// username@server-ip-addr / path</b></li> </ul>

	<b>Command or Action</b>	<b>Purpose</b>
		<ul style="list-style-type: none"> <li>• <b>tftp:// server-ip-addr : port-num / path</b></li> </ul> <p><b>Note</b> TFTP has a file size limitation of 32 MB. Because firmware bundles can be much larger than that, we recommend that you do not select TFTP for firmware downloads.</p> <p>If you use a hostname rather than an IP address, configure a DNS server in Cisco UCS Manager.</p>
<b>Step 3</b>	Enter the password for the remote server.	The password for the remote server username. This field does not apply if the protocol is tftp.
<b>Step 4</b>	UCS-A /firmware # <b>show download-task</b>	Displays the status for your download task. When your image is completely downloaded, the task state changes from Downloading to Downloaded. The CLI does not automatically refresh, so you may have to enter the <b>show download-task</b> command multiple times until the task state displays Downloaded.
<b>Step 5</b>	Repeat this task until all of the firmware bundles have been downloaded to the fabric interconnect.	

The following example uses SCP to download the ucs-k9-bundle.1.0.0.988.gbin firmware package.

```
UCS-A# scope firmware
UCS-A /firmware # download image scp://user1@192.168.10.10/images/ucs-k9-bundle.1.0.0.988.gbin
Password: yourpassword
UCS-A /firmware # show download-task
UCS-A /firmware #
```

### What to Do Next

After the image file for the firmware bundles have downloaded completely, update the firmware on the endpoints.

## Displaying the Firmware Package Download Status

After a firmware download operation has been started, you can check the download status to see if the package is still downloading or if it has completely downloaded.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>show download-task</b>	Displays the status for your download task. When your image is completely downloaded, the task state changes from

	<b>Command or Action</b>	<b>Purpose</b>
		Downloading to Downloaded. The CLI does not automatically refresh, so you may have to enter the <b>show download-task</b> command multiple times until the task state displays Downloaded.

The following example displays the download status for the ucs-k9-bundle.1.0.0.988.gbin firmware package. The **show download-task** command is entered multiple times until the download state indicates that the firmware package has been downloaded:

```
UCS-A# scope firmware
UCS-A /firmware # show download-task

Download task:
File Name Protocol Server      Userid      State
-----
ucs-k9-bundle.1.0.0.988.gbin   Scp        10.193.32.11    user1      Downloading

UCS-A /firmware # show download-task

Download task:
File Name Protocol Server      Userid      State
-----
ucs-k9-bundle.1.0.0.988.gbin   Scp        10.193.32.11    user1      Downloading

UCS-A /firmware # show download-task

Download task:
File Name Protocol Server      Userid      State
-----
ucs-k9-bundle.1.0.0.988.gbin   Scp        10.193.32.11    user1      Downloaded
```

## Cancelling an Image Download

You can cancel the download task for an image only while it is in progress. After the image has downloaded, deleting the download task does not delete the image that was downloaded. You cannot cancel the FSM related to the image download task.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>delete download-task task-name</b>	Deletes the specified download task.
<b>Step 3</b>	UCS-A /firmware # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example cancels an image download:

```
UCS-A# scope firmware
UCS-A /firmware # delete download-task taskname
UCS-A /firmware* # commit-buffer
UCS-A /firmware* #
```

## Displaying All Available Software Images on the Fabric Interconnect

This procedure is optional and displays the available software images on the fabric interconnect for all endpoints. You can also use the **show image** command in each endpoint mode to display the available software images for that endpoint.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>show image</b>	<p>Displays all software images downloaded onto the fabric interconnect.</p> <p><b>Note</b> You must provide the software version number when directly updating an endpoint. If you intend to directly update firmware at an endpoint, note its version number in the right column.</p>

The following example displays all available software images on the fabric interconnect:

```
UCS-A# scope firmware
UCS-A /firmware # show image
Name                                         Type          Version
-----
ucs-2100.1.0.0.988.gbin                     Iom          1.0(0.988)
ucs-6100-k9-kickstart.4.0.1a.N2.1.0.988.gbin
4.0(1a)N2(1.0.988)
ucs-6100-k9-system.4.0.1a.N2.1.0.988.gbin   Switch Software
4.0(1a)N2(1.0.988)
ucs-b200-m1-bios.S5500.86B.01.00.0030-978a.021920.gbin Server Bios
S5500.86B.01.00.0030-978a.021920
ucs-b200-m1-k9-bmc.1.0.0.988.gbin            Bmc          1.0(0.988)
ucs-b200-m1-sasctlr.2009.02.09.gbin         Storage Controller 2009.02.09
ucs-m71kr-e-cna.1.0.0.988.gbin               Adapter      1.0(0.988)
ucs-m71kr-e-hba.zf280a4.gbin                 Host Hba     zf280a4
ucs-m71kr-e-optionrom.ZN502N5.gbin           Host Hba Optionrom ZN502N5
ucs-m71kr-q-cna.1.0.0.988.gbin               Adapter      1.0(0.988)
ucs-m71kr-q-optionrom.1.69.gbin              Host Hba Optionrom 1.69
ucs-m81kr-vic.1.0.0.988.gbin                Adapter      1.0(0.988)
ucs-manager-k9.1.0.0.988.gbin                System       1.0(0.988)
```

## Displaying All Available Packages on the Fabric Interconnect

This procedure is optional and displays the available software packages on the fabric interconnect for all endpoints.. You can also use the **show package** command in each endpoint mode to display the available software images for that endpoint.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>show package</b>	<p>Displays all software packages downloaded onto the fabric interconnect.</p> <p><b>Note</b> You must provide the software version number when directly updating an endpoint. If you intend to directly update firmware at an endpoint, note its version number in the right column.</p>

The following example displays all available software packages on the fabric interconnect:

```
UCS-A# scope firmware
UCS-A /firmware # show package
Name                                     Version
-----
ucs-k9-bundle.1.3.0.221.bin
ucs-k9-bundle.1.4.0.292.gbin
ucs-k9-bundle.1.4.0.357.gbin
ucs-k9-bundle.1.4.0.378.gbin
ucs-k9-bundle.1.4.0.390.gbin           1.4(0.378)
                                         1.4(0.390)
Pubs-A /firmware #
```

## Determining the Contents of a Firmware Package

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>show package package-name expand</b>	Displays the contents of the specified firmware package.

The following example displays the contents of a firmware package:

```
UCS-A# scope firmware
UCS-A /firmware # show package ucs-k9-bundle.1.4.0.390.gbin expand
Package ucs-k9-bundle.1.4.0.390.gbin:
  Images:
    ucs-2100.1.4.0.390.gbin
    ucs-6100-k9-kickstart.4.2.1.N1.1.3.390.gbin
    ucs-6100-k9-system.4.2.1.N1.1.3.390.gbin
    ucs-b200-m1-bios.S5500.1.4.0.6.090220101221.gbin
    ucs-b200-m1-k9-cimc.1.4.0.390.gbin
    ucs-b200-m1-sasctlr.01.28.03.00_06.28.00.00_03.12.00.00.gbin
    ucs-b200-m2-bios.S5500.1.4.0.6.090220101221.gbin
    ucs-b230-m1-bios.B230M1.1.4.0.35.090220101135.gbin
    ucs-b230-m1-k9-cimc.1.4.0.390.gbin
    ucs-b230-m1-mrsasctlr.20.7.1-0020_4.18.00_NA.gbin
    ucs-b230-m1-pld.B2301008.gbin
    ucs-b250-m1-bios.S5500.1.4.0.6.090220101735.gbin
    ucs-b250-m1-k9-cimc.1.4.0.390.gbin
```

```

ucs-b250-m2-bios.S5500.1.4.0.6.090220101735.gbin
ucs-b440-m1-bios.B440M1.1.4.0.3.090120101140.gbin
ucs-b440-m1-k9-cimc.1.4.0.390.gbin
ucs-b440-m1-mrsasctlr.12.4.0-0028_3.13.00_NA.gbin
ucs-b440-m1-pld.B440100C-B4402006.gbin
ucs-c-pci-n2xx-acppci01.1.4.0.390.gbin
ucs-c200-bios.C200.1.2.1.3.082520100537.gbin
ucs-c200-k9-cimc.1.4.0.390.gbin
ucs-c250-bios.C250.1.2.1.3.082520102328.gbin
ucs-c250-k9-cimc.1.4.0.390.gbin
ucs-m51kr-b.5.2.7.12.1.gbin
ucs-m61kr-i.2.1.60.1.1.gbin
ucs-m71kr-e-cna.1.4.0.390.gbin
ucs-m71kr-e-hba.2.80A4.gbin
ucs-m71kr-e-optionrom.5.03A8.gbin
ucs-m71kr-q-cna.1.4.0.390.gbin
ucs-m71kr-q-optionrom.2.02.gbin
ucs-m72kr-e.2.702.200.1702.gbin
ucs-m72kr-q.01.02.08.gbin
ucs-m81kr-vic.1.4.0.390.gbin
ucs-manager-k9.1.4.0.390.gbin
UCS-A /firmware #

```

## Checking the Available Space on a Fabric Interconnect

If an image download fails, check whether the bootflash on the fabric interconnect or fabric interconnects in the Cisco UCS has sufficient available space.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>UCS-A# scope fabric-interconnect {a   b}</b>	Enters fabric interconnect mode for the specified fabric.
<b>Step 2</b>	<b>UCS-A /fabric-interconnect # show storage [detail   expand]</b>	Displays the available space for the specified fabric.  <b>Note</b> When you download a firmware image bundle, a fabric interconnect needs at least twice as much available space as the size of the firmware image bundle. If the bootflash does not have sufficient space, delete the obsolete firmware, core files, and other unneeded objects from the fabric interconnect.

The following example displays the available space for a fabric interconnect:

```

UCS-A# scope fabric-interconnect
UCS-A /fabric-interconnect # show storage
Storage on local flash drive of fabric interconnect:
  Partition      Size (MBytes)    Used Percentage
  -----
  bootflash      8658          50
  opt            1917          2
  workspace      277           4
UCS-A /fabric-interconnect #

```

## Deleting Firmware Packages from a Fabric Interconnect

Use this procedure if you want to delete an entire package. If you prefer, you can also delete only a single image from a package.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>delete package package-name</b>	Deletes the specified firmware package.
<b>Step 3</b>	UCS-A /firmware # <b>commit-buffer</b>	Commits the transaction to the system configuration.

Cisco UCS Manager deletes the selected package or packages and all images contained within each package.

The following example deletes a firmware package and commits the transaction:

```
UCS-A# scope firmware
UCS-A /firmware # delete image ucs-k9-bundle.1.4.0.433m.gbin
UCS-A /firmware* # commit-buffer
UCS-A /firmware #
```

## Deleting Firmware Images from a Fabric Interconnect

Use this procedure if you want to delete only a single image from a package.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope firmware</b>	Enters firmware mode.
<b>Step 2</b>	UCS-A /firmware # <b>delete image image-name</b>	Deletes the specified firmware image.
<b>Step 3</b>	UCS-A /firmware # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a firmware image and commits the transaction:

```
UCS-A# scope firmware
UCS-A /firmware # delete image ucs-2100.1.4.0.433k.gbin
UCS-A /firmware* # commit-buffer
UCS-A /firmware #
```

# Directly Upgrading Firmware at Endpoints

## Updating and Activating the Firmware on an Adapter


**Caution**

Do not remove the hardware that contains the endpoint or perform any maintenance on it until the update process has completed. If the hardware is removed or otherwise unavailable due to maintenance, the firmware update fails. This failure may corrupt the backup partition. You cannot update the firmware on an endpoint with a corrupted backup partition.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope adapter chassis-id / blade-id / adapter-id</b>	Enters chassis server adapter mode for the specified adapter.
<b>Step 2</b>	UCS-A /chassis/server/adapter # <b>show image</b>	Displays the available software images for the adapter.
<b>Step 3</b>	UCS-A /chassis/server/adapter # <b>update firmware version-num</b>	Updates the selected firmware version on the adapter.
<b>Step 4</b>	UCS-A /chassis/server/adapter # <b>commit-buffer</b>	(Optional) Commits the transaction.  Use this step only if you intend to use the <b>show firmware</b> command in Step 5 to verify that the firmware update completed successfully before activating the firmware in Step 6. You can skip this step and commit the <b>update-firmware</b> and <b>activate-firmware</b> commands in the same transaction; however, if the firmware update does not complete successfully, the firmware activation does not start.  Cisco UCS Manager copies the selected firmware image to the backup memory partition and verifies that image is not corrupt. The image remains as the backup version until you explicitly activate it.
<b>Step 5</b>	UCS-A /chassis/server/adapter # <b>show firmware</b>	(Optional) Displays the status of the firmware update.  Use this step only if you want to verify that the firmware update completed successfully. The firmware update is complete when the update status is Ready. The CLI does not automatically refresh, so you may have to enter the <b>show firmware</b> command multiple times until the task state changes from Updating to Ready. Continue to Step 6 when the update status is Ready.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /chassis/server/adapter # <b>activate firmware</b> <i>version-num</i> [ <b>ignorecompcheck</b> [ <b>set-startup-only</b> ]   <b>set-startup-only</b> ]	Activates the selected firmware version on the adapter.  Use the <b>set-startup-only</b> keyword if you want to move the activated firmware into the pending-next-boot state and not immediately reboot the server. The activated firmware does not become the running version of firmware on the adapter until the server is rebooted. You cannot use the <b>set-startup-only</b> keyword for an adapter in the host firmware package.  Use the <b>ignorecompcheck</b> keyword if you want to ignore the compatibility check and activate the firmware regardless of any possible incompatibilities or currently executing tasks.
<b>Step 7</b>	UCS-A /chassis/server/adapter # <b>commit-buffer</b>	Commits the transaction.
<b>Step 8</b>	UCS-A /chassis/server/adapter # <b>show firmware</b>	(Optional) Displays the status of the firmware activation.  Use this step only if you want to verify that the firmware activation completed successfully. The CLI does not automatically refresh, so you may have to enter the <b>show firmware</b> command multiple times until the task state changes from Activating to Ready.

The following example updates and activates the adapter firmware to version 1.2(1) in the same transaction, without verifying that the firmware update and firmware activation completed successfully:

```
UCS-A# scope adapter 1/1/1
UCS-A# /chassis/server/adapter # show image
Name                                         Type      Version      State
-----                                     -----
ucs-m81kr-vic.1.2.1.gbin                   Adapter    1.2(1)     Active
UCS-A# /chassis/server/adapter # update firmware 1.2(1)
UCS-A# /chassis/server/adapter* # activate firmware 1.2(1) ignorecompcheck set-startup-only
UCS-A# /chassis/server/adapter* # commit-buffer
UCS-A# /chassis/server/adapter #
```

The following example updates the adapter firmware to version 1.2(1), verifies that the firmware update completed successfully before starting the firmware activation, activates the adapter firmware, and verifies that the firmware activation completed successfully:

```
UCS-A# scope adapter 1/1/1
UCS-A# /chassis/server/adapter # show image
Name                                         Type      Version      State
-----                                     -----
ucs-m81kr-vic.1.2.1.gbin                   Adapter    1.2(1)     Active
UCS-A# /chassis/server/adapter # update firmware 1.2(1)
UCS-A# /chassis/server/adapter* # commit-buffer
UCS-A# /chassis/server/adapter # show firmware
Adapter 1:
  Running-Vers: 1.1(1)
  Update-Status: Updating
  Activate-Status: Ready
```

```

UCS-A# /chassis/server/adapter # show firmware
Adapter 1:
    Running-Vers: 1.1(1)
    Update-Status: Ready
    Activate-Status: Ready

UCS-A# /chassis/server/adapter # activate firmware 1.2(1) ignorecompcheck
UCS-A# /chassis/server/adapter* # commit-buffer
UCS-A# /chassis/server/adapter # show firmware
Adapter 1:
    Running-Vers: 1.1(1)
    Update-Status: Ready
    Activate-Status: Activating

UCS-A# /chassis/server/adapter # show firmware
Adapter 1:
    Running-Vers: 1.2(1)
    Update-Status: Ready
    Activate-Status: Ready

```

## Updating and Activating the CIMC Firmware on a Server


**Caution**

Do not remove the hardware that contains the endpoint or perform any maintenance on it until the update process has completed. If the hardware is removed or otherwise unavailable due to maintenance, the firmware update fails. This failure may corrupt the backup partition. You cannot update the firmware on an endpoint with a corrupted backup partition.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / blade-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters chassis server CIMC mode.
<b>Step 3</b>	UCS-A /chassis/server/cimc # <b>show image</b>	Displays the available software images for the adapter.
<b>Step 4</b>	UCS-A /chassis/server/cimc # <b>update firmware</b> <i>version-num</i>	Updates the selected firmware version on the CIMC in the server.
<b>Step 5</b>	UCS-A /chassis/cimc # <b>commit-buffer</b>	(Optional) Commits the transaction.  Use this step only if you intend to use the <b>show firmware</b> command in Step 6 to verify that the firmware update completed successfully before activating the firmware in Step 7. You can skip this step and commit the <b>update-firmware</b> and <b>activate-firmware</b> commands in the same transaction; however, if the firmware update does not complete successfully, the firmware activation does not start.  Cisco UCS Manager copies the selected firmware image to the backup memory partition and verifies that image is not corrupt.

	<b>Command or Action</b>	<b>Purpose</b>
		The image remains as the backup version until you explicitly activate it.
<b>Step 6</b>	UCS-A /chassis/cimc # <b>show firmware</b>	(Optional) Displays the status of the firmware update.  Use this step only if you want to verify that the firmware update completed successfully. The firmware update is complete when the update status is Ready. The CLI does not automatically refresh, so you may have to enter the <b>show firmware</b> command multiple times until the task state changes from Updating to Ready. Continue to Step 7 when the update status is Ready.
<b>Step 7</b>	UCS-A /chassis/server/cimc # <b>activate firmware</b> <i>version-num</i> [ <b>ignorecompcheck</b> ]	Activates the selected firmware version on the CIMC in the server.  Use the <b>ignorecompcheck</b> keyword if you want to ignore the compatibility check and activate the firmware regardless of any possible incompatibilities or currently executing tasks.
<b>Step 8</b>	UCS-A /chassis/server/cimc # <b>commit-buffer</b>	Commits the transaction.
<b>Step 9</b>	UCS-A /chassis/cimc # <b>show firmware</b>	(Optional) Displays the status of the firmware activation.  Use this step only if you want to verify that the firmware activation completed successfully. The CLI does not automatically refresh, so you may have to enter the <b>show firmware</b> command multiple times until the task state changes from Activating to Ready.

The following example updates and activates the CIMC firmware to version 1.2(1) in the same transaction, without verifying that the firmware update and firmware activation completed successfully:

```

UCS-A# scope server 1/1
UCS-A# /chassis/server # scope cimc
UCS-A# /chassis/server/cimc # show image
Name                                         Type          Version        State
-----
ucs-b200-m1-k9-cimc.1.2.1.gbin             Bmc          1.2(1)
Active

UCS-A# /chassis/server/cimc # update firmware 1.2(1)
UCS-A# /chassis/server/cimc* # activate firmware 1.2(1) ignorecompcheck set-startup-only
UCS-A# /chassis/server/cimc* # commit-buffer
UCS-A# /chassis/server/cimc #

```

The following example updates the CIMC firmware to version 1.2(1), verifies that the firmware update completed successfully before starting the firmware activation, activates the CIMC firmware, and verifies that the firmware activation completed successfully:

```
UCS-A# scope server 1/1
```

```

UCS-A# /chassis/server # scope cimc
UCS-A# /chassis/server/cimc # show image
Name                                         Type          Version      State
-----
ucs-b200-m1-k9-cimc.1.2.1.gbin             Bmc          1.2(1)
Active

UCS-A# /chassis/server/cimc # update firmware 1.2(1)
UCS-A# /chassis/server/cimc* # commit-buffer
UCS-A# /chassis/server/cimc # show firmware
Running-Vers     Update-Status   Activate-Status
-----
1.1(1)          Updating       Ready

UCS-A# /chassis/server/cimc # show firmware
Running-Vers     Update-Status   Activate-Status
-----
1.1(1)          Ready         Ready

UCS-A# /chassis/server/cimc # activate firmware 1.2(1) ignorecompcheck
UCS-A# /chassis/server/cimc* # commit-buffer
UCS-A# /chassis/server/cimc # show firmware
Running-Vers     Update-Status   Activate-Status
-----
1.1(1)          Ready         Activating

UCS-A# /chassis/server/cimc # show firmware
Running-Vers     Update-Status   Activate-Status
-----
1.2(1)          Ready         Ready

```

## Updating and Activating the Firmware on an IOM

If your system is running in a high availability cluster configuration, you must update and activate both I/O modules.


**Caution**

Do not remove the hardware that contains the endpoint or perform any maintenance on it until the update process has completed. If the hardware is removed or otherwise unavailable due to maintenance, the firmware update fails. This failure may corrupt the backup partition. You cannot update the firmware on an endpoint with a corrupted backup partition.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-id</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope iom</b> <i>iom-id</i>	Enters chassis I/O module mode for the selected I/O module.
<b>Step 3</b>	UCS-A /chassis/iom # <b>show</b> <b>image</b>	Displays the available software images for the I/O module.
<b>Step 4</b>	UCS-A /chassis/iom # <b>update firmware</b> <i>version-num</i>	Updates the selected firmware version on the I/O module.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /chassis/iom # <b>commit-buffer</b>	(Optional) Commits the transaction.  Use this step only if you intend to use the <b>show firmware</b> command in Step 6 to verify that the firmware update completed successfully before activating the firmware in Step 7. You can skip this step and commit the <b>update-firmware</b> and <b>activate-firmware</b> commands in the same transaction; however, if the firmware update does not complete successfully, the firmware activation does not start.  Cisco UCS Manager copies the selected firmware image to the backup memory partition and verifies that image is not corrupt. The image remains as the backup version until you explicitly activate it.
<b>Step 6</b>	UCS-A /chassis/iom # <b>show firmware</b>	(Optional) Displays the status of the firmware update.  Use this step only if you want to verify that the firmware update completed successfully. The firmware update is complete when the update status is Ready. The CLI does not automatically refresh, so you may have to enter the <b>show firmware</b> command multiple times until the task state changes from Updating to Ready. Continue to Step 7 when the update status is Ready.
<b>Step 7</b>	UCS-A /chassis/iom # <b>activate firmware</b> <i>version-num</i> [ <b>ignorecompcheck</b> [ <b>set-startup-only</b> ]   <b>set-startup-only</b> ]	Activates the selected firmware version on the I/O module.  Use the <b>set-startup-only</b> keyword if you want to reboot the I/O module only when the fabric interconnect in its data path reboots. If you do not use the <b>set-startup-only</b> keyword, the I/O module reboots and disrupts traffic. In addition, if Cisco UCS Manager detects a protocol and firmware version mismatch between it and the I/O module, it updates the I/O module with the firmware version that matches its own and then activates the firmware and reboots the I/O module again.  Use the <b>ignorecompcheck</b> keyword if you want to ignore the compatibility check and activate the firmware regardless of any possible incompatibilities or currently executing tasks.
<b>Step 8</b>	UCS-A /chassis/iom # <b>commit-buffer</b>	Commits the transaction.
<b>Step 9</b>	UCS-A /chassis/iom # <b>show firmware</b>	(Optional) Displays the status of the firmware activation.  Use this step only if you want to verify that the firmware activation completed successfully. The CLI does not automatically refresh, so you may have to enter the <b>show firmware</b> command multiple times until the task state changes from Activating to Ready.

The following example updates and activates the I/O module firmware to version 1.2(1) in the same transaction, without verifying that the firmware update and firmware activation completed successfully:

```
UCS-A# scope chassis 1
UCS-A# /chassis # scope iom 1
UCS-A# /chassis/iom # show image
Name                                         Type          Version      State
-----                                     -----        -----
ucs-2100.1.2.1.gbin                         Iom          1.2(1)     Active
UCS-A# /chassis/iom # update firmware 1.2(1)
UCS-A# /chassis/iom* # activate firmware 1.2(1) ignorecompcheck set-startup-only
UCS-A# /chassis/iom* # commit-buffer
UCS-A# /chassis/iom #
```

The following example updates the I/O module firmware to version 1.2(1), verifies that the firmware update completed successfully before starting the firmware activation, activates the I/O module firmware, and verifies that the firmware activation completed successfully:

```
UCS-A# scope chassis 1
UCS-A# /chassis # scope iom 1
UCS-A# /chassis/iom # show image
Name                                         Type          Version      State
-----                                     -----        -----
ucs-2100.1.2.1.gbin                         Iom          1.2(1)     Active
UCS-A# /chassis/iom # update firmware 1.2(1)
UCS-A# /chassis/iom* # commit-buffer
UCS-A# /chassis/iom # show firmware
IOM      Fabric ID Running-Vers   Update-Status  Activate-Status
-----  -----
1 A       1.1(1)                 Updating       Ready
UCS-A# /chassis/iom # show firmware
IOM      Fabric ID Running-Vers   Update-Status  Activate-Status
-----  -----
1 A       1.1(1)                 Ready         Ready
UCS-A# /chassis/iom # activate firmware 1.2(1) ignorecompcheck
UCS-A# /chassis/iom* # commit-buffer
UCS-A# /chassis/iom # show firmware
IOM      Fabric ID Running-Vers   Update-Status  Activate-Status
-----  -----
1 A       1.1(1)                 Ready         Activating
UCS-A# /chassis/iom # show firmware
IOM      Fabric ID Running-Vers   Update-Status  Activate-Status
-----  -----
1 A       1.2(1)                 Ready         Ready
```

## Activating the Board Controller Firmware on a Server

Only certain servers, such as the Cisco UCS B440 High Performance blade server and the Cisco UCS B230 blade server, have board controller firmware. The board controller firmware controls many of the server functions, including eUSBs, LEDs, and I/O connectors.

**Note**

This activation procedure causes the server to reboot. Depending upon whether or not the service profile associated with the server includes a maintenance policy, the reboot can occur immediately. To reduce the number of times a server needs to be rebooted during the upgrade process, we recommend that you upgrade the board controller firmware through the host firmware package in the service profile as the last step of upgrading a Cisco UCS domain, along with the server BIOS.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-id / server-id</b>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope boardcontroller</b>	Enters board controller mode for the server.
<b>Step 3</b>	UCS-A /chassis/server/boardcontroller # <b>show image</b>	(Optional) Displays the available software images for the board controller.
<b>Step 4</b>	UCS-A /chassis/server/boardcontroller # <b>show firmware</b>	(Optional) Displays the current running software image for the board controller.
<b>Step 5</b>	UCS-A /chassis/server/boardcontroller # <b>activate firmware version-num [ignorecompcheck]</b>	Activates the selected firmware version on the board controller in the server.  Use the <b>ignorecompcheck</b> keyword if you want to ignore the compatibility check and activate the firmware regardless of any possible incompatibilities or currently executing tasks.
<b>Step 6</b>	UCS-A /chassis/server/boardcontroller # <b>commit-buffer</b>	Commits the transaction to the system configuration.

Cisco UCS Manager disconnects all active sessions, logs out all users, and activates the software. When the upgrade is complete, you are prompted to log back in. If you are prompted to re-login immediately after being disconnected, the login will fail. You must wait until the activation of Cisco UCS Manager is completed, which takes a few minutes.

The following example activates the board controller firmware:

```

UCS-A# scope server 1/1
UCS-A# /chassis/server # scope boardcontroller
UCS-A# /chassis/server/boardcontroller # show image
Name                           Type            Version          State
-----                         -----           -----
ucs-b440-m1-pld.B440100C-B4402006.bin   Board Controller  B440100C-B4402006  Active

UCS-A# /chassis/server/boardcontroller # show firmware
BoardController:
    Running-Vers: B440100C-B4402006
    Activate-Status: Ready

```

```
UCS-A# /chassis/server/boardcontroller # activate firmware B440100C-B4402006
  ignorecompcheck
UCS-A# /chassis/server/boardcontroller* # commit-buffer
```

## Activating the Cisco UCS Manager Software

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>show image</b>	Displays the available software images for Cisco UCS Manager (system).
<b>Step 3</b>	UCS-A /system # <b>activate firmware</b> <i>version-num</i> [ <b>ignorecompcheck</b> ]	Activates the selected firmware version on the system.  Use the <b>ignorecompcheck</b> keyword if you want to ignore the compatibility check and activate the firmware regardless of any possible incompatibilities or currently executing tasks.  <b>Note</b> Activating Cisco UCS Manager does not require rebooting the fabric interconnect; however, management services will briefly go down and all VSH shells will be terminated as part of the activation.
<b>Step 4</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction.  Cisco UCS Manager makes the selected version the startup version and schedules the activation to occur when the fabric interconnects are upgraded.

The following example upgrades Cisco UCS Manager to version 1.2(1) and commits the transaction:

```
UCS-A# scope system
UCS-A# /system # show image
Name                                     Type      Version      State
-----+-----+-----+-----+
ucsmanger-k9.1.2.1.gbin                  System    1.2(1)     Active

UCS-A# /system # activate firmware 1.2(1)
UCS-A# /system* # commit-buffer
UCS-A# /system #
```

## Activating the Firmware on a Fabric Interconnect

When updating the firmware on two fabric interconnects in a high availability cluster configuration, you must activate the subordinate fabric interconnect before activating the primary fabric interconnect. For more information about determining the role for each fabric interconnect, see [Verifying the High Availability Status and Roles of a Cluster Configuration, on page 175](#).

**Tip**

If you ever need to recover the password to the admin account that was created when you configured the fabric interconnects for the Cisco UCS domain, you must know the running kernel version and the running system version. If you do not plan to create additional accounts, we recommend that you save the path to these firmware versions in a text file so that you can access them if required.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fabric-interconnect {a   b}</b>	Enters fabric interconnect mode for the specified fabric interconnect.
<b>Step 2</b>	UCS-A /fabric-interconnect # <b>show image</b>	Displays the available software images for the fabric interconnect.
<b>Step 3</b>	UCS-A /fabric-interconnect # <b>activate firmware {kernel-version kernel-ver-num   system-version system-ver-num}</b>	Activates the selected firmware version on the fabric interconnect.
<b>Step 4</b>	UCS-A /fabric-interconnect # <b>commit-buffer</b>	Commits the transaction. Cisco UCS Manager updates and activates the firmware, and then reboots the fabric interconnect and any I/O module in the data path to that fabric interconnect, disrupting data traffic to and from that fabric interconnect.

The following example upgrades the fabric interconnect to version 4.0(1a)N2(1.2.1) and commits the transaction:

```
UCS-A# scope fabric-interconnect a
UCS-A /fabric-interconnect # show image
Name                                         Type          Version        State
-----
ucs-6100-k9-kickstart.4.0.1a.N2.1.2.1.gbin   Fabric Interconnect 4.0(1a)N2(1.2.1) Active
ucs-6100-k9-system.4.0.1a.N2.1.2.1.gbin      Fabric Interconnect 4.0(1a)N2(1.2.1) Active

UCS-A /fabric-interconnect # activate firmware kernel-version 4.0(1a)N2(1.2.1) system-version 4.0(1a)N2(1.2.1)
UCS-A /fabric-interconnect* # commit-buffer
UCS-A /fabric-interconnect #
```

## Updating Firmware through Service Profiles

### Host Firmware Package

This policy enables you to specify a set of firmware versions that make up the host firmware package (also known as the host firmware pack). The host firmware includes the following firmware for server and adapter endpoints:

- Adapter
- BIOS
- Board Controller
- FC Adapters
- HBA Option ROM
- Storage Controller

**Tip**

You can include more than one type of firmware in the same host firmware package. For example, a host firmware package can include both BIOS firmware and storage controller firmware or adapter firmware for two different models of adapters. However, you can only have one firmware version with the same type, vendor, and model number. The system recognizes which firmware version is required for an endpoint and ignores all other firmware versions.

The firmware package is pushed to all servers associated with service profiles that include this policy.

This policy ensures that the host firmware is identical on all servers associated with service profiles which use the same policy. Therefore, if you move the service profile from one server to another, the firmware versions are maintained. Also, if you change the firmware version for an endpoint in the firmware package, new versions are applied to all the affected service profiles immediately, which could cause server reboots.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect.

**Prerequisites**

This policy is not dependent upon any other policies. However, you must ensure that the appropriate firmware has been downloaded to the fabric interconnect. If the firmware image is not available when Cisco UCS Manager is associating a server with a service profile, Cisco UCS Manager ignores the firmware upgrade and completes the association.

## **Creating and Updating a Host Firmware Package**

If the policy is included in one or more service profiles associated with a server and those service profiles do not include maintenance policies, Cisco UCS Manager updates and activates the firmware in the server and adapter with the new versions and reboots the server as soon as you save the host firmware package policy.

**Tip**

You can include more than one type of firmware in the same host firmware package. For example, a host firmware package can include both BIOS firmware and storage controller firmware or adapter firmware for two different models of adapters. However, you can only have one firmware version with the same type, vendor, and model number. The system recognizes which firmware version is required for an endpoint and ignores all other firmware versions.

**Before You Begin**

Ensure that the appropriate firmware has been downloaded to the fabric interconnect.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A org/ # <b>create fw-host-pack</b> <i>pack-name</i>	Creates a host firmware package with the specified package name and enters organization firmware host package mode.
<b>Step 3</b>	UCS-A /org/fw-host-pack # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the host firmware package.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A org/fw-host-pack # <b>create pack-image</b> <i>hw-vendor-name</i> <i>hw-model{adapter   host-hba   host-hba-combined   host-hba-optionrom   host-nic   server-bios   storage-controller   unspecified}</i> <i>version-num</i>	Creates a package image for the host firmware package and enters organization firmware host package image mode. The <i>hw-vendor-name</i> and <i>hw-model</i> values are labels that help you easily identify the package image when you enter the <b>show image detail</b> command. The <i>version-num</i> value specifies the version number of the firmware being used for the package image.  The model and model number (PID) must match the servers that are associated with this firmware package. If you select the wrong model or model number, Cisco UCS Manager cannot install the firmware update.
<b>Step 5</b>	UCS-A org/fw-host-pack/pack-image # <b>set version</b> <i>version-num</i>	(Optional) Specifies the package image version number. Changing this number triggers firmware updates on all components using the firmware through a service profile. Use this step only when updating a host firmware package, not when creating a package.  <b>Note</b> The host firmware package can contain multiple package images. Repeat <b>Step 4</b> , and <b>Step 5</b> , to create additional package images for other components.
<b>Step 6</b>	UCS-A org/fw-host-pack/pack-image # <b>commit-buffer</b>	Commits the transaction.  Cisco UCS Manager verifies the model numbers and vendor against all servers associated with service profiles that include this policy. If the model numbers and vendor match a firmware version in the policy, Cisco UCS Manager updates the firmware according to the settings in the maintenance policies included in the service profiles.

The following example creates the app1 host firmware package, creates a storage controller package image with version 2009.02.09 firmware, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create fw-host-pack app1
UCS-A /org/fw-host-pack* # set descr "This is a host firmware package example."
```

```
UCS-A /org/fw-host-pack* # create pack-image Cisco UCS storage-controller 2009.02.09
UCS-A /org/fw-host-pack/pack-image* # commit-buffer
UCS-A /org/fw-host-pack/pack-image #
```

### What to Do Next

Include the policy in a service profile and/or template.

## Management Firmware Package

This policy enables you to specify a set of firmware versions that make up the management firmware package (also known as a management firmware pack). The management firmware package includes the Cisco Integrated Management Controller (CIMC) on the server. You do not need to use this package if you upgrade the CIMC directly.

The firmware package is pushed to all servers associated with service profiles that include this policy. This policy ensures that the CIMC firmware is identical on all servers associated with service profiles which use the same policy. Therefore, if you move the service profile from one server to another, the firmware versions are maintained.

You must include this policy in a service profile, and that service profile must be associated with a server for it to take effect.

This policy is not dependent upon any other policies. However, you must ensure that the appropriate firmware has been downloaded to the fabric interconnect.

## Creating and Updating a Management Firmware Package


**Caution**

If the policy is included in one or more service profiles associated with a server and those service profiles do not include maintenance policies, Cisco UCS Manager updates and activates the management firmware in the server with the new versions and reboots the server as soon as you save the management firmware package policy.

### Before You Begin

Ensure that the appropriate firmware has been downloaded to the fabric interconnect.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A org/ # <b>create fw-mgmt-pack <i>pack-name</i></b>	Creates a management firmware package with the specified package name and enters organization firmware management package mode.
<b>Step 3</b>	UCS-A /org/fw-mgmt-pack # <b>set descr <i>description</i></b>	(Optional) Provides a description for the management firmware package.

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A org/fw-mgmt-pack # <b>create pack-image</b> <i>hw-vendor-name hw-model</i> <b>bmc</b> <i>version-num</i>	Creates a package image for the management firmware package and enters organization firmware management package image mode. The <i>hw-vendor-name</i> and <i>hw-model</i> values are labels that help you easily identify the package image when you enter the <b>show image detail</b> command. The <i>version-num</i> value specifies the version number of the firmware being used for the package image. The model and model number (PID) must match the servers that are associated with this firmware package. If you select the wrong model or model number, Cisco UCS Manager cannot install the firmware update.
<b>Step 5</b>	UCS-A org/fw-mgmt-pack/pack-image # <b>set version</b> <i>version-num</i>	(Optional) Specifies the package image version number. Changing this number triggers firmware updates on all components using the firmware through a service profile. Use this step only when updating a firmware package, not when creating a package.
<b>Step 6</b>	UCS-A org/fw-mgmt-pack/pack-image # <b>commit-buffer</b>	Commits the transaction. Cisco UCS Manager verifies the model numbers and vendor against all servers associated with service profiles that include this policy. If the model numbers and vendor match a firmware version in the policy, Cisco UCS Manager updates the firmware according to the settings in the maintenance policies included in the service profiles.

The following example creates the cimc1 host firmware package, creates a CIMC package image with version 1.0(0.988) firmware, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create fw-mgmt-pack cimc1
UCS-A /org/fw-mgmt-pack* # set descr "This is a management firmware package example."
UCS-A /org/fw-mgmt-pack* # create pack-image Cisco UCS cimc 1.0(0.988)
UCS-A /org/fw-mgmt-pack/pack-image* # commit-buffer
UCS-A /org/fw-mgmt-pack/pack-image #
```

### What to Do Next

Include the policy in a service profile and/or template.

# Managing the Capability Catalog

## Capability Catalog

The Capability Catalog is a set of tunable parameters, strings, and rules. Cisco UCS Manager uses the catalog to update the display and configurability of components such as newly qualified DIMMs and disk drives for servers.

The catalog is divided by hardware components, such as the chassis, CPU, local disk, and I/O module. You can use the catalog to view the list of providers available for that component. There is one provider per hardware component. Each provider is identified by the vendor, model (PID), and revision. For each provider, you can also view details of the equipment manufacturer and the form factor.

### Contents of the Capability Catalog

The contents of the Capability Catalog include the following:

#### Implementation-Specific Tunable Parameters

- Power and thermal constraints
- Slot ranges and numbering
- Adapter capacities

#### Hardware-Specific Rules

- Firmware compatibility for components such as the BIOS, CIMC, RAID controller, and adapters
- Diagnostics
- Hardware-specific reboot

#### User Display Strings

- Part numbers, such as the CPN, PID/VID
- Component descriptions
- Physical layout/dimensions
- OEM information

### Updates to the Capability Catalog

Capability Catalog updates are included in each Cisco UCS Manager update. Unless otherwise instructed by Cisco Technical Support, you only need to activate the Capability Catalog update after you've downloaded, updated, and activated an Cisco UCS Infrastructure Software Bundle.

As soon as you activate a Capability Catalog update, Cisco UCS Manager immediately updates to the new baseline catalog. You do not have to perform any further tasks. Updates to the Capability Catalog do not require you to reboot any component in the Cisco UCS instance or to reinstall Cisco UCS Manager.

Each Cisco UCS Manager release contains a baseline catalog. In rare circumstances, Cisco releases an update to the Capability Catalog and makes it available on the same site where you download firmware images. The catalog update is compatible with Cisco UCS, Release 1.3(1) and later.

## Activating a Capability Catalog Update

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope capability</b>	Enters system capability mode.
<b>Step 3</b>	UCS-A /system/capability # <b>activate firmware firmware-version</b>	Activates the specified Capability Catalog version.
<b>Step 4</b>	UCS-A /system/capability # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example activates a Capability Catalog update and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope capability
UCS-A /system/capability # activate firmware 1.0(3)
UCS-A /system/capability* # commit-buffer
UCS-A /system/capability #
```

## Verifying that the Capability Catalog is Current

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope capability</b>	Enters system capability mode.
<b>Step 3</b>	UCS-A /system/capability # <b>show version</b>	Displays the current Capability Catalog version.
<b>Step 4</b>	On <a href="#">Cisco.com</a> , determine the most recent release of the Capability Catalog available.	For more information about the location of Capability Catalog updates, see <a href="#">Obtaining Capability Catalog Updates from Cisco, on page 204</a> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	If a more recent version of the Capability Catalog is available on Cisco.com, update the Capability Catalog with that version.	

The following example displays the current Capability Catalog version:

```
UCS-A# scope system
UCS-A /system # scope capability
UCS-A /system/capability # show version
Catalog:
    Running-Vers: 1.0(8.35)
    Activate-Status: Ready
UCS-A /system/capability #
```

## Restarting a Capability Catalog Update

You can restart a failed Capability Catalog file update, modifying the update parameters if necessary.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope system	Enters system command mode.
<b>Step 2</b>	UCS-A /system # scope capability	Enters capability command mode.
<b>Step 3</b>	UCS-A /system/capability # show cat-updater [filename ]	(Optional) Displays the update history for Capability Catalog file update operations.
<b>Step 4</b>	UCS-A /system/capability # scope cat-updater filename	Enters the command mode for the Capability Catalog file update operation.
<b>Step 5</b>	UCS-A /system/capability/cat-updater # set userid username	(Optional) Specifies the username for the remote server.
<b>Step 6</b>	UCS-A /system/capability/cat-updater # set password password	(Optional) Specifies the password for the remote server username.  If no password is configured, you are prompted for a password when you start the update.
<b>Step 7</b>	UCS-A /system/capability/cat-updater # set protocol {ftp   scp   sftp   tftp}	(Optional) Specifies the file transfer protocol for the remote server.  <b>Note</b> TFTP has a file size limitation of 32 MB. Because catalog images can be much larger than that, we recommend that you do not use TFTP for catalog image downloads.
<b>Step 8</b>	UCS-A /system/capability/cat-updater # set server {hostname   ip-address}	(Optional) Specifies the hostname or IP address of the remote server.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 9</b>	UCS-A /system/capability/cat-updater # <b>set path</b> pathname/filename	(Optional) Specifies the path and file name of the Capability Catalog file on the remote server.
<b>Step 10</b>	UCS-A /system/capability/cat-updater # <b>restart</b>	Restarts the Capability Catalog file update operation.

The following example changes the server IP address and restarts the Capability Catalog file update operation:

```
UCS-A# scope system
UCS-A /system # scope capability
UCS-A /system/capability # show cat-updater

Catalog Updater:
  File Name Protocol Server          Userid      Status
  -----  -----  -----  -----
  ucs-catalog.1.0.0.4.bin            Scp        192.0.2.111    user1      Failed

UCS-A /system/capability # scope cat-updater ucs-catalog.1.0.0.4.bin
UCS-A /system/capability/cat-updater # set server 192.0.2.112
UCS-A /system/capability/cat-updater # restart
UCS-A /system/capability/cat-updater #
```

## Viewing a Capability Catalog Provider

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system command mode.
<b>Step 2</b>	UCS-A /system # <b>scope capability</b>	Enters capability command mode.
<b>Step 3</b>	UCS-A /system/capability # <b>show {chassis   cpu   disk   fan   fru   iom   memory   psu   server} [vendor model revision] [detail   expand]</b>	Displays vendor, model, and revision information for all components in the specified component category. To view manufacturing and form factor details for a specific component, specify the <i>vendor</i> , <i>model</i> , and <i>revision</i> with the <b>expand</b> keyword. If any of these fields contains spaces, you must enclose the field with quotation marks.



**Note**

If the server contains one or more SATA devices, such as a hard disk drive or solid state drive, the **show disk** command displays ATA in the Vendor field. Use the **expand** keyword to display additional vendor information.

The following example lists the installed fans and displays detailed information from the Capability Catalog about a specific fan:

```
UCS-A# scope system
UCS-A /system # scope capability
UCS-A /system/capability # show fan

Fan Module:
Vendor Model Revision
-----
Cisco Systems, Inc. N10-FAN1 0
Cisco Systems, Inc. N10-FAN2 0
Cisco Systems, Inc. N20-FAN5 0

UCS-A /system/capability # show fan "Cisco Systems, Inc." N10-FAN1 0 expand

Fan Module:
Vendor: Cisco Systems, Inc.
Model: N10-FAN1
Revision: 0

Equipment Manufacturing:
Name: Fan Module for UCS 6140 Fabric Interconnect
PID: N10-FAN1
VID: NA
Caption: Fan Module for UCS 6140 Fabric Interconnect
Part Number: N10-FAN1
SKU: N10-FAN1
CLEI:
Equipment Type:

Form Factor:
Depth (C): 6.700000
Height (C): 1.600000
Width (C): 4.900000
Weight (C): 1.500000

UCS-A /system/capability #
```

## Downloading Individual Capability Catalog Updates

### Obtaining Capability Catalog Updates from Cisco

#### Procedure

---

- Step 1** In a web browser, navigate to <http://www.cisco.com>.
- Step 2** Under **Support**, click **Download Software**.
- Step 3** Click **Unified Computing**.
- Step 4** If prompted, enter your Cisco.com username and password to log in.
- Step 5** Click **Cisco UCS Manager Capability Catalog Software > Unified Computing System (UCS) Manager Capability Catalog**.
- Step 6** Click the link for the latest release of the Capability Catalog.
- Step 7** Click one of the following buttons and follow the instructions provided:
  - **Download Now**—Allows you to download the catalog update immediately

- **Add to Cart**—Adds the catalog update to your cart to be downloaded at a later time

**Step 8** Follow the prompts to complete your download of the catalog update.

---

### What to Do Next

Update the Capability Catalog.

## Updating the Capability Catalog from a Remote Location

You cannot perform a partial update to the Capability Catalog. When you update the Capability Catalog, all components included in the catalog image are updated.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system command mode.
<b>Step 2</b>	UCS-A /system# <b>scope capability</b>	Enters capability command mode.
<b>Step 3</b>	UCS-A /system/capability# <b>update catalog URL</b>	Imports and applies the specified Capability Catalog file. Specify the URL for the operation using one of the following syntax: <ul style="list-style-type: none"> <li>• <b>ftp:// username@hostname / path</b></li> <li>• <b>scp:// username@hostname / path</b></li> <li>• <b>sftp:// username@hostname / path</b></li> <li>• <b>tftp:// hostname : port-num / path</b></li> </ul> When a username is specified, you are prompted for a password.
<b>Step 4</b>	UCS-A /system/capability# <b>show version</b>	(Optional) Displays the catalog update version.
<b>Step 5</b>	UCS-A /system/capability# <b>show cat-updater [filename ]</b>	(Optional) Displays the update history for a Capability Catalog file, if specified, or for all Capability Catalog file update operations.

Cisco UCS Manager downloads the image and updates the Capability Catalog. You do not need to reboot any hardware components.

The following example uses SCP to import a Capability Catalog file:

```
UCS-A# scope system
UCS-A /system # scope capability
UCS-A /system/capability # update catalog
scp://user1@192.0.2.111/catalogs/ucs-catalog.1.0.0.4.bin
Password:
UCS-A /system/capability # show version
```

```

Catalog:
    Update Version: 1.0(0.4)

UCS-A /system/capability # show cat-updater

Catalog Updater:
    File Name Protocol Server          Userid      Status
    -----  -----  -----  -----
    ucs-catalog.1.0.0.4.bin            Scp        192.0.2.111   user1      Success

UCS-A /system/capability #

```

## Updating Management Extensions

### Management Extensions

Management Extension updates are included in each Cisco UCS Manager update. Unless otherwise instructed by Cisco Technical Support, you only need to activate the Management Extension update after you've downloaded, updated, and activated an Cisco UCS Infrastructure Software Bundle.

Management Extensions enable you to add support for previously unsupported servers and other hardware to Cisco UCS Manager. For example, you may need to activate a Management Extension if you want to add a new, previously unsupported server to an existing Cisco UCS instance.

The Management Extension image contains the images, information, and firmware required by Cisco UCS Manager to be able to manage the new hardware.

Cisco UCS Manager may need to access a Management Extension when you activate. Therefore, the Management Extension is locked during the activation and update process.

### Activating a Management Extension

The Management Extension is included in the server bundle that you have already downloaded. You do not need to download the Management Extension separately.

To verify the Management Extension version, issue the **show version** command.

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system# <b>scope management-extension</b>	Enters system Management Extension mode.
<b>Step 3</b>	UCS-A /system/management-extension # <b>activate firmware firmware-version</b>	Activates the specified Management Extension.
<b>Step 4</b>	UCS-A /system/management-extension # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example activates the Management Extension and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope management-extension
UCS-A /system/management-extension # activate firmware 1.0(4)
CS-A /system/management-extension* # commit-buffer
```





# CHAPTER 11

## Configuring DNS Servers

This chapter includes the following sections:

- [DNS Servers in Cisco UCS , page 209](#)
- [Configuring a DNS Server, page 209](#)
- [Deleting a DNS Server, page 210](#)

### DNS Servers in Cisco UCS

You need to specify an external DNS server for each Cisco UCS instance 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.

### Configuring a DNS Server

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>create dns ip-addr</b>	Configures the system to use the DNS server with the specified IP address.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a DNS server with the IP address 192.168.200.105 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # create dns 192.168.200.105
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

## Deleting a DNS Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>delete dns ip-addr</b>	Deletes the NTP server with the specified IP address.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the DNS server with the IP address 192.168.200.105 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # delete dns 192.168.200.105
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```



# CHAPTER 12

## Configuring System-Related Policies

---

This chapter includes the following sections:

- [Configuring the Chassis Discovery Policy, page 211](#)
- [Configuring the Rack Server Discovery Policy, page 213](#)
- [Configuring the Aging Time for the MAC Address Table, page 215](#)

## Configuring the Chassis Discovery Policy

### Chassis Discovery Policy

The chassis discovery policy determines how the system reacts when you add a new chassis. Cisco UCS Manager uses the settings in the chassis discovery policy to determine the minimum threshold for the number of links between the chassis and the fabric interconnect. However, the configuration in the chassis discovery policy does not prevent you from connecting multiple chassis to the fabric interconnects in a Cisco UCS instance and wiring those chassis with a different number of links.

If you have a Cisco UCS instance that has some chassis wired with 1 link, some with 2 links, and some with 4 links, we recommend that you configure the chassis discovery policy for the minimum number links in the instance so that Cisco UCS Manager can discover all chassis. 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 discovery policy. For example, if the chassis 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 discovery policy works in a multi-chassis Cisco UCS instance:

**Table 11: Chassis Discovery Policy and Chassis Links**

<b>Number of Links Wired for the Chassis</b>	<b>1-Link Chassis Discovery Policy</b>	<b>2-Link Chassis Discovery Policy</b>	<b>4-Link Chassis Discovery Policy</b>
<b>1 link between IOM and fabric interconnects</b>	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance as a chassis wired with 1 link.	Chassis cannot be discovered by Cisco UCS Manager and is not added to the Cisco UCS instance.	Chassis cannot be discovered by Cisco UCS Manager and is not added to the Cisco UCS instance.
<b>2 links between IOM and fabric interconnects</b>	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance 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 instance as a chassis wired with 2 link.	Chassis cannot be discovered by Cisco UCS Manager and is not added to the Cisco UCS instance.
<b>4 links between IOM and fabric interconnects</b>	Chassis is discovered by Cisco UCS Manager and added to the Cisco UCS instance 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 instance 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 instance as a chassis wired with 4 link.

## Configuring the Chassis Discovery Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.  <b>Note</b> The chassis discovery policy can be accessed only from the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope chassis-disc-policy</b>	Enters organization chassis discovery policy mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org/chassis-disc-policy # <b>set action {1-link   2-link   4-link}</b>	Specifies the number of links to the fabric interconnect that the chassis must have before it can be discovered.
<b>Step 4</b>	UCS-A /org/chassis-disc-policy # <b>set descr description</b>	(Optional) Provides a description for the chassis discovery policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	UCS-A /org/chassis-disc-policy # <b>set qualifier qualifier</b>	(Optional) Uses the specified server pool policy qualifications to associate this policy with a server pool.
<b>Step 6</b>	UCS-A /org/chassis-disc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example scopes to the default chassis discovery policy, sets it to discover chassis with four links to a fabric interconnect, provides a description for the policy, specifies the server pool policy qualifications that will be used to qualify the chassis, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope chassis-disc-policy
UCS-A /org/chassis-disc-policy* # set action 4-link
UCS-A /org/chassis-disc-policy* # set descr "This is an example chassis discovery policy."
UCS-A /org/chassis-disc-policy* # set qualifier ExampleQual
UCS-A /org/chassis-disc-policy* # commit-buffer
UCS-A /org/chassis-disc-policy *
```

## 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 hardware installation guide for that server.

## Configuring the Rack Server Discovery Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.  <b>Note</b> The rack server discovery policy can be accessed only from the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope rackserver-disc-policy</b>	Enters organization rack server discovery policy mode.
<b>Step 3</b>	UCS-A /org/rackserver-disc-policy # <b>set action {immediate   user-acknowledged}</b>	Specifies the way the system reacts when you add a new rack server.
<b>Step 4</b>	UCS-A /org/rackserver-disc-policy # <b>set descr <i>description</i></b>	(Optional) Provides a description for the rack server discovery policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	UCS-A /org/rackserver-disc-policy # <b>set scrub-policy <i>scrub-pol-name</i></b>	Specifies the scrub policy that should run on a newly discovered rack server.
<b>Step 6</b>	UCS-A /org/rackserver-disc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example scopes to the default rack server discovery policy, sets it to immediately discover new rack servers, provides a description for the policy, specifies a scrub policy called scrubpol1, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope rackserver-disc-policy
UCS-A /org/rackserver-disc-policy* # set action immediate
UCS-A /org/rackserver-disc-policy* # set descr "This is an example rackserver discovery
policy."
UCS-A /org/rackserver-disc-policy* # set scrub-policy scrubpol1
UCS-A /org/rackserver-disc-policy* # commit-buffer
UCS-A /org/rackserver-disc-policy #
```

# 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>set mac-aging {dd hh mm ss   mode-default   never}</b>	Specifies the aging time for the MAC address table. Use the <b>mode-default</b> keyword to set the aging time to a default value dependent on the configured Ethernet switching mode. Use the <b>never</b> keyword to never remove MAC addresses from the table regardless of how long they have been idle.
<b>Step 3</b>	UCS-A /eth-uplink # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the aging time for the MAC address table to one day and 12 hours and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # set mac-aging 01 12 00 00
UCS-A /eth-uplink* # commit-buffer
UCS-A /eth-uplink #
```





# CHAPTER 13

## Managing Licenses

---

This chapter includes the following sections:

- [Licenses, page 217](#)
- [Obtaining the Host ID for a Fabric Interconnect, page 218](#)
- [Obtaining a License, page 219](#)
- [Installing a License, page 219](#)
- [Viewing the Licenses Installed on a Fabric Interconnect, page 220](#)
- [Viewing License Usage for a Fabric Interconnect, page 221](#)
- [Uninstalling a License, page 222](#)

## Licenses

Port licenses for each Cisco UCS fabric interconnect are factory installed and shipped with the hardware. 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

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.

### 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>show server-host-id</b>	Obtains the host ID or serial number for the fabric interconnect.  <b>Tip</b> Use the entire host ID that displays after the equal (=) sign.

The following example obtains the host ID for a fabric interconnect:

```
UCS-A# scope license
UCS-A /license # show server-host-id
Server host id:
  Scope Host Id
  -----
  A      VDH=SSI12121212
  B      VDH=SSI13131313
UCS-A /license #
```

**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.

# Installing a License


**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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<code>UCS-A# scope license</code>	Enters license mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /license # <b>download license</b> <i>from-filesystem</i>	Downloads the license from its source location. For the <i>from-filesystem</i> : argument, use one of the following syntaxes: <ul style="list-style-type: none"> <li>• <b>ftp:// server-ip-addr</b></li> <li>• <b>scp:// username@server-ip-addr</b></li> <li>• <b>sftp:// username@server-ip-addr</b></li> <li>• <b>tftp:// server-ip-addr : port-num</b></li> </ul>
<b>Step 3</b>	UCS-A /license # <b>install file</b> <i>license_filename</i>	Installs the license.

The following example uses FTP to download and install a license:

```
UCS-A # scope license
UCS-A /license # download license ftp://192.168.10.10/license/port9.lic
UCS-A /license # install file port9.lic
UCS-A /license #
```

## Viewing the Licenses Installed on a Fabric Interconnect

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>show file</b> [ <i>license_filename</i>   <b>detail</b> ]	Displays the licenses installed on the fabric interconnect with the level of detail specified in the command.

The following example displays the full details for the licenses installed on a fabric interconnect:

```
UCS-A# scope license
UCS-A /license # show file detail

License file: UCSFEAT20100928112305377.lic
Id: 1212121212121212
Version: 1.0
Scope: A
State: Installed
Features
Feature Name: ETH_PORT_ACTIVATION_PKG
Vendor: cisco
Version: 1.0
Quantity: 24
Lines
Line Id: 1
Type: Increment
```

```

Expiry Date: Never
Pak:
Quantity: 24
Signature: B10101010101

License file: UCSFEAT20100928112332175.lic
Id: 1313131313131313
Version: 1.0
Scope: B
State: Installed
Features
Feature Name: ETH_PORT_ACTIVATION_PKG
Vendor: cisco
Version: 1.0
Quantity: 24
Lines
Line Id: 1
Type: Increment
Expiry Date: Never
Pak:
Quantity: 24
Signature: F302020202020

```

UCS-A /license #

## Viewing License Usage for a Fabric Interconnect

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>show usage</b>	<p>Displays the license usage table for all license files installed on the fabric interconnect.</p> <p>This following are included:</p> <ul style="list-style-type: none"> <li>• <b>Feat Name</b> Package name corresponding to the licensed feature.</li> <li>• <b>Scope</b> Fabric interconnect on which the feature is present.</li> <li>• <b>Default</b> Number of default licenses for the fabric interconnect-- 8 or 16.</li> <li>• <b>Total Quant</b> Total quantity of licenses.</li> <li>• <b>Used Quant</b> Number of licenses in use.</li> </ul>

	<b>Command or Action</b>	<b>Purpose</b>
		<ul style="list-style-type: none"> <li>• <b>State</b> Denotes whether the license is valid.</li> <li>• <b>Peer Status</b> Identifies whether matching licenses are installed on both fabrics.</li> <li>• <b>Grace Used</b> Amount of time (in seconds) used in the grace period.</li> </ul>

The following example displays full details of the licenses installed on a fabric interconnect:

```
UCS-A# scope license
UCS-A /license # show usage
Feat Name          Scope Default Total Quant Used Quant State
Peer      Status     Grace Used
-----  -----
-----  -----
ETH_PORT_ACTIVATION_PKG    A       16        40      11 License
Ok           Matching      0
ETH_PORT_ACTIVATION_PKG    B       16        40      11 License
Ok           Matching      0
UCS-A /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.
- Disable the feature or port associated with the license you want to uninstall.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope license	Enters license mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /license # <b>clear file</b> <i>license-filename</i>	Uninstalls the specified license.

Cisco UCS Manager deactivates the license, removes the license from the list of licenses, and deletes the license from the fabric interconnect. In a cluster setup, you must uninstall the license from the other fabric interconnect.

The following example shows the uninstallation of port9.lic:

```
UCS-A # scope license
UCS-A /license # clear file port9.lic
Clearing license port9.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT ETH_PORT_ACTIVATION_PKG cisco 1.0 permanent 1 \
    VENDOR_STRING=<LIC_SOURCE>UCS_SWIFT</LIC_SOURCE><SKU>N10-L001=</SKU> \
    HOSTID=VDH=FLC12360025 \
    NOTICE=<LicFileID>20090519200954833</LicFileID><LicLineID>1</LicLineID> \
    <PAK></PAK>" SIGN=C01FAE4E87FA

Clearing license .....done
UCS-A /license #
```





PART



## Network Configuration

- Configuring VLANs, page 227
- Configuring LAN Pin Groups, page 239
- Configuring MAC Pools, page 241
- Configuring Quality of Service, page 243
- Configuring Network-Related Policies, page 251





# CHAPTER 14

## Configuring VLANs

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This chapter includes the following sections:

- [Named VLANs, page 227](#)
- [Private VLANs, page 228](#)
- [VLAN Port Limitations, page 229](#)
- [Configuring Named VLANs, page 230](#)
- [Configuring Private VLANs, page 234](#)
- [Viewing the VLAN Port Count, page 238](#)

### 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 4048. 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.

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.

### 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 4048. 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.

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 domain Cisco 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 Accessible to Both Fabric Interconnects (Uplink Ethernet Mode)



**Important** You cannot create VLANs with IDs from 3968 to 4048. 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

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>create vlan</b> <i>vlan-name vlan-id</i>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet uplink VLAN mode.
<b>Step 3</b>	UCS-A /eth-uplink/fabric/vlan # <b>set sharing {isolated   none   primary}</b>	<p>Sets the sharing for the specified VLAN. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>isolated</b> —This is a secondary VLAN associated with a primary VLAN. This VLAN is private.</li> <li>• <b>none</b> —This VLAN does not have any secondary or private VLANs.</li> </ul>

	<b>Command or Action</b>	<b>Purpose</b>
		• <b>primary</b> —This VLAN can have one or more secondary VLANs.
<b>Step 4</b>	UCS-A /eth-uplink/vlan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for both fabric interconnects, names the VLAN accounting, assigns the VLAN ID 2112, sets the sharing to none, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # create vlan accounting 2112
UCS-A /eth-uplink/vlan* # set sharing none
UCS-A /eth-uplink/vlan* # commit-buffer
UCS-A /eth-uplink/vlan #
```

## Creating a Named VLAN Accessible to Both Fabric Interconnects (Ethernet Storage Mode)



**Important** You cannot create VLANs with IDs from 3968 to 4048. 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>create vlan</b> <i>vlan-name vlan-id</i>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet storage VLAN mode.
<b>Step 3</b>	UCS-A /eth-storage/vlan # <b>create member-port</b> {a   b} <i>slot-id port-id</i>	Creates a member port for the specified VLAN on the specified fabric.
<b>Step 4</b>	UCS-A /eth-storage/vlan/member-port # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for both fabric interconnects, names the VLAN accounting, assigns the VLAN ID 2112, creates a member port on slot 2, port 20, and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # create vlan accounting 2112
UCS-A /eth-storage/vlan* # create member-port a 2 20
UCS-A /eth-storage/vlan/member-port* # commit-buffer
UCS-A /eth-storage/vlan/member-port #
```

## Creating a Named VLAN Accessible to One Fabric Interconnect (Uplink Ethernet Mode)



**Important** You cannot create VLANs with IDs from 3968 to 4048. 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters Ethernet uplink fabric interconnect mode for the specified fabric interconnect (A or B).
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>create vlan <i>vlan-name</i> <i>vlan-id</i></b>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet uplink fabric interconnect VLAN mode.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/vlan # <b>set sharing {isolated   none   primary}</b>	Sets the sharing for the specified VLAN. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>isolated</b> —This is a secondary VLAN associated with a primary VLAN. This VLAN is private.</li> <li>• <b>none</b> —This VLAN does not have any secondary or private VLANs.</li> <li>• <b>primary</b> —This VLAN can have one or more secondary VLANs.</li> </ul>
<b>Step 5</b>	UCS-A /eth-uplink/fabric/vlan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for fabric interconnect A, names the VLAN finance, assigns the VLAN ID 3955, sets the sharing to none, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # create vlan finance 3955
UCS-A /eth-uplink/fabric/vlan* # set sharing none
UCS-A /eth-uplink/fabric/vlan* # commit-buffer
UCS-A /eth-uplink/fabric/vlan #
```

## Creating a Named VLAN Accessible to One Fabric Interconnect (Ethernet Storage Mode)


**Important**

You cannot create VLANs with IDs from 3968 to 4048. 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-storage</b>	Enters Ethernet storage mode.
<b>Step 2</b>	UCS-A /eth-storage # <b>scope fabric {a   b}</b>	Enters Ethernet storage fabric interconnect mode for the specified fabric interconnect.
<b>Step 3</b>	UCS-A /eth-storage/fabric # <b>create vlan <i>vlan-name vlan-id</i></b>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet storage fabric interconnect VLAN mode.
<b>Step 4</b>	UCS-A /eth-storage/vlan # <b>create member-port {a   b} <i>slot-id port-id</i></b>	Creates a member port for the specified VLAN on the specified fabric.
<b>Step 5</b>	UCS-A /eth-storage/fabric/vlan/member-port # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for fabric interconnect A, names the VLAN finance, assigns the VLAN ID 3955, creates a member port on slot 2, port 20, and commits the transaction:

```
UCS-A# scope eth-storage
UCS-A /eth-storage # scope fabric a
UCS-A /eth-storage/fabric # create vlan finance 3955
UCS-A /eth-storage/fabric/vlan* # create member-port a 2 20
UCS-A /eth-storage/fabric/vlan/member-port* # commit-buffer
UCS-A /eth-storage/fabric/vlan/member-port #
```

## 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.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	(Optional) Enters Ethernet uplink fabric mode. Use this command when you want to delete a named VLAN only from the specified fabric (a or b).
<b>Step 3</b>	UCS-A /eth-uplink # <b>delete vlan <i>vlan-name</i></b>	Deletes the specified named VLAN.
<b>Step 4</b>	UCS-A /eth-uplink # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a named VLAN accessible to both fabric interconnects and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # delete vlan accounting
UCS-A /eth-uplink* # commit-buffer
UCS-A /eth-uplink #
```

The following example deletes a named VLAN accessible to one fabric interconnect and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # delete vlan finance
UCS-A /eth-uplink/fabric* # commit-buffer
UCS-A /eth-uplink/fabric #
```

## Configuring Private VLANs

### Creating a Primary VLAN for a Private VLAN (Accessible to Both Fabric Interconnects)



**Important** You cannot create VLANs with IDs from 3968 to 4048. 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /eth-uplink # <b>create vlan</b> <i>vlan-name vlan-id</i>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet uplink VLAN mode.
<b>Step 3</b>	UCS-A /eth-uplink/vlan # <b>set sharing primary</b>	Sets the VLAN as the primary VLAN.
<b>Step 4</b>	UCS-A /eth-uplink/vlan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for both fabric interconnects, names the VLAN accounting, assigns the VLAN ID 2112, makes this VLAN the primary VLAN, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # create vlan accounting 2112
UCS-A /eth-uplink/vlan* # set sharing primary
UCS-A /eth-uplink/vlan* # commit-buffer
UCS-A /eth-uplink/vlan #
```

## Creating a Primary VLAN for a Private VLAN (Accessible to One Fabric Interconnect)



**Important** You cannot create VLANs with IDs from 3968 to 4048. 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters Ethernet uplink fabric interconnect mode for the specified fabric interconnect.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>create vlan</b> <i>vlan-name vlan-id</i>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet uplink fabric interconnect VLAN mode.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/vlan # <b>set sharing primary</b>	Sets the VLAN as the primary VLAN.
<b>Step 5</b>	UCS-A /eth-uplink/fabric/vlan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for fabric interconnect A, names the VLAN finance, assigns the VLAN ID 3955, makes this VLAN the primary VLAN, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # create vlan finance 3955
UCS-A /eth-uplink/fabric/vlan* # set sharing primary
UCS-A /eth-uplink/fabric/vlan* # commit-buffer
UCS-A /eth-uplink/fabric/vlan #
```

## Creating a Secondary VLAN for a Private VLAN (Accessible to Both Fabric Interconnects)



**Important** You cannot create VLANs with IDs from 3968 to 4048. 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

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>create vlan <i>vlan-name vlan-id</i></b>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet uplink VLAN mode.
<b>Step 3</b>	UCS-A /eth-uplink/vlan # <b>set sharing isolated</b>	Sets the VLAN as the secondary VLAN.
<b>Step 4</b>	UCS-A /eth-uplink/vlan # <b>set pubnwnname <i>primary-vlan-name</i></b>	Specifies the primary VLAN to be associated with this secondary VLAN.
<b>Step 5</b>	UCS-A /eth-uplink/vlan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for both fabric interconnects, names the VLAN accounting, assigns the VLAN ID 2112, makes this VLAN the secondary VLAN, associates the secondary VLAN with the primary VLAN, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # create vlan accounting 2112
UCS-A /eth-uplink/vlan* # set sharing isolated
UCS-A /eth-uplink/vlan* # set pubnwnname pvlan1000
UCS-A /eth-uplink/vlan* # commit-buffer
UCS-A /eth-uplink/vlan #
```

## Creating a Secondary VLAN for a Private VLAN (Accessible to One Fabric Interconnect)


**Important**

You cannot create VLANs with IDs from 3968 to 4048. 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters Ethernet uplink fabric interconnect mode for the specified fabric interconnect (A or B).
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>create vlan <i>vlan-name vlan-id</i></b>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters Ethernet uplink fabric interconnect VLAN mode.
<b>Step 4</b>	UCS-A /eth-uplink/vlan # <b>set sharing isolated</b>	Sets the VLAN as the secondary VLAN.
<b>Step 5</b>	UCS-A /eth-uplink/vlan # <b>set pubnwnname <i>primary-vlan-name</i></b>	Specifies the primary VLAN to be associated with this secondary VLAN.
<b>Step 6</b>	UCS-A /eth-uplink/fabric/vlan/member-port # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VLAN for fabric interconnect A, names the VLAN finance, assigns the VLAN ID 3955, makes this VLAN the secondary VLAN, associates the secondary VLAN with the primary VLAN, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # create vlan finance 3955
UCS-A /eth-uplink/fabric/vlan* # set sharing isolated
UCS-A /eth-uplink/fabric/vlan* # set pubnwnname pvlan1000
UCS-A /eth-uplink/fabric/vlan* # commit-buffer
UCS-A /eth-uplink/fabric/vlan #
```

## Viewing the VLAN Port Count

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fabric-interconnect {a   b}</b>	Enters fabric interconnect mode for the specified fabric interconnect.
<b>Step 2</b>	UCS-A /fabric-interconnect # <b>show vlan-port-count</b>	Displays the VLAN port count.

The following example displays the VLAN port count for fabric interconnect A:

```
UCS-A# scope fabric-interconnect a
UCS-A /fabric-interconnect # show vlan-port-count
```

VLAN-Port Count:	VLAN-Port Limit	Access VLAN-Port Count	Border VLAN-Port Count	Alloc Status
-----	-----	-----	-----	-----
	6000	3	0	Available



# CHAPTER 15

## Configuring LAN Pin Groups

This chapter includes the following sections:

- [LAN Pin Groups, page 239](#)
- [Configuring a LAN Pin Group, page 239](#)

### 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.

### Configuring 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>create pin-group <i>pin-group-name</i></b>	Creates an Ethernet (LAN) pin group with the specified name, and enters Ethernet uplink pin group mode.
<b>Step 3</b>	UCS-A /eth-uplink/pin-group # <b>set descr <i>description</i></b>	(Optional) Provides a description for the pin group.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /eth-uplink/pin-group # <b>set target {a   b   dual} {port <i>slot-num / port-num   port-channel port-num</i>}</b>	(Optional) Sets the Ethernet pin target to the specified fabric and port, or fabric and port channel.
<b>Step 5</b>	UCS-A /eth-uplink/pin-group # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a LAN pin group named pingroup54 on fabric A, provides a description for the pin group, sets the pin group target to port channel 28, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # create pin-group pingroup54
UCS-A /eth-uplink/pin-group* # set descr "This is my pin group #54"
UCS-A /eth-uplink/pin-group* # set target a port-channel 28
UCS-A /eth-uplink/pin-group* # commit-buffer
UCS-A /eth-uplink/pin-group #
```

## What to Do Next

Include the pin group in a vNIC template.



# CHAPTER 16

## Configuring MAC Pools

This chapter includes the following sections:

- [MAC Pools, page 241](#)
- [Configuring a MAC Pool, page 241](#)

### 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 multi-tenancy, you can use the organizational hierarchy to ensure that MAC pools can only be used by specific applications or business services. Cisco UCS Manager 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.

### Configuring a MAC Pool

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create mac-pool <i>mac-pool-name</i></b>	Creates a MAC pool with the specified name, and enters organization MAC pool mode.
<b>Step 3</b>	UCS-A /org/mac-pool # <b>set descr <i>description</i></b>	(Optional) Provides a description for the MAC pool.

	<b>Command or Action</b>	<b>Purpose</b>
		<p><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.</p>
<b>Step 4</b>	UCS-A /org/mac-pool# <b>create block</b> <i>first-mac-addr</i> <i>last-mac-addr</i>	<p>Creates a block (range) of MAC addresses, and enters organization MAC pool block mode. You must specify the first and last MAC addresses in the address range using the form <i>nn : nn : nn : nn : nn : nn</i>, with the addresses separated by a space.</p> <p><b>Note</b> A MAC pool can contain more than one MAC address block. To create multiple MAC address blocks, you must enter multiple <b>create block</b> commands from organization MAC pool mode.</p>
<b>Step 5</b>	UCS-A /org/mac-pool # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a MAC pool named pool37, provides a description for the pool, defines a MAC address block by specifying the first and last MAC addresses in the block, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create mac-pool pool37
UCS-A /org/mac-pool* # set descr "This is my MAC pool"
UCS-A /org/mac-pool* # create block 00:A0:D7:42:00:01 00:A0:D7:42:01:00
UCS-A /org/mac-pool/block* # commit-buffer
UCS-A /org/mac-pool/block #
```

### What to Do Next

Include the MAC pool in a vNIC template.



# CHAPTER 17

## Configuring Quality of Service

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This chapter includes the following sections:

- [Quality of Service, page 243](#)
- [Configuring System Classes, page 243](#)
- [Configuring Quality of Service Policies, page 246](#)
- [Configuring Flow Control Policies, page 248](#)

### 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 instance. 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 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 instance.

Each system class reserves a specific segment of the bandwidth for a specific type of traffic. This 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 12: 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.

## Configuring a System Class

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

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope eth-server</b>	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # <b>scope qos</b>	Enters Ethernet server QoS mode.
<b>Step 3</b>	UCS-A /eth-server/qos # <b>scope eth-classified {bronze   gold   platinum   silver}</b>	Enters Ethernet server QoS Ethernet classified mode for the specified system class.
<b>Step 4</b>	UCS-A /eth-server/qos/eth-classified # <b>enable</b>	Enables the specified system class.
<b>Step 5</b>	UCS-A /eth-server/qos/eth-classified # <b>set cos cos-value</b>	Specifies the class of service for the specified system class. Valid class of service values are 0 to 6; higher values indicate more important traffic.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /eth-server/qos/eth-classified # <b>set drop {drop   no-drop}</b>	Specifies whether the channel can drop packets or not. <b>Note</b> Only one system class can use the no-drop option.
<b>Step 7</b>	UCS-A /eth-server/qos/eth-classified # <b>set mtu {mtu-value   fc   normal}</b>	Specifies the maximum transmission unit (MTU) for the specified system class. Valid MTU values are 1538 to 9216.
<b>Step 8</b>	UCS-A /eth-server/qos/eth-classified # <b>set multicast-optimize {no   yes}</b>	Specifies whether the class is optimized to for sending multicast packets.
<b>Step 9</b>	UCS-A /eth-server/qos/eth-classified # <b>set weight {weight-value   best-effort   none}</b>	Specifies the relative weight for the specified system class. Valid weight values are 0 to 10.
<b>Step 10</b>	UCS-A /eth-server/qos/eth-classified # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables the platinum system class, allows the channel to drop packets, sets the class of service to 6, sets the MTU to normal, optimizes the class for sending multicast packets, sets the relative weight to 5, and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server # scope qos
UCS-A /eth-server/qos # scope eth-classified platinum
UCS-A /eth-server/qos/eth-classified # enable
UCS-A /eth-server/qos/eth-classified* # set drop drop
UCS-A /eth-server/qos/eth-classified* # set cos 6
UCS-A /eth-server/qos/eth-classified* # set mtu normal
UCS-A /eth-server/qos/eth-classified* # set multicast-optimize yes
UCS-A /eth-server/qos/eth-classified* # set weight 5
UCS-A /eth-server/qos/eth-classified* # commit-buffer
UCS-A /eth-server/qos/eth-classified #
```

## Disabling a System Class

If you disable a system class that is used in a QoS policy, Cisco UCS Manager uses the system class configured with CoS 0 for traffic on servers that are configured with the QoS policy. If no system class is configured as CoS 0, the Best Effort system class is used. You cannot disable the Best Effort or Fibre Channel system classes.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-server</b>	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # <b>scope qos</b>	Enters Ethernet server QoS mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /eth-server/qos # <b>scope eth-classified {bronze   gold   platinum silver}</b>	Enters Ethernet server QoS Ethernet classified mode for the specified system class.
<b>Step 4</b>	UCS-A /eth-server/qos/eth-classified # <b>disable</b>	Disables the specified system class.
<b>Step 5</b>	UCS-A /eth-server/qos/eth-classified # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disables the platinum system class and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server # scope qos
UCS-A /eth-server/qos # scope eth-classified platinum
UCS-A /eth-server/qos/eth-classified # disable
UCS-A /eth-server/qos/eth-classified* # commit-buffer
UCS-A /eth-server/qos/eth-classified #
```

## 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.

### Configuring a QoS Policy

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Switch-A# <b>scope org org-name</b>	Enters org mode for the specified organization. To enter the default org mode, type <code>/</code> as the <code>org-name</code> .
<b>Step 2</b>	Switch-A /org # <b>create qos-policy policy-name</b>	Creates the specified QoS policy, and enters org QoS policy mode.
<b>Step 3</b>	Switch-A /org/qos-policy # <b>create egress-policy</b>	Creates the egress policy (for both vNICs and vHBAs) to be used by the QoS policy, and enters org QoS policy egress policy mode.
<b>Step 4</b>	Switch-A /org/qos-policy/egress-policy # <b>set host-cos-control {full   none}</b>	(Optional) Specifies whether the host or Cisco UCS Manager controls the class of service (CoS). Use the <code>full</code> keyword to have the host control the CoS. If the packet has a valid CoS value, the host uses that value. Otherwise, it uses the CoS value associated with the specified class priority.

	<b>Command or Action</b>	<b>Purpose</b>
		Use the <b>none</b> keyword to have Cisco UCS Manager use the CoS value associated with the specified priority.
<b>Step 5</b>	Switch-A /org/qos-policy/egress-policy # <b>set prio sys-class-name</b>	Specifies the system class to be used for the egress policy. The <i>sys-class-name</i> argument can be one of the following class keywords: <ul style="list-style-type: none"> <li>• <b>fc</b>—Use this priority for QoS policies that control vHBA traffic only.</li> <li>• <b>platinum</b>—Use this priority for QoS policies that control vNIC traffic only.</li> <li>• <b>gold</b>—Use this priority for QoS policies that control vNIC traffic only.</li> <li>• <b>silver</b>—Use this priority for QoS policies that control vNIC traffic only.</li> <li>• <b>bronze</b>—Use this priority for QoS policies that control vNIC traffic only.</li> <li>• <b>best-effort</b>—Do not use this priority. It is reserved for the Basic Ethernet traffic lane. If you assign this priority to a QoS policy and configure another system class as CoS 0, Cisco UCS Manager does not default to this system class. It defaults to the priority with CoS 0 for that traffic.</li> </ul>
<b>Step 6</b>	Switch-A /org/qos-policy/egress-policy # <b>set rate {line-rate   kbps} burst bytes</b>	Specifies the rate limit for egress traffic by defining the average traffic rate and burst size. The <b>line-rate</b> keyword sets the rate limit to the physical line rate.
<b>Step 7</b>	Switch-A /org/qos-policy/egress-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a QoS policy for vNIC traffic, assigns the platinum system class and sets the rate limit (traffic rate and burst size) for the egress policy, and commits the transaction:

```
Switch-A# scope org /
Switch-A /org # create qos-policy VnicPolicy34
Switch-A /org/qos-policy* # create egress-policy
Switch-A /org/qos-policy/egress-policy* # set prio platinum
Switch-A /org/qos-policy/egress-policy* # set rate 5000000 burst 65000
Switch-A /org/qos-policy/egress-policy* # commit-buffer
Switch-A /org/qos-policy/egress-policy #
```

The following example creates a QoS policy for vHBA traffic, assigns the fc (Fibre Channel) system class and sets the rate limit (traffic rate and burst size) for the egress policy, and commits the transaction:

```
Switch-A# scope org /
Switch-A /org # create qos-policy VhbaPolicy12
Switch-A /org/qos-policy* # create egress-policy
Switch-A /org/qos-policy/egress-policy* # set prio fc
Switch-A /org/qos-policy/egress-policy* # set rate 5000000 burst 65000
```

```
Switch-A /org/qos-policy/egress-policy* # commit-buffer
Switch-A /org/qos-policy/egress-policy #
```

### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete qos-policy policy-name</b>	Deletes the specified QoS policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following deletes the QoS policy named QosPolicy34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete qos-policy QosPolicy34
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Configuring Flow Control Policies

### Flow Control Policy

Flow control policies determine whether the uplink Ethernet ports in a Cisco UCS instance 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.

## Configuring 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope flow-control</b>	Enters Ethernet uplink flow control mode.
<b>Step 3</b>	UCS-A /eth-uplink/flow-control # <b>create policy <i>policy-name</i></b>	Creates the specified flow control policy.
<b>Step 4</b>	UCS-A /eth-uplink/flow-control/policy # <b>set prio <i>prio-option</i></b>	Specifies one of the following flow control priority options: <ul style="list-style-type: none"> <li>• <b>auto</b> —The Cisco UCS system and the network negotiate whether PPP will be used on this fabric interconnect.</li> <li>• <b>on</b> —PPP is enabled on this fabric interconnect.</li> </ul>
<b>Step 5</b>	UCS-A /eth-uplink/flow-control/policy # <b>set receive <i>receive-option</i></b>	Specifies one of the following flow control receive options: <ul style="list-style-type: none"> <li>• <b>off</b> —Pause requests from the network are ignored and traffic flow continues as normal.</li> <li>• <b>on</b> —Pause requests are honored and all traffic is halted on that uplink port until the network cancels the pause request.</li> </ul>
<b>Step 6</b>	UCS-A /eth-uplink/flow-control/policy # <b>set send <i>send-option</i></b>	Specifies one of the following flow control send options: <ul style="list-style-type: none"> <li>• <b>off</b> —Traffic on the port flows normally regardless of the packet load.</li> <li>• <b>on</b> —The Cisco UCS system 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.</li> </ul>
<b>Step 7</b>	UCS-A /org/qos-policy/vnic-egress-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following configures a flow control policy and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope flow-control
UCS-A /eth-uplink/flow-control # create policy FlowControlPolicy23
UCS-A /eth-uplink/flow-control/policy* # set prio auto
UCS-A /eth-uplink/flow-control/policy* # set receive on
UCS-A /eth-uplink/flow-control/policy* # set send on
UCS-A /eth-uplink/flow-control/policy* # commit-buffer
UCS-A /eth-uplink/flow-control/policy #
```

### What to Do Next

Associate the flow control policy with an uplink Ethernet port or port channel.

## Deleting a Flow Control Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope flow-control</b>	Enters Ethernet uplink flow control mode.
<b>Step 3</b>	UCS-A /eth-uplink/flow-control # <b>delete policy <i>policy-name</i></b>	Deletes the specified flow control policy.
<b>Step 4</b>	UCS-A /eth-uplink/flow-control # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the flow control policy named FlowControlPolicy23 and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope flow-control
UCS-A /eth-uplink/flow-control # delete policy FlowControlPolicy23
UCS-A /eth-uplink/flow-control* # commit-buffer
UCS-A /eth-uplink/flow-control #
```



# CHAPTER 18

## Configuring Network-Related Policies

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This chapter includes the following sections:

- [Configuring vNIC Templates, page 251](#)
- [Configuring Ethernet Adapter Policies, page 253](#)
- [Configuring Network Control Policies, page 256](#)

### 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.

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.

---

## Configuring a vNIC Template

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create vnic-templ <i>vnic-templ-name</i> [<i>eth-if</i> <i>vlan-name</i>] [<b>fabric {a   b}</b>] [<b>target [adapter   vm]</b>]</b>	Creates a vNIC template and enters organization vNIC template mode.
<b>Step 3</b>	UCS-A /org/vnic-templ # <b>set descr <i>description</i></b>	(Optional) Provides a description for the vNIC template.
<b>Step 4</b>	UCS-A /org/vnic-templ # <b>set fabric {a   b}</b>	(Optional) Specifies the fabric to use for the vNIC. If you did not specify the fabric when creating the vNIC template in Step 2, you have the option to specify it with this command.
<b>Step 5</b>	UCS-A /org/vnic-templ # <b>set mac-pool <i>mac-pool-name</i></b>	Specifies the MAC pool to use for the vNIC.
<b>Step 6</b>	UCS-A /org/vnic-templ # <b>set mtu <i>mtu-value</i></b>	Specifies the maximum transmission unit, or packet size, that the vNIC accepts.
<b>Step 7</b>	UCS-A /org/vnic-templ # <b>set nw-control-policy <i>policy-name</i></b>	Specifies the network control policy to use for the vNIC.
<b>Step 8</b>	UCS-A /org/vnic-templ # <b>set pin-group <i>group-name</i></b>	Specifies the LAN pin group to use for the vNIC.
<b>Step 9</b>	UCS-A /org/vnic-templ # <b>set qos-policy <i>policy-name</i></b>	Specifies the QoS policy to use for the vNIC.
<b>Step 10</b>	UCS-A /org/vnic-templ # <b>set stats-policy <i>policy-name</i></b>	Specifies the server and server component statistics threshold policy to use for the vNIC.
<b>Step 11</b>	UCS-A /org/vnic-templ # <b>set type {initial-template   updating-template}</b>	Specifies the vNIC template update type. If you do not want vNIC instances created from this template to be automatically updated when the template is updated, use the <b>initial-template</b> keyword; otherwise, use the <b>updating-template</b> keyword to ensure that all vNIC instance are updated when the vNIC template is updated.
<b>Step 12</b>	UCS-A /org/vnic-templ # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a vNIC template and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create vnic template VnicTempFoo
UCS-A /org/vnic-templ* # set descr "This is a vNIC template example."
UCS-A /org/vnic-templ* # set fabric a
UCS-A /org/vnic-templ* # set mac-pool pool137
UCS-A /org/vnic-templ* # set mtu 8900
UCS-A /org/vnic-templ* # set nw-control-policy ncp5
UCS-A /org/vnic-templ* # set pin-group PinGroup54
UCS-A /org/vnic-templ* # set qos-policy QosPol5
UCS-A /org/vnic-templ* # set stats-policy ServStatsPolicy
UCS-A /org/vnic-templ* # set type updating-template
UCS-A /org/vnic-templ* # commit-buffer
UCS-A /org/vnic-templ *
```

## Deleting a vNIC Template

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete vnic-templ</b> <i>vnic-templ-name</i>	Deletes the specified vNIC template.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the vNIC template named VnicTempFoo and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete vnic template VnicTempFoo
UCS-A /org* # commit-buffer
UCS-A /org *
```

## 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:

$$\text{Completion Queues} = \text{Transmit Queues} + \text{Receive Queues}$$

$$\text{Interrupt Count} = (\text{Completion Queues} + 2) \text{ rounded up to nearest power of 2}$$

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

$$\text{Completion Queues} = 1 + 8 = 9$$

$$\text{Interrupt Count} = (9 + 2) \text{ rounded up to the nearest power of 2} = 16$$

**Configuring an Ethernet Adapter Policy****Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <code>scope org org-name</code>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /org# <b>create eth-policy</b> <i>policy-name</i>	Creates the specified Ethernet adapter policy and enters organization Ethernet policy mode.
<b>Step 3</b>	UCS-A /org/eth-policy# <b>set comp-queue count</b> <i>count</i>	(Optional) Configures the Ethernet completion queue.
<b>Step 4</b>	UCS-A /org/eth-policy# <b>set descr description</b>	(Optional) Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	UCS-A /org/eth-policy# <b>set failover timeout</b> <i>timeout-sec</i>	(Optional) Configures the Ethernet failover.
<b>Step 6</b>	UCS-A /org/eth-policy# <b>set interrupt {coalescing-time</b> <i>sec</i>   <b>coalescing-type</b> {idle   min}   count <i>count</i>   <b>mode</b> {intx   msi   msi-x}}}	(Optional) Configures the Ethernet interrupt.
<b>Step 7</b>	UCS-A /org/eth-policy# <b>set offload {large-receive   tcp-rx-checksum   tcp-segment   tcp-tx-checksum} {disabled   enabled}</b>	(Optional) Configures the Ethernet offload.
<b>Step 8</b>	UCS-A /org/eth-policy# <b>set recv-queue {count</b> <i>count</i>   <b>ring-size</b> <i>size-num</i> } {disabled   enabled}	(Optional) Configures the Ethernet receive queue.
<b>Step 9</b>	UCS-A /org/eth-policy# <b>set rss receivesidescaling {disabled   enabled}</b>	(Optional) Configures the RSS.
<b>Step 10</b>	UCS-A /org/eth-policy# <b>set trans-queue {count</b> <i>count</i>   <b>ring-size</b> <i>size-num</i> } {disabled   enabled}	(Optional) Configures the Ethernet transmit queue.
<b>Step 11</b>	UCS-A /org/eth-policy# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures an Ethernet adapter policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create eth-policy EthPolicy19
UCS-A /org/eth-policy* # set comp-queue count 16
UCS-A /org/eth-policy* # set descr "This is an Ethernet adapter policy example."
UCS-A /org/eth-policy* # set failover timeout 300
UCS-A /org/eth-policy* # set interrupt count 64
UCS-A /org/eth-policy* # set offload large-receive disabled
UCS-A /org/eth-policy* # set recv-queue count 32
UCS-A /org/eth-policy* # set rss receivesidescaling enabled
UCS-A /org/eth-policy* # set trans-queue
UCS-A /org/eth-policy* # commit-buffer
UCS-A /org/eth-policy #
```

## Deleting an Ethernet Adapter Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete eth-policy</b> <i>policy-name</i>	Deletes the specified Ethernet adapter policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the Ethernet adapter policy named EthPolicy19 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete eth-policy EthPolicy19
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Configuring Network Control Policies

### Network Control Policy

This policy configures the network control settings for the Cisco UCS instance, including the following:

- Whether the Cisco Discovery Protocol (CDP) is enabled or disabled
- How the VIF behaves if no uplink port is available in end-host mode
- Whether the server can use different MAC addresses when sending packets to the fabric interconnect

The network control policy also determines the action that Cisco UCS Manager takes on the remote Ethernet interface, vEthernet interface , or vFibreChannel interface when the associated border port fails.

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 vFibreChannel 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 vFibreChannel interfaces that are bound to the remote Ethernet interface are brought down as well.

**Note**

Cisco UCS Manager, version 1.4(2) and earlier did not enforce the **Action on Uplink Fail** property for those types of non-VM-FEX capable converged network adapters mentioned above. If the **Action on Uplink Fail** property was set to link-down, Cisco UCS Manager would ignore this setting and instead issue a warning. Therefore, if your implementation includes one of those converged network adapters 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.

Please note that this configuration may result in an Ethernet teaming driver not being able to detect a link failure when the border port goes down.

## Configuring a Network Control Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>create nwctrl-policy policy-name</b>	Creates the specified network control policy, and enters organization network control policy mode.
<b>Step 3</b>	UCS-A /org/nwctrl-policy # <b>{disable   enable} cdp</b>	Disables or enables Cisco Discovery Protocol (CDP).
<b>Step 4</b>	UCS-A /org/nwctrl-policy # <b>set uplink-fail-action {link-down   warning}</b>	Specifies the action to be taken when no uplink port is available in end-host mode.  Use the <b>link-down</b> keyword to change the operational state of a vNIC to down when uplink connectivity is lost on the fabric interconnect, and facilitate fabric failover for vNICs. Use the <b>warning</b> keyword to maintain server-to-server connectivity even when no uplink port is available, and disable fabric failover when uplink connectivity is lost on the fabric interconnect. The default uplink failure action is link-down.
<b>Step 5</b>	UCS-A /org/nwctrl-policy # <b>{create mac-security}</b>	Enters organization network control policy MAC security mode
<b>Step 6</b>	UCS-A /org/nwctrl-policy/mac-security # <b>{set forged-transmit {allow   deny}}</b>	Allows or denies the forging of MAC addresses when sending traffic. MAC security is disabled when forged MAC addresses are allowed, and MAC security is enabled when forged MAC addresses are denied. By default, forged MAC addresses are allowed (MAC security is disabled).
<b>Step 7</b>	UCS-A /org/nwctrl-policy/mac-security # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a network control policy named ncp5, enables CDP, sets the uplink fail action to link-down, denies forged MAC addresses (enables MAC security), and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create nwctrl-policy ncp5
UCS-A /org/nwctrl-policy* # enable cdp
UCS-A /org/nwctrl-policy* # set uplink-fail-action link-down
UCS-A /org/nwctrl-policy* # create mac-security
UCS-A /org/nwctrl-policy/mac-security* # set forged-transmit deny
UCS-A /org/nwctrl-policy/mac-security* # commit-buffer
UCS-A /org/nwctrl-policy/mac-security #
```

## Deleting a Network Control Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>delete nwctrl-policy</b> <i>policy-name</i>	Deletes the specified network control policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the network control policy named ncp5 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete nwctrl-policy ncp5
UCS-A /org* # commit-buffer
UCS-A /org #
```



PART **IV**

## Storage Configuration

- Configuring Named VSANs, page 261
- Configuring SAN Pin Groups, page 269
- Configuring WWN Pools, page 271
- Configuring Storage-Related Policies, page 275





# CHAPTER 19

## Configuring Named VSANs

This chapter includes the following sections:

- [Named VSANs, page 261](#)
- [Fibre Channel Uplink Trunking for Named VSANs, page 262](#)
- [Guidelines and Recommendations for VSANs, page 262](#)
- [Creating a Named VSAN Accessible to Both Fabric Interconnects \(Fibre Channel Uplink Mode\), page 263](#)
- [Creating a Named VSAN Accessible to Both Fabric Interconnects \(Fibre Channel Storage Mode\), page 264](#)
- [Creating a Named VSAN Accessible to One Fabric Interconnect \(Fibre Channel Uplink Mode\), page 264](#)
- [Creating a Named VSAN Accessible to One Fabric Interconnect \(Fibre Channel Storage Mode\), page 265](#)
- [Deleting a Named VSAN, page 266](#)
- [Enabling or Disabling Fibre Channel Uplink Trunking, page 266](#)

### 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 instance 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.

## **Creating a Named VSAN Accessible to Both Fabric Interconnects (Fibre Channel Uplink Mode)**

You can create a named VSAN with IDs from 1 to 4093, except for those in the following reserved ranges:

#### **Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>create vsan vsan-name vsan-id fcoe-id</b>	Creates the specified named VSAN, specifies the VSAN name, VSAN ID and FCoE VLAN ID, and enters Fibre Channel uplink VSAN mode.
<b>Step 3</b>	UCS-A /fc-uplink/vsan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VSAN for both fabric interconnects, names the VSAN accounting, assigns the VSAN ID 2112, assigns the FCoE VLAN ID 4021, and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink* # create vsan accounting 2112 4021
UCS-A /fc-uplink/vsan* # commit-buffer
UCS-A /fc-uplink/vsan #
```

## Creating a Named VSAN Accessible to Both Fabric Interconnects (Fibre Channel Storage Mode)

You can create a named VSAN with IDs from 1 to 4093, except for those in the following reserved ranges:

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage mode.
<b>Step 2</b>	UCS-A /fc-storage # <b>create vsan</b> <i>vsan-name vsan-id fcoe-id</i>	Creates the specified named VSAN, specifies the VSAN name, VSAN ID, and FCoE VLAN ID, and enters Fibre Channel storage VSAN mode.
<b>Step 3</b>	UCS-A /fc-storage/vsan # <b>create member-port</b> { <b>a</b>   <b>b</b> } <i>slot-id port-id</i>	Creates a member port; specifies the slot ID and port ID.
<b>Step 4</b>	UCS-A /fc-storage/vsan# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VSAN, names the VSAN finance, assigns the VSAN ID 3955, assigns the FCoE VLAN ID 4021, creates a member port and assigns it to member port A, slot 1 port 40, and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage# create VSAN finance 3955 4021
UCS-A /fc-storage/vsan# create member-port fcoe a 1 40
UCS-A /fc-storage/vsan/member-port* # commit-buffer
UCS-A /fc-storage/vsan/member-port #
```

## Creating a Named VSAN Accessible to One Fabric Interconnect (Fibre Channel Uplink Mode)

You can create a named VSAN with IDs from 1 to 4093, except for those in the following reserved ranges:

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope fabric {a   b}</b>	Enters Fibre Channel uplink fabric interconnect mode for the specified fabric interconnect (A or B).
<b>Step 3</b>	UCS-A /fc-uplink/fabric # <b>create vsan</b> <i>vsan-name vsan-id fcoe-id</i>	Creates the specified named VSAN, specifies the VSAN name, VSAN ID, and FCoE VLAN ID, and enters Fibre Channel uplink VSAN mode.
<b>Step 4</b>	UCS-A /fc-uplink/fabric/vsan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VSAN for fabric interconnect A, names the VSAN finance, assigns the VSAN ID 3955, assigns the FCoE VLAN ID 2221, and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # create vsan finance 3955 2221
UCS-A /fc-uplink/fabric/vsan* # commit-buffer
UCS-A /fc-uplink/fabric/vsan #
```

## Creating a Named VSAN Accessible to One Fabric Interconnect (Fibre Channel Storage Mode)

You can create a named VSAN with IDs from 1 to 4093, except for those in the following reserved ranges:

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage mode.
<b>Step 2</b>	UCS-A /fc-storage # <b>scope fabric {a   b}</b>	Enters Fibre Channel storage mode for the specified fabric interconnect.
<b>Step 3</b>	UCS-A /fc-storage/fabric # <b>create vsan</b> <i>vsan-name vsan-id fcoe-id</i>	Creates the specified named VSAN, specifies the VSAN name, VSAN ID, and FCoE VLAN ID, and enters Fibre Channel storage VSAN mode.
<b>Step 4</b>	UCS-A /fc-storage/fabric/vsan # <b>create member-port</b> <i>{a   b} slot-id port-id</i>	Creates a member port on the specified VSAN.
<b>Step 5</b>	UCS-A /fc-storage/fabric/vsan # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a named VSAN on fabric A, names the VSAN finance, assigns the VSAN ID 3955, assigns the FCoE VLAN ID 2221, creates a member port and assigns it to member port A, slot 1 port 40, and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage/ # scope fabric a
UCS-A /fc-storage/fabric # create VSAN finance 3955 2221
UCS-A /fc-storage/fabric/vsan # create member-port a 1 40
UCS-A /fc-storage/fabric/vsan/member-port* # commit-buffer
UCS-A /fc-storage/fabric/vsan/member-port #
```

## Deleting a Named 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope fc-uplink	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # delete vsan <i>vsan-name</i>	Deletes the specified named VSAN.
<b>Step 3</b>	UCS-A /fc-uplink # commit-buffer	Commits the transaction to the system configuration.

The following example deletes a named VSAN and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # delete vsan finance
UCS-A /fc-uplink* # commit-buffer
UCS-A /fc-uplink #
```

## Enabling or Disabling 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope fc-uplink	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # scope fabric {a   b }	Enters Fibre Channel uplink mode for the specified fabric.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /fc-uplink/fabric # <b>set uplink-trunking {enabled   disabled }</b>	Enables or disables uplink trunking.
<b>Step 4</b>	UCS-A /fc-uplink/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables Fibre Channel uplink trunking for fabric A and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope fabric a
UCS-A /fc-uplink/fabric # set uplink-trunking enabled
UCS-A /fc-uplink/fabric* # commit-buffer
UCS-A /fc-uplink/fabric #
```





# CHAPTER 20

## Configuring SAN Pin Groups

This chapter includes the following sections:

- [SAN Pin Groups, page 269](#)
- [Configuring a SAN Pin Group, page 269](#)

### 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.

### Configuring 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>create pin-group</b> <i>pin-group-name</i>	Creates a Fibre Channel (SAN) pin group with the specified name, and enters Fibre Channel uplink pin group mode.
<b>Step 3</b>	UCS-A /fc-uplink/pin-group # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the pin group.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /fc-uplink/pin-group # <b>set target</b> {a   b   dual} <b>port</b> <i>slot-num / port-num</i>	(Optional) Sets the Fibre Channel pin target to the specified fabric and port.
<b>Step 5</b>	UCS-A /fc-uplink/pin-group # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a SAN pin group named fcpingroup12, provides a description for the pin group, sets the pin group target to slot 2, port 1, and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # create pin-group fcpingroup12
UCS-A /fc-uplink/pin-group* # set descr "This is my pin group #12"
UCS-A /fc-uplink/pin-group* # set target a port 2/1
UCS-A /fc-uplink/pin-group* # commit-buffer
UCS-A /fc-uplink/pin-group #
```

## What to Do Next

Include the pin group in a vHBA template.



# CHAPTER 21

## Configuring WWN Pools

This chapter includes the following sections:

- [WWN Pools, page 271](#)
- [Configuring a WWN Pool, page 272](#)

### WWN Pools

A WWN pool is a collection of WWNs for use by the Fibre Channel vHBAs in a Cisco UCS instance. You create separate pools for the following:

- WW node names assigned to the server
- WW port names assigned to the vHBA



#### 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 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. For each block or individual WWN, you can assign a boot target.

#### 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.

# Configuring a WWN 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i>
<b>Step 2</b>	UCS-A /org # <b>create wwn-pool <i>wwn-pool-name</i> {node-wwn-assignment   port-wwn-assignment}</b>	Creates a WWN pool with the specified name and purpose, and enters organization WWN pool mode. The purpose of the WWN pool can be one of the following: <ul style="list-style-type: none"> <li>• To assign world wide node names (WWNNs) and world wide port names (WWPNs)</li> <li>• To assign only WWNNs</li> <li>• To assign only WWPNs</li> </ul>
<b>Step 3</b>	UCS-A /org/wwn-pool # <b>set descr <i>description</i></b>	(Optional) Provides a description for the WWN pool.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/wwn-pool # <b>create block <i>first-wwn</i> <i>last-wwn</i></b>	(Optional) Creates a block (range) of WWNs, and enters organization WWN pool block mode. You must specify the first and last WWN in the block using the form <i>nn : nn : nn : nn : nn : nn : nn : nn</i> , with the WWNs separated by a space.  <b>Note</b> A WWN pool can contain more than one WWN block. To create multiple WWN blocks, you must enter multiple <b>create block</b> commands from organization WWN pool mode.
<b>Step 5</b>	UCS-A /org/wwn-pool # <b>create initiator <i>wwn</i> <i>wwn</i></b>	(Optional) Creates a single initiator, and enters organization WWN pool initiator mode. You must specify the initiator using the form <i>nn : nn : nn : nn : nn : nn : nn : nn</i> .

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> A WWN pool can contain more than one initiator. To create multiple initiators, you must enter multiple <b>create initiator</b> commands from organization WWN pool mode.
<b>Step 6</b>	UCS-A /org/wwn-pool/block <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a WWN pool named sanpool, provides a description for the pool, specifies a block of WWNs and an initiator to be used for the pool, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create wwn-pool sanpool node-wwn-assignment
UCS-A /org/wwn-pool* # set descr "This is my WWNN pool"
UCS-A /org/wwn-pool* # create block 23:00:00:05:AD:1E:00:01 23:00:00:05:AD:1E:01:00
UCS-A /org/wwn-pool/block* # exit
UCS-A /org/wwn-pool* # create initiator 23:00:00:05:AD:1E:02:00
UCS-A /org/wwn-pool/initiator* # commit-buffer
UCS-A /org/wwn-pool/initiator #
```

### What to Do Next

Include the WWPN pool in a vHBA template.





# CHAPTER 22

## Configuring Storage-Related Policies

This chapter includes the following sections:

- [Configuring vHBA Templates, page 275](#)
- [Configuring Fibre Channel Adapter Policies, page 277](#)

### Configuring vHBA Templates

#### vHBA Template

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

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

#### Configuring a vHBA Template

##### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create vhba-templ</b> <i>vhba-templ-name</i> [ <b>fabric</b> {a   b}] [ <b>fc-if</b> <i>vsan-name</i> ]	Creates a vHBA template and enters organization vHBA template mode.
<b>Step 3</b>	UCS-A /org/vhba-templ# <b>set descr</b> <i>description</i>	(Optional) Provides a description for the vHBA template.
<b>Step 4</b>	UCS-A /org/vhba-templ# <b>set fabric</b> {a   b}	(Optional) Specifies the fabric to use for the vHBA. If you did not specify the fabric when creating the vHBA template in

	<b>Command or Action</b>	<b>Purpose</b>
		Step 2, then you have the option to specify it with this command.
<b>Step 5</b>	UCS-A /org/vhba-templ # <b>set fc-if vsan-name</b>	(Optional) Specifies the Fibre Channel interface (named VSAN) to use for the vHBA template. If you did not specify the Fibre Channel interface when creating the vHBA template in Step 2, you have the option to specify it with this command.
<b>Step 6</b>	UCS-A /org/vhba-templ # <b>set max-field-size size-num</b>	Specifies the maximum size of the Fibre Channel frame payload (in bytes) that the vHBA supports.
<b>Step 7</b>	UCS-A /org/vhba-templ # <b>set pin-group group-name</b>	Specifies the pin group to use for the vHBA template.
<b>Step 8</b>	UCS-A /org/vhba-templ # <b>set qos-policy mac-pool-name</b>	Specifies the QoS policy to use for the vHBA template.
<b>Step 9</b>	UCS-A /org/vhba-templ # <b>set stats-policy policy-name</b>	Specifies the server and server component statistics threshold policy to use for the vHBA template.
<b>Step 10</b>	UCS-A /org/vhba-templ # <b>set type {initial-template   updating-template}</b>	Specifies the vHBA template update type. If you do not want vHBA instances created from this template to be automatically updated when the template is updated, use the <b>initial-template</b> keyword; otherwise, use the <b>updating-template</b> keyword to ensure that all vHBA instance are updated when the vHBA template is updated.
<b>Step 11</b>	UCS-A /org/vhba-templ # <b>set wwpn-pool pool-name</b>	Specifies the WWPN pool to use for the vHBA template.
<b>Step 12</b>	UCS-A /org/vhba-templ # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a vHBA template and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create vhba template VhbaTempFoo
UCS-A /org/vhba-templ* # set descr "This is a vHBA template example."
UCS-A /org/vhba-templ* # set fabric a
UCS-A /org/vhba-templ* # set fc-if accounting
UCS-A /org/vhba-templ* # set max-field-size 2112
UCS-A /org/vhba-templ* # set pin-group FcPinGroup12
UCS-A /org/vhba-templ* # set qos-policy policy34foo
UCS-A /org/vhba-templ* # set stats-policy ServStatsPolicy
UCS-A /org/vhba-templ* # set type updating-template
UCS-A /org/vhba-templ* # set wwpn-pool SanPool7
UCS-A /org/vhba-templ* # commit-buffer
UCS-A /org/vhba-templ*
```

## Deleting a vHBA Template

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete vhba-templ <i>vhba-templ-name</i></b>	Deletes the specified vHBA template.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the vHBA template named VhbaTempFoo and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete vhba template VhbaTempFoo
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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 a 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:

$$\text{Completion Queues} = \text{Transmit Queues} + \text{Receive Queues}$$

$$\text{Interrupt Count} = (\text{Completion Queues} + 2) \text{ rounded up to nearest power of 2}$$

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

$$\text{Completion Queues} = 1 + 8 = 9$$

$$\text{Interrupt Count} = (9 + 2) \text{ rounded up to the nearest power of 2} = 16$$

**Configuring a Fibre Channel Adapter Policy****Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /org # <b>create fc-policy</b> <i>policy-name</i>	Creates the specified Fibre Channel adapter policy and enters organization Fibre Channel policy mode.
<b>Step 3</b>	UCS-A /org/fc-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/fc-policy # <b>set error-recovery</b> { <b>fep-error-recovery</b> {disabled   enabled}   <b>link-down-timeout</b> <i>timeout-msec</i>   <b>port-down-io-retry-count</b> <i>retry-count</i>   <b>port-down-timeout</b> <i>timeout-msec</i> }	(Optional) Configures the Fibre Channel error recovery.
<b>Step 5</b>	UCS-A /org/fc-policy # <b>set interrupt mode</b> {intx   msi   msi-x}}	(Optional) Configures the driver interrupt mode.
<b>Step 6</b>	UCS-A /org/fc-policy # <b>set port</b> { <b>io-throttle-count</b> <i>throttle-count</i>   <b>max-luns</b> <i>max-num</i> }	(Optional) Configures the Fibre Channel port.
<b>Step 7</b>	UCS-A /org/fc-policy # <b>set port-f-logi</b> { <b>retries</b> <i>retry-count</i>   <b>timeout</b> <i>timeout-msec</i> }	(Optional) Configures the Fibre Channel port fabric login (FLOGI).
<b>Step 8</b>	UCS-A /org/fc-policy # <b>set port-p-logi</b> { <b>retries</b> <i>retry-count</i>   <b>timeout</b> <i>timeout-msec</i> }	(Optional) Configures the Fibre Channel port-to-port login (PLOGI).
<b>Step 9</b>	UCS-A /org/fc-policy # <b>set recv-queue</b> { <b>count</b> <i>count</i>   <b>ring-size</b> <i>size-num</i> }	(Optional) Configures the Fibre Channel receive queue.
<b>Step 10</b>	UCS-A /org/fc-policy # <b>set scsi-io</b> { <b>count</b> <i>count</i>   <b>ring-size</b> <i>size-num</i> }	(Optional) Configures the Fibre Channel SCSI I/O.
<b>Step 11</b>	UCS-A /org/fc-policy # <b>set trans-queue</b> { <b>ring-size</b> <i>size-num</i> }	(Optional) Configures the Fibre Channel transmit queue.
<b>Step 12</b>	UCS-A /org/fc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a Fibre Channel adapter policy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create fc-policy FcPolicy42
UCS-A /org/fc-policy* # set descr "This is a Fibre Channel adapter policy example."
UCS-A /org/fc-policy* # set error-recovery error-detect-timeout 2500
```

```

UCS-A /org/fc-policy* # set port max-luns 4
UCS-A /org/fc-policy* # set port-f-logi retries 250
UCS-A /org/fc-policy* # set port-p-logi timeout 5000
UCS-A /org/fc-policy* # set recv-queue count 1
UCS-A /org/fc-policy* # set scsi-io ring-size 256
UCS-A /org/fc-policy* # set trans-queue ring-size 256
UCS-A /org/fc-policy* # commit-buffer
UCS-A /org/fc-policy #

```

## Deleting a Fibre Channel Adapter Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete fc-policy</b> <i>policy-name</i>	Deletes the specified Fibre Channel adapter policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the Fibre Channel adapter policy named FcPolicy42 and commits the transaction:

```

UCS-A# scope org /
UCS-A /org # delete fc-policy FcPolicy42
UCS-A /org* # commit-buffer
UCS-A /org #

```



PART **V**

## **Server Configuration**

- Configuring Server-Related Pools, page 283
- Setting the Management IP Address, page 287
- Configuring Server-Related Policies, page 295
- Deferring Deployment of Service Profile Updates, page 363
- Configuring Service Profiles, page 375
- Managing Power in Cisco UCS, page 401





# CHAPTER **23**

## Configuring Server-Related Pools

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This chapter includes the following sections:

- [Server Pool Configuration, page 283](#)
- [UUID Suffix Pool Configuration, page 285](#)

## Server Pool Configuration

### 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 multi-tenancy 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.

### Configuring a Server Pool

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /org # <b>create server-pool</b> <i>server-pool-name</i>	Creates a server pool with the specified name, and enters organization server pool mode.
<b>Step 3</b>	UCS-A /org/server-pool # <b>create server</b> <i>chassis-num</i> / <i>slot-num</i>	Creates a server for the server pool. <b>Note</b> A server pool can contain more than one server. To create multiple servers for the pool, you must enter multiple <b>create server</b> commands from organization server pool mode.
<b>Step 4</b>	UCS-A /org/server-pool # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server pool named ServPool2, creates two servers for the server pool, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create server-pool ServPool2
UCS-A /org/server-pool* # create server 1/1
UCS-A /org/server-pool* # create server 1/4
UCS-A /org/server-pool* # commit-buffer
UCS-A /org/server-pool #
```

## Deleting a Server Pool

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-pool</b> <i>server-pool-name</i>	Deletes the specified server pool.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server pool named ServPool2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete server-pool ServPool2
UCS-A /org* # commit-buffer
UCS-A /org #
```

# UUID Suffix Pool Configuration

## 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.

## Configuring a UUID Suffix Pool

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create uuid-suffix-pool</b> <i>pool-name</i>	Creates a UUID suffix pool with the specified pool name and enters organization UUID suffix pool mode.
<b>Step 3</b>	UCS-A /org/uuid-suffix-pool # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the UUID suffix pool.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/uuid-suffix-pool # <b>create block</b> <i>first-uuid</i> <i>last-uuid</i>	Creates a block (range) of UUID suffixes, and enters organization UUID suffix pool block mode. You must specify the first and last UUID suffixes in the block using the form <i>nnnn-nnnnnnnnnnnn</i> , with the UUID suffixes separated by a space.  <b>Note</b> A UUID suffix pool can contain more than one UUID suffix block. To create multiple blocks, you must enter multiple <b>create block</b> commands from organization UUID suffix pool mode.
<b>Step 5</b>	UCS-A /org/uuid-suffix-pool/block # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a UUID suffix pool named pool4, provides a description for the pool, specifies a block of UUID suffixes to be used for the pool, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create uuid-suffix-pool pool4
UCS-A /org/uuid-suffix-pool* # set descr "This is UUID suffix pool 4"
UCS-A /org/uuid-suffix-pool* # create block 1000-000000000001 1000-000000000010
UCS-A /org/uuid-suffix-pool/block* # commit-buffer
UCS-A /org/uuid-suffix-pool/block #
```

### **What to Do Next**

Include the UUID suffix pool in a service profile and/or template.

## **Deleting a UUID Suffix Pool**

### **Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete uuid-suffix-pool <i>pool-name</i></b>	Deletes the specified UUID suffix pool.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the UUID suffix pool named pool4 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete uuid-suffix-pool pool4
UCS-A /org* # commit-buffer
```



# CHAPTER **24**

## **Setting the Management IP Address**

---

This chapter includes the following sections:

- [Management IP Address, page 287](#)
- [Configuring the Management IP Address on a Blade Server, page 288](#)
- [Configuring the Management IP Address on a Rack Server, page 289](#)
- [Setting the Management IP Address on a Service Profile or Service Profile Template, page 291](#)
- [Configuring the Management IP Pool, page 292](#)

### **Management IP Address**

Each server in a Cisco UCS instance 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 instance. 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

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-id / blade-id</b>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters chassis server CIMC mode.
<b>Step 3</b>	UCS-A /chassis/server/cimc # <b>create ext-static-ip</b>	Creates a static management IP address for the specified server.
<b>Step 4</b>	UCS-A /chassis/server/cimc/ext-static-ip # <b>set addr ip-addr</b>	Specifies the static IPv4 address to be assigned to the server.
<b>Step 5</b>	UCS-A /chassis/server/cimc/ext-static-ip # <b>set default-gw ip-addr</b>	Specifies the default gateway that the IP address should use.
<b>Step 6</b>	UCS-A /chassis/server/cimc/ext-static-ip # <b>set subnet ip-addr</b>	Specifies the subnet mask for the IP address.
<b>Step 7</b>	UCS-A /chassis/server/cimc/ext-static-ip # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a static management IP address for chassis 1 server 1, sets the static IPv4 address, sets the default gateway, sets the subnet mask, and commits the transaction:

```
UCS-A# scope server 1/1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # create ext-static-ip
UCS-A /chassis/server/cimc/ext-static-ip* # set addr 192.168.10.10
UCS-A /chassis/server/cimc/ext-static-ip* # set default-gw 192.168.10.1
UCS-A /chassis/server/cimc/ext-static-ip* # set subnet 255.255.255.0
UCS-A /chassis/server/cimc/ext-static-ip* # commit-buffer
UCS-A /chassis/server/cimc/ext-static-ip #
```

## Configuring a Blade Server to Use the Management IP Pool

Deleting the static management IP address returns the specified server to the management IP pool.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / blade-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters chassis server CIMC mode.
<b>Step 3</b>	UCS-A /chassis/server/cimc # <b>delete ext-static-ip</b>	Deletes the external static IP address and returns the blade server to the management IP pool.
<b>Step 4</b>	UCS-A /chassis/server/cimc/ # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the static management IP address for chassis 1 server 1 and commits the transaction:

```
UCS-A# scope server 1/1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # delete ext-static-ip
UCS-A /chassis/server/cimc* # commit-buffer
UCS-A /chassis/server/cimc/ #
```

## Configuring the Management IP Address on a Rack Server

### Configuring a Rack Server to Use a Static IP Address

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>blade-id</i>	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /server # <b>scope cimc</b>	Enters server CIMC mode.
<b>Step 3</b>	UCS-A /server/cimc # <b>create ext-static-ip</b>	Creates a static management IP address for the specified server.
<b>Step 4</b>	UCS-A /server/cimc/ext-static-ip # <b>set addr</b> <i>ip-addr</i>	Specifies the static IPv4 address to be assigned to the server.
<b>Step 5</b>	UCS-A /server/cimc/ext-static-ip # <b>set default-gw</b> <i>ip-addr</i>	Specifies the default gateway that the IP address should use.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /server/cimc/ext-static-ip # <b>set subnet</b> <i>ip-addr</i>	Specifies the subnet mask for the IP address.
<b>Step 7</b>	UCS-A /server/cimc/ext-static-ip # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a static management IP address for rack server 1, sets the static IPv4 address, sets the default gateway, sets the subnet mask, and commits the transaction:

```
UCS-A# scope server 1
UCS-A /server # scope cimc
UCS-A /server/cimc # create ext-static-ip
UCS-A /server/cimc/ext-static-ip* # set addr 192.168.10.10
UCS-A /server/cimc/ext-static-ip* # set default-gw 192.168.10.1
UCS-A /server/cimc/ext-static-ip* # set subnet 255.255.255.0
UCS-A /server/cimc/ext-static-ip* # commit-buffer
UCS-A /server/cimc/ext-static-ip #
```

## Configuring a Rack Server to Use the Management IP Pool

Deleting the static management IP address returns the specified server to the management IP pool.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>blade-id</i>	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /server # <b>scope cimc</b>	Enters server CIMC mode.
<b>Step 3</b>	UCS-A /server/cimc # <b>delete ext-static-ip</b>	Deletes the external static IP address and returns the rack server to the management IP pool.
<b>Step 4</b>	UCS-A /server/cimc # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the static management IP address for rack server 1 and commits the transaction:

```
UCS-A# scope server 1
UCS-A /server # scope cimc
UCS-A /server/cimc # delete ext-static-ip
UCS-A /server/cimc* # commit-buffer
UCS-A /server/cimc/ #
```

# Setting the Management IP Address on a Service Profile or Service Profile Template

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set ext-mgmt-ip-state {none   pooled   static}</b>	Specifies how the management IP address will be assigned to the service profile.  You can set the management IP address policy using the following options: <ul style="list-style-type: none"> <li>• None--The service profile is not assigned an IP address.</li> <li>• Pooled--The service profile is assigned an IP address from the management IP pool.</li> <li>• Static--The service profile is assigned the configured static IP address.</li> </ul> <p><b>Note</b> Setting the ext-management-ip-state to static for a service profile template is not supported and will result in an error.</p>
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the management IP address policy for a service profile called accounting to static and then commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # set ext-mgmt-ip-state static
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## What to Do Next

If you have set the management IP address to static, configure a server to use a static IP address.

# Configuring the Management IP Pool

## Management IP Pool

The management IP pool 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 subnet 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.

## Configuring an IP Address Block for 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters root organization mode.
<b>Step 2</b>	UCS-A /org # <b>scope ip-pool ext-mgmt</b>	Enters organization IP pool mode.  <b>Note</b> You cannot create (or delete) a management IP pool. You can only enter (scope to) the existing default pool.
<b>Step 3</b>	UCS-A /org/ip-pool # <b>set descr <i>description</i></b>	(Optional) Provides a description for the management IP pool. This description applies to all address blocks in the management IP pool.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/ip-pool # <b>create block <i>first-ip-addr</i> <i>last-ip-addr</i> <i>gateway-ip-addr</i> <i>subnet-mask</i></b>	Creates a block (range) of IP addresses, and enters organization IP pool block mode. You must specify the first and last IP addresses in the address range, the gateway IP address, and subnet mask.

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> A IP pool can contain more than one IP address block. To create multiple IP address blocks, you must enter multiple <b>create block</b> commands from organization IP pool mode.
<b>Step 5</b>	UCS-A /org/ip-pool/block # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures an IP address block for the management IP pool and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ip-pool ext-mgmt
UCS-A /org/ip-pool* # set descr "This is a management IP pool example."
UCS-A /org/ip-pool* # create block 192.168.100.1 192.168.100.200 192.168.100.10 255.255.255.0
UCS-A /org/ip-pool/block* # commit-buffer
UCS-A /org/ip-pool/block #
```

#### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope ip-pool ext-mgmt</b>	Enters the management IP pool.
<b>Step 3</b>	UCS-A /org/ip-pool # <b>delete block</b> <i>first-ip-addr</i> <i>last-ip-addr</i>	Deletes the specified block (range) of IP addresses.
<b>Step 4</b>	UCS-A /org/ip-pool # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures an IP address block for the management IP pool and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ip-pool ext-mgmt
UCS-A /org/ip-pool # delete block 192.168.100.1 192.168.100.200
UCS-A /org/ip-pool* # commit-buffer
UCS-A /org/ip-pool #
```





# CHAPTER **25**

## **Configuring Server-Related Policies**

---

This chapter includes the following sections:

- [Configuring BIOS Settings, page 295](#)
- [Configuring Boot Policies, page 317](#)
- [Configuring IPMI Access Profiles, page 324](#)
- [Configuring Local Disk Configuration Policies, page 328](#)
- [Configuring Scrub Policies, page 332](#)
- [Configuring Serial over LAN Policies, page 334](#)
- [Configuring Server Autoconfiguration Policies, page 336](#)
- [Configuring Server Discovery Policies, page 338](#)
- [Configuring Server Inheritance Policies, page 340](#)
- [Configuring Server Pool Policies, page 342](#)
- [Configuring Server Pool Policy Qualifications, page 344](#)
- [Configuring vNIC/vHBA Placement Policies, page 356](#)

### **Configuring BIOS Settings**

#### **Server BIOS Settings**

Cisco UCS provides two methods for making global modifications to the BIOS settings on servers in an instance. 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 instance, 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 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 and Sparing 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
<b>Reboot on BIOS Settings Change</b> <code>set reboot-on-update</code>	When the server is rebooted after you change one or more BIOS settings.  <b>yes</b> —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.  <b>no</b> —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.
<b>Quiet Boot</b> <code>set quiet-boot-config</code>	What the BIOS displays during Power On Self-Test (POST). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS displays all messages and Option ROM information during boot.</li> <li>• <b>enabled</b>—The BIOS displays the logo screen, but does not display any messages or Option ROM information during boot.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Post Error Pause</b> <b>set post-error-pause-config</b> <b>post-error-pause</b>	What happens when the server encounters a critical error during POST. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS continues to attempt to boot the server.</li> <li>• <b>enabled</b>—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Resume Ac On Power Loss</b> <b>set resume-ac-on-power-loss-config</b> <b>resume-action</b>	How the server behaves when power is restored after an unexpected power loss. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>stay-off</b>—The server remains off until manually powered on.</li> <li>• <b>last-state</b>—The server is powered on and the system attempts to restore its last state.</li> <li>• <b>reset</b>—The server is powered on and automatically reset.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Front Panel Lockout</b> <b>set front-panel-lockout-config</b> <b>front-panel-lockout</b>	Whether the power and reset buttons on the front panel are ignored by the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The power and reset buttons on the front panel are active and can be used to affect the server.</li> <li>• <b>enabled</b>—The power and reset buttons are locked out. The server can only be reset or powered on or off from the CIMC GUI.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>ACPI10 Support</b> <code>set acpi10-support-config acpi10-support</code>	Whether the BIOS publishes the ACPI 1.0 version of FADT in the Root System Description table. This version may be required for compatibility with OS versions that only support ACPI 1.0. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—ACPI 1.0 version is not published.</li> <li>• <b>enabled</b>—ACPI 1.0 version is published.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Turbo Boost</b> <code>set intel-turbo-boost-config turbo-boost</code>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>enabled</b>—The processor utilizes Turbo Boost Technology if required.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Enhanced Intel Speedstep</b> <b>set enhanced-intel-speedstep-config</b> <b>speed-step</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Hyper Threading</b> <b>set hyper-threading-config</b> <b>hyper-threading</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>enabled</b>—The processor allows for the parallel execution of multiple threads.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

Name	Description
<b>Core Multi Processing</b> <b>set core-multi-processing-config multi-processing</b>	Sets the state of logical processor cores in a package. If you disable this setting, Hyper Threading is also disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>all</b>—Enables multi processing on all logical processor cores.</li> <li>• <b>1 through 10</b>—Specifies the number of logical processor cores that can run on the server. To disable multi processing and have only one logical processor core running on the server, select 1.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Execute Disabled Bit</b> <b>set execute-disable bit</b>	Classifies memory areas on the server to specify where 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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not classify memory areas.</li> <li>• <b>enabled</b>—The processor classifies memory areas.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Virtualization Technology (VT)</b> <b>set intel-vt-config vt</b>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not permit virtualization.</li> <li>• <b>enabled</b>—The processor allows multiple operating systems in independent partitions.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>

Name	Description
<b>Direct Cache Access</b> <code>set direct-cache-access-config access</code>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Processor C State</b> <code>set processor-c-state-config c-state</code>	Significantly reduces the power of the processor during idle periods. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b></li> <li>• <b>enabled</b></li> <li>• <b>platform-default</b></li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Processor C1E</b> <code>set processor-c1e-config c1e</code>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b></li> <li>• <b>enabled</b></li> <li>• <b>platform-default</b></li> </ul>
<b>Processor C3 Report</b> <code>set processor-c3-report-config processor-c3-report</code>	Whether the processor sends the C3 report to the operating system. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not send the C3 report.</li> <li>• <b>acpi-c2</b>—The processor sends the C3 report using the ACPI C2 format.</li> <li>• <b>acpi-c3</b>—The processor sends the C3 report using the ACPI C3 format.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>On the B440 server, the BIOS Setup menu uses enabled and disabled for these options. If you specify acpi-c2 or acpi-c3, the server sets the BIOS value for that option to enabled.</p>

Name	Description
<b>Processor C6 Report</b> <code>set processor-c6-report-config processor-report</code>	Whether the processor sends the C6 report to the operating system. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not send the C6 report.</li> <li>• <b>enabled</b>—The processor sends the C6 report.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>CPU Performance</b> <code>set cpu-performance-config cpu-config</code>	Sets the CPU performance profile for the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enterprise</b>—All prefetchers and data reuse are disabled.</li> <li>• <b>high-throughput</b>—All prefetchers are enabled, and data reuse is disabled.</li> <li>• <b>hpc</b>—All prefetchers and data reuse are enabled. This setting is also known as high performance computing.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Max Variable MTRR Setting</b> <code>set max-variable-mtrr-setting-config processor-mtrr</code>	Allows you to select the number of MTRR variables. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto-max</b>—The BIOS uses the default value for the processor.</li> <li>• <b>8</b>—The BIOS uses the number specified for the variable MTRR.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

### 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
<b>VT for Directed IO</b> <code>set intel-vt-directed-io-config vtd</code>	Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The processor does not use virtualization technology.</li> <li><b>enabled</b>—The processor uses virtualization technology.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Interrupt Remap</b> <code>set intel-vt-directed-io-config interrupt-remapping</code>	Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The processor does not support remapping.</li> <li><b>enabled</b>—The processor uses VT-d Interrupt Remapping as required.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Coherency Support</b> <code>set intel-vt-directed-io-config coherency-support</code>	Whether the processor supports Intel VT-d Coherency. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The processor does not support coherency.</li> <li><b>enabled</b>—The processor uses VT-d Coherency as required.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>ATS Support</b> <code>set intel-vt-directed-io-config ats-support</code>	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The processor does not support ATS.</li> <li><b>enabled</b>—The processor uses VT-d ATS as required.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Pass Through DMA Support</b> <code>set intel-vt-directed-io-config passthrough-dma</code>	Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The processor does not support pass-through DMA.</li> <li><b>enabled</b>—The processor uses VT-d Pass-through DMA as required.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Memory RAS Config</b> <code>set memory-ras-config ras-config</code>	How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: <ul style="list-style-type: none"> <li><b>maximum performance</b>—System performance is optimized.</li> <li><b>mirroring</b>—System reliability is optimized by using half the system memory as backup.</li> <li><b>lockstep</b>—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.</li> <li><b>sparing</b>—System reliability is enhanced with a degree of memory redundancy while making more memory available to the operating system than mirroring.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>NUMA</b> <b>set numa-config numa-optimization</b>	Whether the BIOS supports NUMA. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The BIOS does not support NUMA</li> <li><b>enabled</b>—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.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Mirroring Mode</b> <b>set memory-mirroring-mode</b> <b>mirroring-mode</b>	Memory mirroring enhances system reliability by keeping two identical data images in memory. This option is only available if you choose the <b>mirroring</b> option for Memory RAS Config. It can be one of the following: <ul style="list-style-type: none"> <li><b>inter-socket</b>—Memory is mirrored between two Integrated Memory Controllers (IMCs) across CPU sockets.</li> <li><b>intra-socket</b>—One IMC is mirrored with another IMC in the same socket.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Sparing Mode</b> <b>set memory-sparing-mode</b> <b>sparing-mode</b>	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 <b>sparing</b> option for Memory RAS Config. It can be one of the following: <ul style="list-style-type: none"> <li><b>dimm-sparing</b>—One DIMM is held in reserve. If a DIMM fails, the contents of a failing DIMM are transferred to the spare DIMM.</li> <li><b>rank-sparing</b>—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.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>LV DDR Mode</b> <code>set lv-dimm-support-config lv-ddr-mode</code>	Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>power-saving-mode</b>—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.</li> <li>• <b>performance-mode</b>—The system prioritizes high frequency operations over low voltage operations.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Serial Port A</b> <code>set serial-port-a-config serial-port-a</code>	Whether serial port A is enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The serial port is disabled.</li> <li>• <b>enabled</b>—The serial port is enabled.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Make Device Non Bootable</b> <b>usb-boot-config</b> <b>make-device-non-bootable</b>	Whether the server can boot from a USB device. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The server cannot boot from a USB device.</li> <li><b>enabled</b>—The server can boot from a USB device.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Max Memory Below 4G</b> <b>max-memory-below-4gb-config</b> <b>max-memory</b>	Whether the BIOS maximizes memory usage below 4GB for an operating without PAE support, depending on the system configuration. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—Does not maximize memory usage. Choose this option for all operating systems with PAE support.</li> <li><b>enabled</b>—Maximizes memory usage below 4GB for an operating system without PAE support.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Memory Mapped IO Above 4Gb Config</b> <b>memory-mapped-io-above-4gb-config</b>	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: <ul style="list-style-type: none"> <li><b>disabled</b>—Does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li><b>enabled</b>—Maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Boot Option Retry</b> <code>boot-option-retry-config retry</code>	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—Waits for user input before retrying NON-EFI based boot options.</li> <li><b>enabled</b>—Continually retries NON-EFI based boot options without waiting for user input.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Intel Entry SAS RAID</b> <code>intel-entry-sas-raid-config sas-raid</code>	Whether the Intel SAS Entry RAID Module is enabled. This can be one of the following: <ul style="list-style-type: none"> <li><b>disabled</b>—The Intel SAS Entry RAID Module is disabled.</li> <li><b>enabled</b>—The Intel SAS Entry RAID Module is enabled.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Intel Entry SAS RAID Module</b> <code>intel-entry-sas-raid-config sas-raid-module</code>	How the Intel SAS Entry RAID Module is configured. This can be one of the following: <ul style="list-style-type: none"> <li><b>it-ir-raid</b>—Configures the RAID module to use Intel IT/IR RAID.</li> <li><b>intel-esrtii</b>—Configures the RAID module to use Intel Embedded Server RAID Technology II.</li> <li><b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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
<b>Assert Nmi on Serr</b> <b>set assert-nmi-on-serr-config assertion</b>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS does not generate an NMI or log an error when a SERR occurs.</li> <li>• <b>enabled</b>—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable <b>Assert Nmi on Perr</b>.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Assert Nmi on Perr</b> <b>set assert-nmi-on-perr-config assertion</b>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS does not generate an NMI or log an error when a PERR occurs.</li> <li>• <b>enabled</b>—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable <b>Assert Nmi on Serr</b> to use this setting.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>OS Boot Watchdog Timer</b> <b>set os-boot-watchdog-timer-config</b> <b>os-boot-watchdog-timer</b>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The watchdog timer is not used to track how long the server takes to boot.</li> <li>• <b>enabled</b>—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.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>This feature requires either operating system support or Intel Management software.</p>

Name	Description
<b>OS Boot Watchdog Timer Timeout Policy</b>  set os-boot-watchdog-timer-policy-config <b>os-boot-watchdog-timer policy</b>	What action the system takes if the watchdog timer expires. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>power-off</b>—The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>This option is only available if you enable the OS Boot Watchdog Timer.</p>
<b>OS Boot Watchdog Timer Timeout</b>  set <b>os-boot-watchdog-timer-timeout-config</b> <b>os-boot-watchdog-timeout</b>	What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>5-minutes</b>—The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• <b>10-minutes</b>—The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• <b>15-minutes</b>—The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• <b>20-minutes</b>—The watchdog timer expires 20 minutes after the OS begins to boot.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>This option is only available if you enable the OS Boot Watchdog Timer.</p>

## Console Redirection Settings

Name	Description
<b>Console Redirection</b> <b>set console-redir-config console-redir</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—No console redirection occurs during POST.</li> <li>• <b>serial-port-a</b>—Enables serial port A for console redirection during POST. This option is valid for blade servers and rack-mount servers.</li> <li>• <b>serial-port-b</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.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.</p>
<b>Flow Control</b> <b>set console-redir-config flow-control</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>none</b>—No flow control is used.</li> <li>• <b>rts-cts</b>—RTS/CTS is used for flow control.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>

Name	Description
<b>BAUD Rate</b> <b>set console-redir-config baud-rate</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>9600</b>—A 9600 BAUD rate is used.</li> <li>• <b>19200</b>—A 19200 BAUD rate is used.</li> <li>• <b>38400</b>—A 38400 BAUD rate is used.</li> <li>• <b>57600</b>—A 57600 BAUD rate is used.</li> <li>• <b>115200</b>—A 115200 BAUD rate is used.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Terminal Type</b> <b>set console-redir-config terminal-type</b>	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>pc-ansi</b>—The PC-ANSI terminal font is used.</li> <li>• <b>vt100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>vt100-plus</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>vt-utf8</b>—A video terminal with the UTF-8 character set is used.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Legacy OS Redirect</b> <b>set uefi-os-legacy-video-config legacy-video</b>	<p>Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The serial port enabled for console redirection is hidden from the legacy operating system.</li> <li>• <b>enabled</b>—The serial port enabled for console redirection is visible to the legacy operating system.</li> <li>• <b>platform-default</b>—The processor uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## 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 instance.

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 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 and Sparing Mode for RAS Memory, are not supported by all Cisco UCS servers

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters org mode for the specified organization. To enter the default org mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create bios-policy</b> <i>policy-name</i>	Creates a BIOS policy with the specified policy name, and enters org BIOS policy mode.
<b>Step 3</b>	Configure the BIOS settings.	For the CLI commands, descriptions and information about the options for each BIOS setting, see the following topics: <ul style="list-style-type: none"> <li>• <b>Main</b> page: <a href="#">Main BIOS Settings, on page 296</a></li> <li>• <b>Processor</b> page: <a href="#">Processor BIOS Settings, on page 298</a></li> <li>• <b>Intel Directed IO</b> page: <a href="#">Intel Directed I/O BIOS Settings, on page 302</a></li> <li>• <b>RAS Memory</b> page: <a href="#">RAS Memory BIOS Settings, on page 304</a></li> <li>• <b>Serial Port</b> page: <a href="#">Serial Port BIOS Settings, on page 306</a></li> <li>• <b>USB</b> page: <a href="#">USB BIOS Settings, on page 306</a></li> <li>• <b>PCI Configuration</b> page: <a href="#">PCI Configuration BIOS Settings, on page 307</a></li> <li>• <b>Boot Options</b> page: <a href="#">Boot Options BIOS Settings, on page 308</a></li> <li>• <b>Server Management</b> page: <a href="#">Server Management BIOS Settings, on page 308</a></li> </ul>
<b>Step 4</b>	UCS-A /org/bios-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a BIOS policy under the root organization and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create bios-policy biosPolicy3
UCS-A /org/bios-policy* # set numa-config numa-optimization enabled
UCS-A /org/bios-policy* # commit-buffer
UCS-A /org/bios-policy #
```

## Modifying 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 and Sparing 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 instance.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope server-defaults</b>	Enters server defaults mode.
<b>Step 3</b>	UCS-A /system/server-defaults # <b>show platform</b>	(Optional) Displays platform descriptions for all servers.
<b>Step 4</b>	UCS-A /system/server-defaults # <b>scope platform</b> <i>platform-description</i>	Enters server defaults mode for the server specified. For the <i>platform-description</i> argument, enter the entire server description as displayed by the <b>show platform</b> command.
<b>Step 5</b>	UCS-A /system/server-defaults/platform # <b>scope bios-settings</b>	Enters server defaults BIOS settings mode for the server.
<b>Step 6</b>	Reconfigure the BIOS settings.	<p>For the CLI commands, descriptions and information about the options for each BIOS setting, see the following topics:</p> <ul style="list-style-type: none"> <li>• <b>Main</b> page: <a href="#">Main BIOS Settings, on page 296</a></li> <li>• <b>Processor</b> page: <a href="#">Processor BIOS Settings, on page 298</a></li> <li>• <b>Intel Directed IO</b> page: <a href="#">Intel Directed I/O BIOS Settings, on page 302</a></li> <li>• <b>RAS Memory</b> page: <a href="#">RAS Memory BIOS Settings, on page 304</a></li> <li>• <b>Serial Port</b> page: <a href="#">Serial Port BIOS Settings, on page 306</a></li> <li>• <b>USB</b> page: <a href="#">USB BIOS Settings, on page 306</a></li> <li>• <b>PCI Configuration</b> page: <a href="#">PCI Configuration BIOS Settings, on page 307</a></li> <li>• <b>Boot Options</b> page: <a href="#">Boot Options BIOS Settings, on page 308</a></li> <li>• <b>Server Management</b> page: <a href="#">Server Management BIOS Settings, on page 308</a></li> </ul>
<b>Step 7</b>	UCS-A /system/server-defaults/platform/bios-settings # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example shows how to change the NUMA default BIOS setting for a platform and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope server-defaults
UCS-A /system/server-defaults # show platform

Platform:
  Product Name Vendor      Model      Revision
  -----  -----
Cisco B200-M1          Cisco Systems, Inc.      N20-B6620-1      0
                        N20-B6620-1
                        0

UCS-A /system/server-defaults # scope platform 'Cisco Systems Inc' N20-B6620-1 0
UCS-A /system/server-defaults/platform # scope bios-settings
UCS-A /system/server-defaults/platform/bios-settings # set numa-config numa-optimization
disabled
UCS-A /system/server-defaults/platform/bios-settings* # commit-buffer
UCS-A /system/server-defaults/platform/bios-settings #
```

## Viewing the Actual BIOS Settings for a Server

Follow this procedure to see the actual BIOS settings on a server.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id/server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope bios</b>	Enters BIOS mode for the specified server.
<b>Step 3</b>	UCS-A /chassis/server/bios # <b>scope bios-settings</b>	Enters BIOS settings mode for the specified server.
<b>Step 4</b>	UCS-A /chassis/server/bios/bios-settings # <b>show setting</b>	Displays the BIOS setting. Enter <b>show ?</b> to display a list of allowed values for <i>setting</i> .

The following example displays a BIOS setting for blade 3 in chassis 1:

```
UCS-A# scope server 1/3
UCS-A /chassis/server # scope bios
UCS-A /chassis/server/bios # scope bios-settings
UCS-A /chassis/server/bios/bios-settings # show intel-vt-config

Intel Vt Config:
  Vt
  --
  Enabled

UCS-A /chassis/server/bios/bios-settings #
```

# Configuring Boot Policies

## 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.


**Important**

Changes to a boot policy may 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 auto-triggered.

## Guidelines

When you create a boot policy, you can add one or more of the following to the boot policy and specify their boot order:

Boot type	Description
SAN boot	<p>Boots from an operating system image on the SAN. You can specify a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.</p> <p>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.</p>
LAN boot	Boots from a centralized provisioning server. It is frequently used to install operating systems on a server from that server.
Local disk boot	<p>If the server has a local drive, boots from that drive.</p> <p><b>Note</b> Cisco UCS Manager does not differentiate between the types of local drives. 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 local drives the server should use as the boot drive.</p>

Boot type	Description
Virtual media boot	Mimics the insertion of a physical CD-ROM disk (read-only) or floppy disk (read-write) into a server. It is typically used to manually install operating systems on a server.

**Note**

The default boot order is as follows:

- 1 Local disk boot
- 2 LAN boot
- 3 Virtual media read-only boot
- 4 Virtual media read-write boot

## Configuring a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, except for iSCSI boot, we recommend that you create a global boot policy that can be included in multiple service profiles or service profile templates.

### Before You Begin

If you are creating a boot policy that boots the server from a SAN LUN and you require reliable SAN boot operations, you must first remove all local disks from servers associated with a service profile that includes the boot policy.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create boot-policy</b> <i>policy-name</i> [ <b>purpose</b> { <b>operational</b>   <b>utility</b> }]	Creates a boot policy with the specified policy name, and enters organization boot policy mode.  When you create the boot policy, specify the <b>operational</b> option. This ensures that the server boots from the operating system installed on the server. The <b>utility</b> option is reserved and should only be used if instructed to do so by a Cisco representative.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the boot policy.

	Command or Action	Purpose
		<p><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <code>show</code> command output.</p>
<b>Step 4</b>	UCS-A /org/boot-policy # <code>set reboot-on-update {no   yes}</code>	Specifies whether the servers using this boot policy are automatically rebooted after you make changes to the boot order.
<b>Step 5</b>	UCS-A /org/boot-policy # <code>commit-buffer</code>	Commits the transaction to the system configuration.

The following example creates a boot policy named boot-policy-LAN, provides a description for the boot policy, specifies that servers using this policy will not be automatically rebooted when the boot order is changed, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create boot-policy boot-policy-LAN purpose operational
UCS-A /org/boot-policy* # set descr "Boot policy that boots from the LAN."
UCS-A /org/boot-policy* # set reboot-on-update no
UCS-A /org/boot-policy* # commit-buffer
UCS-A /org/boot-policy #
```

### What to Do Next

Configure one or more of the following boot options for the boot policy and set their boot order:

- **LAN Boot**—Boots from a centralized provisioning server. It is frequently used to install operating systems on a server from that server.  
If you choose the LAN Boot option, continue to [Configuring a LAN Boot for a Boot Policy, on page 320](#).
- **Storage Boot**—Boots from an operating system image on the SAN. You can specify 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 exactly the same operating system image. Therefore, the new server appears to be exactly the same server to the network.

If you choose the Storage Boot option, continue to [Configuring a Storage Boot for a Boot Policy, on page 321](#).

- **Virtual Media Boot**—Mimics the insertion of a physical CD into a server. It is typically used to manually install operating systems on a server.

If you choose the Virtual Media boot option, continue to [Configuring a Virtual Media Boot for a Boot Policy, on page 322](#).

**Tip**

We recommend that the boot order in a boot policy include either a local disk or a SAN LUN, but not both, to avoid the possibility of the server booting from the wrong storage type. 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.

---

Include the boot policy in a service profile and/or template.

## Configuring a LAN Boot for a Boot Policy

### Before You Begin

Create a boot policy to contain the LAN boot configuration.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create lan</b>	Creates a LAN boot for the boot policy and enters organization boot policy LAN mode.
<b>Step 4</b>	UCS-A /org/boot-policy/lan # <b>set order</b> {1   2   3   4}	Specifies the boot order for the LAN boot.
<b>Step 5</b>	UCS-A /org/boot-policy/lan # <b>create path</b> {primary   secondary}	Creates a primary or secondary LAN boot path and enters organization boot policy LAN path mode.
<b>Step 6</b>	UCS-A /org/boot-policy/lan/path # <b>set vnic</b> <i>vnic-name</i>	Specifies the vNIC to use for the LAN path to the boot image.
<b>Step 7</b>	UCS-A /org/boot-policy/lan/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the boot policy named lab2-boot-policy, creates a LAN boot for the policy, sets the boot order to 2, creates primary and secondary paths using the vNICs named vNIC1 and vNIC2 , and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab2-boot-policy
UCS-A /org/boot-policy* # create lan
UCS-A /org/boot-policy/lan* # set order 2
UCS-A /org/boot-policy/lan* # create path primary
```

```

UCS-A /org/boot-policy/lan/path* # set vnic vNIC1
UCS-A /org/boot-policy/lan/path* # exit
UCS-A /org/boot-policy/lan* # create path secondary
UCS-A /org/boot-policy/lan/path* # set vnic vNIC2
UCS-A /org/boot-policy/lan/path* # commit-buffer
UCS-A /org/boot-policy/lan/path*

```

## What to Do Next

Include the boot policy in a service profile and/or template.

## Configuring a Storage Boot for a Boot Policy

### Before You Begin

Create a boot policy to contain the storage boot configuration.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy <i>policy-name</i></b>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create storage</b>	Creates a storage boot for the boot policy and enters organization boot policy storage mode.
<b>Step 4</b>	UCS-A /org/boot-policy/storage # <b>set order {1   2   3   4}</b>	Sets the boot order for the storage boot.
<b>Step 5</b>	UCS-A /org/boot-policy/storage # <b>create {local   san-image {primary   secondary}}</b>	Creates a local or SAN image storage location, and if the san-image option is specified, enters organization boot policy storage SAN image 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.
<b>Step 6</b>	UCS-A /org/boot-policy/storage/san-image # <b>set vhba <i>vhba-name</i></b>	Specifies the vHBA to be used for the storage boot.
<b>Step 7</b>	UCS-A /org/boot-policy/storage/san-image # <b>create path {primary   secondary}</b>	Creates a primary or secondary storage boot path and enters organization boot policy SAN path 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.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 8</b>	UCS-A /org/boot-policy/storage/san-image/path # <b>set {lun lun-id   wwn wwn-num}</b>	Specifies the LUN or WWN to be used for the storage path to the boot image.
<b>Step 9</b>	UCS-A /org/boot-policy/storage/san-image/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the boot policy named lab1-boot-policy, creates a storage boot for the policy, sets the boot order to 1, creates a primary SAN image, uses a vHBA named vHBA2, creates primary path using LUN 967295200, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab1-boot-policy
UCS-A /org/boot-policy* # create storage
UCS-A /org/boot-policy/storage* # set order 1
UCS-A /org/boot-policy/storage* # create san-image primary
UCS-A /org/boot-policy/storage* # set vhba vHBA2
UCS-A /org/boot-policy/storage/san-image* # create path primary
UCS-A /org/boot-policy/storage/san-image/path* # set lun 967295200
UCS-A /org/boot-policy/storage/san-image/path* # commit-buffer
UCS-A /org/boot-policy/storage/san-image/path #
```

### What to Do Next

Include the boot policy in a service profile and/or template.

## Configuring a Virtual Media Boot for a Boot Policy

### Before You Begin

Create a boot policy to contain the virtual media boot configuration.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope org <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # scope boot-policy <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # create virtual-media {read-only   read-write}	Creates a virtual media boot for the boot policy, specifies whether the virtual media is has read-only or read-write privileges, and enters organization boot policy virtual media mode.
<b>Step 4</b>	UCS-A /org/boot-policy/virtual-media # set order {1   2   3   4}	Sets the boot order for the virtual-media boot.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /org/boot-policy/virtual-media # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the boot policy named lab3-boot-policy, creates a virtual media boot with read-only privileges for the policy, sets the boot order to 3, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab3-boot-policy
UCS-A /org/boot-policy* # create virtual-media read-only
UCS-A /org/boot-policy/virtual-media* # set order 3
UCS-A /org/boot-policy/virtual-media* # commit-buffer
```

### What to Do Next

Include the boot policy in a service profile and/or template.

## Viewing a Boot Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>show boot-policy policy-name</b>	Displays the boot definition (set by the create boot-definition command). If the boot-definition is not set, and if a policy is set (using the set boot-policy command), then the policy will be displayed.

The following example shows how to display boot policy information for a boot policy called boot-policy-LAN:

```
UCS-A# scope org /
UCS-A /org # show boot-policy boot-policy-LAN
```

```
Boot Policy:
Full Name: org-root/boot-policy-LAN
Name: boot-policy-LAN
Purpose: Operational
Reboot on Update: Yes
Description:
Enforce vNIC Name: No
```

## Deleting a Boot Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete boot-policy <i>policy-name</i></b>	Deletes the specified boot policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the boot policy named boot-policy-LAN and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete boot-policy boot-policy-LAN
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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.

### Configuring an IPMI Access Profile

#### Before You Begin

Obtain the following:

- 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create ipmi-access-profile <i>profile-name</i></b>	Creates the specified IPMI access profile and enters organization IPMI access profile mode.
<b>Step 3</b>	UCS-A /org/ipmi-access-profile # <b>create ipmi-user <i>ipmi-user-name</i></b>	Creates the specified endpoint user and enters organization IPMI access profile endpoint user mode. <b>Note</b> More than one endpoint user can be created within an IPMI access profile, with each endpoint user having its own password and privileges.
<b>Step 4</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set password</b>	Sets the password for the endpoint user. After entering the <b>set password</b> command, you are prompted to enter and confirm the password. For security purposes, the password that you type does not appear in the CLI.
<b>Step 5</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set privilege {admin   readonly}</b>	Specifies whether the endpoint user has administrative or read-only privileges.
<b>Step 6</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an IPMI access profile named ReadOnly, creates an endpoint user named bob, sets the password and the privileges for bob, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create ipmi-access-profile ReadOnly
UCS-A /org/ipmi-access-profile* # create ipmi-user bob
UCS-A /org/ipmi-access-profile/ipmi-user* # set password
Enter a password:
Confirm the password:
UCS-A /org/ipmi-access-profile/ipmi-user* # set privilege readonly
UCS-A /org/ipmi-access-profile/ipmi-user* # commit-buffer
UCS-A /org/ipmi-access-profile/ipmi-user #
```

## What to Do Next

Include the IPMI profile in a service profile and/or template.

## Deleting an IPMI Access Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete ipmi-access-profile</b> <i>profile-name</i>	Deletes the specified IPMI access profile.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the IPMI access profile named ReadOnly and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete ipmi-access-profile ReadOnly
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Adding an Endpoint User to an IPMI Access Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope ipmi-access-profile</b> <i>profile-name</i>	Enters organization IPMI access profile mode for the specified IPMI access profile.
<b>Step 3</b>	UCS-A /org/ipmi-access-profile # <b>create ipmi-user</b> <i>ipmi-user-name</i>	Creates the specified endpoint user and enters organization IPMI access profile endpoint user mode. <b>Note</b> More than one endpoint user can be created within an IPMI access profile, with each endpoint user having its own password and privileges.
<b>Step 4</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set password</b>	Sets the password for the endpoint user. After entering the <b>set password</b> command, you are prompted to enter and confirm the password. For security purposes, the password that you type does not appear in the CLI.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set privilege {admin   readonly}</b>	Specifies whether the endpoint user has administrative or read-only privileges.
<b>Step 6</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds an endpoint user named alice to the IPMI access profile named ReadOnly and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope ipmi-access-profile ReadOnly
UCS-A /org/ipmi-access-profile* # create ipmi-user alice
UCS-A /org/ipmi-access-profile/ipmi-user* # set password
Enter a password:
Confirm the password:
UCS-A /org/ipmi-access-profile/ipmi-user* # set privilege readonly
UCS-A /org/ipmi-access-profile/ipmi-user* # commit-buffer
UCS-A /org/ipmi-access-profile/ipmi-user #
```

## Deleting an Endpoint User from an IPMI Access Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>scope ipmi-access-profile profile-name</b>	Enters organization IPMI access profile mode for the specified IPMI access profile.
<b>Step 3</b>	UCS-A /org/ipmi-access-profile# <b>delete ipmi-user epuser-name</b>	Deletes the specified endpoint user from the IPMI access profile.
<b>Step 4</b>	UCS-A /org/ipmi-access-profile# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the endpoint user named alice from the IPMI access profile named ReadOnly and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ipmi-access-profile ReadOnly
UCS-A /org/ipmi-access-profile # delete ipmi-user alice
UCS-A /org/ipmi-access-profile* # commit-buffer
UCS-A /org/ipmi-access-profile #
```

# 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 Stripes**—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.
- **RAID 6 Stripes 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.
- **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.
- **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.

### Impact of Upgrade to Release 1.3(1i) or Higher

An upgrade from an earlier Cisco UCS firmware release to release 1.3(1i) or higher has the following impact on the Protect Configuration property of the local disk configuration policy the first time servers are associated with service profiles after the upgrade:

## Unassociated Servers

After you upgrade the Cisco UCS instance, the initial server association proceeds without configuration errors whether or not the local disk configuration policy matches the server hardware. Even if you enable the Protect Configuration property, Cisco UCS does not protect the user data on the server if there are configuration mismatches between the local disk configuration policy on the previous service profile and the policy in the new service profile.



**Note** If you enable the Protect Configuration property and the local disk configuration policy encounters mismatches between the previous service profile and the new service profile, all subsequent service profile associations with the server are blocked.

## Associated Servers

Any servers that are already associated with service profiles do not reboot after the upgrade. Cisco UCS Manager does not report any configuration errors if there is a mismatch between the local disk configuration policy and the server hardware.

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.

## Guidelines for Local Disk Configuration Policies Configured for RAID

### No Mixed HDDs and SSDs

Do not include HDDs and SSDs in a single RAID configuration.

### 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 instance 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.

## Creating a Local Disk Configuration Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create local-disk-config-policy <i>policy-name</i></b>	Creates a local disk configuration policy and enters local disk configuration policy mode.
<b>Step 3</b>	UCS-A /org/local-disk-config-policy # <b>set descr <i>description</i></b>	(Optional) Provides a description for the local disk configuration policy.
<b>Step 4</b>	UCS-A /org/local-disk-config-policy # <b>set mode {any-configuration   no-local-storage   no-raid   raid-0-striped   raid-1-mirrored   raid-5-striped-parity   raid-6-striped-dual-parity   raid-10-mirrored-and-striped}</b>	Specifies the mode for the local disk configuration policy.
<b>Step 5</b>	UCS-A /org/local-disk-config-policy # <b>set protect {yes   no}</b>	Specifies whether the local disk will be protected or not.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a local disk configuration policy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create local-disk-config-policy DiskPolicy7
UCS-A /org/local-disk-config-policy* # set mode raid-1-mirrored
UCS-A /org/local-disk-config-policy* # set protect yes
UCS-A /org/local-disk-config-policy* # commit-buffer
UCS-A /org/local-disk-config-policy #
```

## Viewing a Local Disk Configuration Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>show local-disk-config-policy policy-name</b>	Displays the local disk policy. If you have not configured a local disk policy, the local disk configuration (created by the create local-disk-config command) displays.  Displays the local disk definition (set by the create local-disk-config command). If the serial over LAN definition is not set, and if a policy is set (using the set local-disk-config-policy command), then the policy will be displayed.

The following example shows how to display local disk policy information for a local disk configuration policy called DiskPolicy7:

```
UCS-A# scope org /
UCS-A /org # show local-disk-config-policy DiskPolicy7

Local Disk Config Policy:
Name: DiskPolicy7
Mode: Raid 1 Mirrored
Description:
Protect Configuration: Yes
```

## Deleting a Local Disk Configuration Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete local-disk-config-policy</b> <i>policy-name</i>	Deletes the specified local disk configuration policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the local disk configuration policy named DiskPolicy7 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete local-disk-config-policy DiskPolicy7
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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. 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

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create scrub-policy</b> <i>policy-name</i>	Creates a scrub policy with the specified policy name, and enters organization scrub policy mode.
<b>Step 3</b>	UCS-A /org/scrub-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the scrub policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/scrub-policy # <b>set disk-scrub {no   yes}</b>	Disables or enables disk scrubbing on servers using this scrub policy as follows: <ul style="list-style-type: none"><li>• If enabled, destroys all data on any local drives</li><li>• If disabled, preserves all data on any local drives, including local storage configuration</li></ul>
<b>Step 5</b>	UCS-A /org/scrub-policy # <b>set bios-settings-scrub {no   yes}</b>	Disables or enables BIOS settings scrubbing on servers using this scrub policy as follows: <ul style="list-style-type: none"><li>• If enabled, erases all BIOS settings for the server and resets them to the BIOS defaults for that server type and vendor</li><li>• If disabled, preserves the existing BIOS settings on the server</li></ul>
<b>Step 6</b>	UCS-A /org/scrub-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a scrub policy named ScrubPolicy2, enables disk scrubbing on servers using the scrub policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create scrub-policy ScrubPolicy2
UCS-A /org/scrub-policy* # set descr "Scrub disk but not BIOS."
UCS-A /org/scrub-policy* # set disk-scrub yes
UCS-A /org/scrub-policy* # set bios-settings-scrub no
UCS-A /org/scrub-policy* # commit-buffer
UCS-A /org/scrub-policy #
```

## Deleting a Scrub Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete scrub-policy</b> <i>policy-name</i>	Deletes the specified scrub policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the scrub policy named ScrubPolicy2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete scrub-policy ScrubPolicy2
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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.

## Configuring a Serial over LAN Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create sol-policy</b> <i>policy-name</i>	Creates a serial over LAN policy and enters organization serial over LAN policy mode.
<b>Step 3</b>	UCS-A /org/sol-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the policy.

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/sol-policy # <b>set speed</b> {115200   19200   38400   57600   9600}	Specifies the serial baud rate.
<b>Step 5</b>	UCS-A /org/sol-policy # { <b>disable</b>   <b>enable</b> }	Disables or enables the serial over LAN policy. By default, the serial over LAN policy is disabled; you must enable it before it can be applied.
<b>Step 6</b>	UCS-A /org/sol-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a serial over LAN policy named Sol9600, provides a description for the policy, sets the speed to 9,600 baud, enables the policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create sol-policy Sol9600
UCS-A /org/sol-policy* # set descr "Sets serial over LAN policy to 9600 baud."
UCS-A /org/sol-policy* # set speed 9600
UCS-A /org/sol-policy* # enable
UCS-A /org/sol-policy* # commit-buffer
UCS-A /org/sol-policy #
```

## Viewing a Serial over LAN Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type <b>/</b> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>show sol-policy policy-name</b>	Displays the serial over LAN definition (set by the create sol-config command). If the serial over LAN definition is not set, and if a policy is set (using the set sol-policy command), then the policy will be displayed.

The following example shows how to display serial over LAN information for a serial over LAN policy called Sol9600:

```
UCS-A# scope org /
UCS-A /org # show sol-policy Sol9600

SOL Policy:
Full Name: Sol9600
SOL State: Enable
```

Speed: 9600  
 Description:

## Deleting a Serial over LAN Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete sol-policy</b> <i>policy-name</i>	Deletes the specified serial over LAN policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the serial over LAN policy named Sol9600 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete sol-policy Sol9600
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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.

## Configuring a Server Autoconfiguration Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create server-autoconfig-policy</b> <i>policy-name</i>	Creates a server autoconfiguration policy with the specified policy name, and enters organization server autoconfiguration policy mode.
<b>Step 3</b>	UCS-A /org/server-autoconfig-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/server-autoconfig-policy # <b>set destination org</b> <i>org-name</i>	(Optional) Specifies the organization for which the server is to be used.
<b>Step 5</b>	UCS-A /org/server-autoconfig-policy # <b>set qualifier</b> <i>server-qual-name</i>	(Optional) Specifies server pool policy qualification to use for qualifying the server.
<b>Step 6</b>	UCS-A /org/server-autoconfig-policy # <b>set template</b> <i>profile-name</i>	(Optional) Specifies a service profile template to use for creating a service profile instance for the server.
<b>Step 7</b>	UCS-A /org/server-autoconfig-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server autoconfiguration policy named AutoConfigFinance, provides a description for the policy, specifies finance as the destination organization, ServPoolQual22 as the server pool policy qualification, and ServTemp2 as the service profile template, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create server-autoconfig-policy AutoConfigFinance
UCS-A /org/server-autoconfig-policy* # set descr "Server Autoconfiguration Policy for
Finance"
UCS-A /org/server-autoconfig-policy* # set destination org finance
UCS-A /org/server-autoconfig-policy* # set qualifier ServPoolQual22
UCS-A /org/server-autoconfig-policy* # set template ServTemp2
UCS-A /org/server-autoconfig-policy* # commit-buffer
UCS-A /org/server-autoconfig-policy #
```

## Deleting a Server Autoconfiguration Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-autoconfig-policy</b> <i>policy-name</i>	Deletes the specified server autoconfiguration policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server autoconfiguration policy named AutoConfigFinance and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete server-autoconfig-policy AutoConfigFinance
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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

### Configuring a Server Discovery Policy

#### Before You Begin

If you plan to associate this policy with a server pool, create server pool policy qualifications.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.  <b>Note</b> Chassis discovery policies can only be accessed from the root organization.
<b>Step 2</b>	UCS-A /org # <b>create server-disc-policy</b> <i>policy-name</i>	Creates a server discovery policy with the specified policy name, and enters org server discovery policy mode.
<b>Step 3</b>	UCS-A /org/server-disc-policy # <b>set action</b> { <b>diag</b>   <b>immediate</b>   <b>user-acknowledged</b> }	Specifies when the system will attempt to discover new servers.
<b>Step 4</b>	UCS-A /org/chassis-disc-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the server discovery policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	UCS-A /org/server-disc-policy # <b>set qualifier</b> <i>qualifier</i>	(Optional) Uses the specified server pool policy qualifications to associates this policy with a server pool.
<b>Step 6</b>	UCS-A /org/server-disc-policy # <b>set scrub-policy</b>	Specifies the scrub policy to be used by this policy. The scrub policy defines whether the disk drive on a server should be scrubbed clean upon discovery.
<b>Step 7</b>	UCS-A /org/server-disc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server discovery policy named ServDiscPolExample, sets it to immediately discover new servers, provides a description for the policy, specifies the server pool policy qualifications and scrub policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create server-disc-policy ServDiscPolExample
UCS-A /org/server-disc-policy* # set action immediate
UCS-A /org/server-disc-policy* # set descr "This is an example server discovery policy."
UCS-A /org/server-disc-policy* # set qualifier ExampleQual
UCS-A /org/server-disc-policy* # set scrub-policy NoScrub
UCS-A /org/server-disc-policy # commit-buffer
```

## What to Do Next

Include the server discovery policy in a service profile and/or template.

## Deleting a Server Discovery Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>Delete server-disc-policy</b> <i>policy-name</i>	Deletes the specified server discovery policy.
<b>Step 3</b>	UCS-A /org/server-disc-policy# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server discovery policy named ServDiscPolExample and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete server-disc-policy ServDiscPolExample
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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.

## Configuring a Server Inheritance Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create server-inherit-policy</b> <i>policy-name</i>	Creates a server inheritance policy with the specified policy name, and enters organization server inheritance policy mode.
<b>Step 3</b>	UCS-A /org/server-inherit-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/server-inherit-policy # <b>set destination org</b> <i>org-name</i>	(Optional) Specifies the organization for which the server is to be used.
<b>Step 5</b>	UCS-A /org/server-inherit-policy # <b>set qualifier</b> <i>server-qual-name</i>	(Optional) Specifies server pool policy qualification to use for qualifying the server.
<b>Step 6</b>	UCS-A /org/server-inherit-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server inheritance policy named InheritEngineering, provides a description for the policy, specifies engineering as the destination organization and ServPoolQual22 as the server pool policy qualification, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create server-inherit-policy InheritEngineering
UCS-A /org/server-inherit-policy* # set descr "Server Inheritance Policy for Engineering"
UCS-A /org/server-inherit-policy* # set destination org engineering
UCS-A /org/server-inherit-policy* # set qualifier ServPoolQual22
UCS-A /org/server-inherit-policy* # commit-buffer
UCS-A /org/server-inherit-policy #
```

## Deleting a Server Inheritance Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-inherit-policy</b> <i>policy-name</i>	Deletes the specified server inheritance policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server inheritance policy named InheritEngineering and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete server-inherit-policy InheritEngineering
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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.

### Configuring a Server Pool Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create pooling-policy</b> <i>policy-name</i>	Creates a server pool policy with the specified name, and enters organization pooling policy mode.
<b>Step 3</b>	UCS-A /org/pooling-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the server pool policy.

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/pooling-policy # <b>set pool</b> <i>pool-distinguished-name</i>	Specifies the server pool to use with the server pool policy. You must specify the full distinguished name for the pool.
<b>Step 5</b>	UCS-A /org/pooling-policy # <b>set qualifier</b> <i>qualifier-name</i>	Specifies the server pool qualifier to use with the server pool policy.
<b>Step 6</b>	UCS-A /org/pooling-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server pool policy named ServerPoolPolicy4 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create pooling-policy ServerPoolPolicy4
UCS-A /org/pooling-policy* # set pool org-root/compute-pool-pool3
UCS-A /org/pooling-policy* # set qualifier ServPoolQual8
UCS-A /org/pooling-policy* # commit-buffer
UCS-A /org/pooling-policy #
```

## Deleting a Server Pool Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete pooling-policy</b> <i>policy-name</i>	Deletes the specified server pool policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server pool policy named ServerPoolPolicy4 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete pooling-policy ServerPoolPolicy4
UCS-A /org/pooling-policy* # commit-buffer
UCS-A /org/pooling-policy #
```

# 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 may 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 a Server Pool Policy Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /org # <b>create server-qual</b> <i>server-qual-name</i>	Creates a server pool qualification with the specified name, and enters organization server qualification mode.
<b>Step 3</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a server pool qualification named ServPoolQual22 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create server-qual ServPoolQual22
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

### What to Do Next

Configure one or more of the following server component qualifications:

- Adapter qualification
- Chassis qualification
- Memory qualification
- Power group qualification
- Processor qualification
- Storage qualification

## Deleting a Server Pool Policy Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-qual</b> <i>server-qual-name</i>	Deletes the specified server pool qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server pool qualification named ServPoolQual22 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete server-qual ServPoolQual22
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Creating an Adapter Qualification

### Before You Begin

Create a server pool policy qualification.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>scope server-qual <i>server-qual-name</i></b>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual# <b>create adapter</b>	Creates an adapter qualification and enters organization server qualification adapter mode.
<b>Step 4</b>	UCS-A /org/server-qual/adapter# <b>create cap-qual <i>adapter-type</i></b>	Creates an adapter capacity qualification for the specified adapter type and enters organization server qualification adapter capacity qualification mode. The <i>adapter-type</i> argument can be any of the following values: <ul style="list-style-type: none"> <li>• <b>fcoe</b> —Fibre Channel over Ethernet</li> <li>• <b>non-virtualized-eth-if</b> —Non-virtualized Ethernet interface</li> <li>• <b>non-virtualized-fc-if</b> —Non-virtualized Fibre Channel interface</li> <li>• <b>path-encap-consolidated</b> —Path encapsulation consolidated</li> <li>• <b>path-encap-virtual</b> —Path encapsulation virtual</li> <li>• <b>protected-eth-if</b> —Protected Ethernet interface</li> <li>• <b>protected-fc-if</b> —Protected Fibre Channel interface</li> <li>• <b>protected-fcoe</b> —Protected Fibre Channel over Ethernet</li> <li>• <b>virtualized-eth-if</b> —Virtualized Ethernet interface</li> <li>• <b>virtualized-fc-if</b> —Virtualized Fibre Channel interface</li> <li>• <b>virtualized-scsi-if</b> —Virtualized SCSI interface</li> </ul>
<b>Step 5</b>	UCS-A /org/server-qual/adapter/cap-qual# <b>set maximum {<i>max-cap</i>   unspecified}</b>	Specifies the maximum capacity for the selected adapter type.
<b>Step 6</b>	UCS-A /org/server-qual/adapter/cap-qual# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates and configures an adapter qualification for a non-virtualized Ethernet interface and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create adapter
UCS-A /org/server-qual/adapter* # create cap-qual non-virtualized-eth-if
UCS-A /org/server-qual/adapter/cap-qual* # set maximum 2500000000
UCS-A /org/server-qual/adapter/cap-qual* # commit-buffer
UCS-A /org/server-qual/adapter/cap-qual #
```

## Deleting an Adapter Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete adapter</b>	Deletes the adapter qualification from the server pool policy qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the adapter qualification from the server pool policy qualification named ServPoolQual22 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete adapter
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Configuring a Chassis Qualification

### Before You Begin

Create a server pool policy qualification.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create chassis</b> <i>min-chassis-num max-chassis-num</i>	Creates a chassis qualification for the specified chassis range and enters organization server qualification chassis mode.
<b>Step 4</b>	UCS-A /org/server-qual/chassis # <b>create slot</b> <i>min-slot-num max-slot-num</i>	Creates a chassis slot qualification for the specified slot range and enters organization server qualification chassis slot mode.
<b>Step 5</b>	UCS-A /org/server-qual/chassis/slot # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a chassis qualification for slots 1 to 4 on chassis 1 and 2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope server-qual ServPoolQual122
UCS-A /org/server-qual* # create chassis 1 2
UCS-A /org/server-qual/chassis* # create slot 1 4
UCS-A /org/server-qual/chassis/slot* # commit-buffer
UCS-A /org/server-qual/chassis/slot #
```

## Deleting a Chassis Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete chassis</b> <i>min-chassis-num max-chassis-num</i>	Deletes the chassis qualification for the specified chassis range.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the chassis qualification for chassis 1 and 2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete chassis 1 2
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a CPU Qualification

### Before You Begin

Create a server pool policy qualification.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create cpu</b>	Creates a CPU qualification and enters organization server qualification processor mode.
<b>Step 4</b>	UCS-A /org/server-qual/cpu # <b>set arch</b> {any   dual-core-opteron   intel-p4-c   opteron   pentium-4   turion-64   xeon   xeon-mp}	Specifies the processor architecture type.
<b>Step 5</b>	UCS-A /org/server-qual/cpu # <b>set maxcores</b> {max-core-num   unspecified}	Specifies the maximum number of processor cores.
<b>Step 6</b>	UCS-A /org/server-qual/cpu # <b>set mincores</b> {min-core-num   unspecified}	Specifies the minimum number of processor cores.
<b>Step 7</b>	UCS-A /org/server-qual/cpu # <b>set maxprocs</b> {max-proc-num   unspecified}	Specifies the maximum number of processors.
<b>Step 8</b>	UCS-A /org/server-qual/cpu # <b>set minprocs</b> {min-proc-num   unspecified}	Specifies the minimum number of processors.
<b>Step 9</b>	UCS-A /org/server-qual/cpu # <b>set maxthreads</b> {max-thread-num   unspecified}	Specifies the maximum number of threads.
<b>Step 10</b>	UCS-A /org/server-qual/cpu # <b>set minthreads</b> {min-thread-num   unspecified}	Specifies the minimum number of threads.
<b>Step 11</b>	UCS-A /org/server-qual/cpu # <b>set stepping</b> {step-num   unspecified}	Specifies the processor stepping number.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 12</b>	UCS-A /org/server-qual/cpu # <b>set model-regex regex</b>	Specifies a regular expression that the processor name must match.
<b>Step 13</b>	UCS-A /org/server-qual/cpu # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates and configures a CPU qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual122
UCS-A /org/server-qual # create processor
UCS-A /org/server-qual/cpu* # set arch xeon
UCS-A /org/server-qual/cpu* # set maxcores 8
UCS-A /org/server-qual/cpu* # set mincores 4
UCS-A /org/server-qual/cpu* # set maxprocs 2
UCS-A /org/server-qual/cpu* # set minprocs 1
UCS-A /org/server-qual/cpu* # set maxthreads 16
UCS-A /org/server-qual/cpu* # set minthreads 8
UCS-A /org/server-qual/cpu* # set stepping 5
UCS-A /org/server-qual/cpu* # commit-buffer
UCS-A /org/server-qual/cpu #
```

## Deleting a CPU Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual server-qual-name</b>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete cpu</b>	Deletes the processor qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the processor qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual122
UCS-A /org/server-qual # delete cpu
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Power Group Qualification

### Before You Begin

Create a server pool policy qualification.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create power-group</b> <i>power-group-name</i>	Creates a power group qualification for the specified power group name.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a power group qualification for a power group called powergroup1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create power-group powergroup1
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Deleting a Power Group Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete power-group</b> <i>power-group-name</i>	Deletes the specified power group qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a power group qualification for a power group called powergroup1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete power-group powergroup1
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Memory Qualification

### Before You Begin

Create a server pool policy qualification.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <b>/</b> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create memory</b>	Creates a memory qualification and enters organization server qualification memory mode.
<b>Step 4</b>	UCS-A /org/server-qual/memory # <b>set clock</b> { <i>clock-num</i>   <b>unspec</b> }	Specifies the memory clock speed.
<b>Step 5</b>	UCS-A /org/server-qual/memory # <b>set maxcap</b> { <i>max-cap-num</i>   <b>unspec</b> }	Specifies the maximum capacity of the memory array.
<b>Step 6</b>	UCS-A /org/server-qual/memory # <b>set mincap</b> { <i>min-cap-num</i>   <b>unspec</b> }	Specifies the minimum capacity of the memory array.
<b>Step 7</b>	UCS-A /org/server-qual/memory # <b>set speed</b> { <i>speed-num</i>   <b>unspec</b> }	Specifies the memory data rate.
<b>Step 8</b>	UCS-A /org/server-qual/memory # <b>set units</b> { <i>unit-num</i>   <b>unspec</b> }	Specifies the number of memory units (DRAM chips mounted to the memory board).
<b>Step 9</b>	UCS-A /org/server-qual/memory # <b>set width</b> { <i>width-num</i>   <b>unspec</b> }	Specifies the bit width of the data bus.
<b>Step 10</b>	UCS-A /org/server-qual/memory # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates and configures a memory qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create memory
UCS-A /org/server-qual/memory* # set clock 1067
```

```

UCS-A /org/server-qual/memory* # set maxcap 4096
UCS-A /org/server-qual/memory* # set mincap 2048
UCS-A /org/server-qual/memory* # set speed unspec
UCS-A /org/server-qual/memory* # set units 16
UCS-A /org/server-qual/memory* # set width 64
UCS-A /org/server-qual/memory* # commit-buffer
UCS-A /org/server-qual/memory#

```

## Deleting a Memory Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete memory</b>	Deletes the memory qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the memory qualification and commits the transaction:

```

UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete memory
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #

```

## Creating a Physical Qualification

### Before You Begin

Create a server pool policy qualification.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org/server-qual # <b>create physical-qual</b>	Creates a physical qualification and enters organization server qualification physical mode.
<b>Step 4</b>	UCS-A /org/server-qual/physical-qual # <b>set model-regex regex</b>	Specifies a regular expression that the model name must match.
<b>Step 5</b>	UCS-A /org/server-qual/physical-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates and configures a physical qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create physical-qual
UCS-A /org/server-qual/physical-qual* # set model-regex
UCS-A /org/server-qual/physical-qual* # commit-buffer
UCS-A /org/server-qual/physical-qual #
```

## Deleting a Physical Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual server-qual-name</b>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete physical-qual</b>	Deletes the physical qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a physical qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete physical-qual
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Storage Qualification

### Before You Begin

Create a server pool policy qualification.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create storage</b>	Creates a storage qualification and enters organization server qualification storage mode.
<b>Step 4</b>	UCS-A /org/server-qual/storage # <b>set blocksize</b> { <i>block-size-num</i>   <b>unspecified</b> }	Specifies the storage block size.
<b>Step 5</b>	UCS-A /org/server-qual/storage # <b>set maxcap</b> { <i>max-cap-num</i>   <b>unspecified</b> }	Specifies the maximum capacity of the storage array.
<b>Step 6</b>	UCS-A /org/server-qual/storage # <b>set mincap</b> { <i>min-cap-num</i>   <b>unspecified</b> }	Specifies the minimum capacity of the storage array.
<b>Step 7</b>	UCS-A /org/server-qual/storage # <b>set numberofblocks</b> { <i>block-num</i>   <b>unspecified</b> }	Specifies the number of blocks.
<b>Step 8</b>	UCS-A /org/server-qual/storage # <b>set perdiskcap</b> { <i>disk-cap-num</i>   <b>unspecified</b> }	Specifies the per-disk capacity.
<b>Step 9</b>	UCS-A /org/server-qual/storage # <b>set units</b> { <i>unit-num</i>   <b>unspecified</b> }	Specifies the number of storage units.
<b>Step 10</b>	UCS-A /org/server-qual/storage # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates and configures a storage qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create storage
UCS-A /org/server-qual/storage* # set blocksize 512
UCS-A /org/server-qual/storage* # set maxcap 420000
UCS-A /org/server-qual/storage* # set mincap 140000
UCS-A /org/server-qual/storage* # set numberofblocks 287277984
UCS-A /org/server-qual/storage* # set perdiskcap 140000
UCS-A /org/server-qual/storage* # set units 1
UCS-A /org/server-qual/storage* # commit-buffer
UCS-A /org/server-qual/storage #
```

## Deleting a Storage Qualification

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete storage</b>	Deletes the storage qualification.
<b>Step 4</b>	UCS-A /org/server-qual/ # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the storage qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual122
UCS-A /org/server-qual # delete storage
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Configuring vNIC/vHBA Placement Policies

### vNIC/vHBA Placement Policies

vNIC/vHBA placement policies are used to determine what types of vNICs or vHBAs can be assigned to the physical adapters on a server. Each vNIC/vHBA placement policy contains four virtual network interface connections (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.

If you do not include a vNIC/vHBA placement policy in the service profile or you use the default configuration for a server with two adapters, Cisco UCS Manager defaults to the **All** configuration and equally distributes the vNICs and vHBAs between the adapters.

You can use this policy to assign vNICs or vHBAs to either of the two vCons. Cisco UCS Manager uses the vCon assignment to determine how to assign the vNICs and vHBAs to the physical adapter during service profile association.

- **all**—All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic.
- **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.

## vCon to Adapter Placement

Cisco UCS Manager 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 with two adapters depends upon the type of server. You must consider this placement when you configure the vNIC/vHBA placement policy 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 these blade servers, the adapters are numbered left to right, but vCons are numbered right to left. If the server has a single adapter, all vCons are assigned to that adapter. However, if the server has two adapters, the vCons are assigned to the adapters in reverse order, as follows:

- Adapter1 is assigned vCon2 and vCon4
- Adapter2 is assigned vCon1 and vCon3

### vCon to Adapter Placement for All Other Supported Servers

For all other servers supported by Cisco UCS, the vCon assignment depends upon the number of adapters in the server, as follows:

**Table 13: vCon to Adapter Placement by Number of Adapters in Server**

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

## 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 **Assigned Only**, **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. 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 box to advise 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.



#### Note

vCon to adapter assignment occurs in a round-robin order. This order means that vNICs are placed on the adapters in the following order: vnic-1, vnic-3, vnic-2, vnic-4. As a result, under the following circumstances, the PCIE order of vNICs can be different than the explicit assignment configured in Cisco UCS Manager:

- In a server with two adapters, vNICs are explicitly assigned to all four vCons.
- A service profile that includes explicit assignment is migrated from a server with a higher number of adapters to one with a lower number of adapters.

### 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 adapter. 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**. You can configure the vCons through a vNIC/vHBA placement policy or in the service profile associated with the server.
- 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.

## Configuring a vNIC/vHBA Placement Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create vcon-policy <i>policy-name</i></b>	Creates the specified vNIC/vHBA placement profile and enters organization vcon policy mode.
<b>Step 3</b>	UCS-A /org/vcon-policy # <b>set descr <i>description</i></b>	(Optional) Provides a description for the vNIC/vHBA Placement Profile.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/vcon-policy # <b>set vcon {1   2} selection {all   assigned-only   exclude-dynamic   exclude-unassigned}</b>	Specifies the selection preference for the specified vCon.
<b>Step 5</b>	UCS-A /org/vcon-policy # <b>commit-buffer</b>	Commits the transaction.

The following example creates a vNIC/vHBA placement policy named Adapter1All, places all vNICs and vHBAs on adapter 1, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create vcon-policy Adapter1
UCS-A /org/vcon-policy* # set descr "This profile places all vNICs and vHBAs on adapter 1."
UCS-A /org/vcon-policy* # set vcon 1 selection all
UCS-A /org/vcon-policy* # commit-buffer
UCS-A /org/vcon-policy* #
UCS-A /org #
```

## Deleting a vNIC/vHBA Placement Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type <b>/</b> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete vcon-policy <i>policy-name</i></b>	Deletes the specified vNIC/vHBA placement profile.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction.

The following example deletes the vNIC/vHBA placement profile named Adapter1All and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete vcon-policy Adapter1All
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the organization which contains the service profile whose vNICs you want to explicitly assign to a vCon. To enter the root organization mode, type <b>/</b> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile <i>profile-name</i></b>	Enters organization service profile mode for the specified service.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic <i>vnic-name</i></b>	Enters organization service profile mode for the specified vnic.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set vcon {1   2   3   4   any}</b>	Sets the virtual network interface connection (vCon) placement for the specified vNIC. Entering a value of any allows Cisco UCS Manager to determine the vCon to which the vNIC is assigned.
<b>Step 5</b>	UCS-A /org/service-profile/vnic # <b>set order {order-num   unspecified}</b>	Specifies the desired PCI order for the vNIC. Valid values include 0-128 and unspecified.
<b>Step 6</b>	UCS-A /org/service-profile/vnic # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the vCon placement for a vNIC called vnic3 to 2, sets the desired order to 10, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope vnic vnic3
UCS-A /org/service-profile/vnic # set vcon 2
UCS-A /org/service-profile/vnic* # set order 10
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the organization which contains the service profile whose vHBAs you want to explicitly assign to a vCon. To enter the root organization mode, type / as the <i>org-name</i> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vhba vhba-name</b>	Enters organization service profile mode for the specified vHBA.
<b>Step 4</b>	UCS-A /org/service-profile/vhba # <b>set vcon {1   2   3   4   any}</b>	Sets the virtual network interface connection (vCon) placement for the specified vHBA. Entering a value of any allows Cisco UCS Manager to determine the vCon to which the vHBA is assigned.
<b>Step 5</b>	UCS-A /org/service-profile/vhba # <b>set order {order-num   unspecified}</b>	Specifies the desired PCI order for the vHBA. Valid desired order number values include 0-128 and unspecified.
<b>Step 6</b>	UCS-A /org/service-profile/vhba # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the vCon placement for a vHBA called vhba3 to 2, sets the desired order to 10, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope vhba vhba3
UCS-A /org/service-profile/vhba # set vcon 2
UCS-A /org/service-profile/vhba* # set order 10
UCS-A /org/service-profile/vhba* # commit-buffer
UCS-A /org/service-profile/vhba #
```



# CHAPTER **26**

## **Deferring Deployment of Service Profile Updates**

This chapter includes the following sections:

- [Deferred Deployment of Service Profiles, page 363](#)
- [Configuring Schedules, page 366](#)
- [Configuring Maintenance Policies, page 370](#)
- [Managing Pending Activities, page 372](#)

### **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 instance 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 the 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.

## Pending Activities

If you configure deferred deployment in a Cisco UCS instance, 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 instance 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 acknowledgement 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>create scheduler</b> <i>sched-name</i>	Creates a scheduler and enters scheduler mode.
<b>Step 3</b>	UCS-A /system/scheduler # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a scheduler called maintenancesched and commits the transaction:

```
UCS-A# scope system
UCS-A /system # create scheduler maintenancesched
UCS-A /system/scheduler* # commit-buffer
UCS-A /system/scheduler #
```

#### What to Do Next

Create a one time occurrence or recurring occurrence for the schedule.

### Creating a One Time Occurrence for a Schedule

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope schedule</b> <i>sched-name</i>	Enters scheduler system mode.
<b>Step 3</b>	UCS-A /system/scheduler # <b>create</b> <b>occurrence one-time</b> <i>occurrence-name</i>	Creates a one-time occurrence.
<b>Step 4</b>	UCS-A /system/scheduler/one-time # <b>set date</b> <i>month day-of-month year hour minute</i>	Sets the date and time this occurrence should run.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /system/scheduler/one-time # <b>set concur-tasks {unlimited   max-num-concur-tasks}</b>	(Optional) Sets the maximum number of tasks that can run concurrently during this occurrence.  If the maximum number of tasks is reached, the scheduler waits for the amount of time set in the minimum interval property before scheduling new tasks.
<b>Step 6</b>	UCS-A /system/scheduler/one-time # <b>set max-duration {none   num-of-days num-of-hours num-of-minutes num-of-seconds}</b>	(Optional) Sets the maximum length of time that this schedule occurrence can run. Cisco UCS completes as many scheduled tasks as possible within the specified time.
<b>Step 7</b>	UCS-A /system/scheduler/one-time # <b>set min-interval {none   num-of-days num-of-hours num-of-minutes num-of-seconds}</b>	(Optional) Sets the minimum length of time that the system should wait before starting a new task.
<b>Step 8</b>	UCS-A /system/scheduler/one-time # <b>set proc-cap {unlimited   max-num-of-tasks}</b>	(Optional) Sets the maximum number of scheduled tasks that can be run during this occurrence.
<b>Step 9</b>	UCS-A /system/scheduler/one-time # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a one time occurrence called onetimemaint for a scheduler called maintsched, sets the maximum number of concurrent tasks to 5, sets the start date to April 1, 2011 at 11:00, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope scheduler maintsched
UCS-A /system/scheduler # create occurrence one-time onetimemaint
UCS-A /system/scheduler/one-time* # set date apr 1 2011 11 00
UCS-A /system/scheduler/one-time* # set concur-tasks 5
UCS-A /system/scheduler/one-time* # commit-buffer
UCS-A /system/scheduler/one-time #
```

## Creating a Recurring Occurrence for a Schedule

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope schedule sched-name</b>	Enters scheduler system mode.
<b>Step 3</b>	UCS-A /system/scheduler # <b>create occurrence recurring occurrence-name</b>	Creates a recurring occurrence.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /system/scheduler/recurring # <b>set day</b> {even-day   every-day   friday   monday   never   odd-day   saturday   sunday   thursday   tuesday   wednesday}	(Optional) Specifies the day this occurrence should run. By default, this property is set to never.
<b>Step 5</b>	UCS-A /system/scheduler/recurring # <b>set hour</b> <i>hour</i>	(Optional) Specifies the hour at which this occurrence starts.
<b>Step 6</b>	UCS-A /system/scheduler/recurring # <b>set minute</b> <i>minute</i>	(Optional) Specifies the minute at which this occurrence starts.
<b>Step 7</b>	UCS-A /system/scheduler/recurring # <b>set concur-tasks</b> {unlimited   <i>max-num-concur-tasks</i> }	(Optional) Sets the maximum number of tasks that can run concurrently during this occurrence.  If the maximum number of tasks is reached, the scheduler waits for the amount of time set in the minimum interval property before scheduling new tasks.
<b>Step 8</b>	UCS-A /system/scheduler/recurring # <b>set max-duration</b> {none   <i>num-of-hours num-of-minutes num-of-seconds</i> }	(Optional) Sets the maximum length of time that this schedule occurrence can run. Cisco UCS completes as many scheduled tasks as possible within the specified time.
<b>Step 9</b>	UCS-A /system/scheduler/recurring # <b>set min-interval</b> {none   <i>num-of-days num-of-hours num-of-minutes num-of-seconds</i> }	(Optional) Sets the minimum length of time that the system should wait before starting a new task.
<b>Step 10</b>	UCS-A /system/scheduler/recurring # <b>set proc-cap</b> {unlimited   <i>max-num-of-tasks</i> }	(Optional) Sets the maximum number of scheduled tasks that can be run during this occurrence.
<b>Step 11</b>	UCS-A /system/scheduler/recurring # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a recurring occurrence called recurringmaint for a scheduler called maintsched, sets the maximum number of concurrent tasks to 5, sets the day this occurrence will run to even days, sets the time it will start to 11:05, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope scheduler maintsched
UCS-A /system/scheduler # create occurrence recurring recurringmaint
UCS-A /system/scheduler/recurring* # set day even-day
UCS-A /system/scheduler/recurring* # set hour 11
UCS-A /system/scheduler/recurring* # set minute 5
UCS-A /system/scheduler/recurring* # set concur-tasks 5
UCS-A /system/scheduler/recurring* # commit-buffer
UCS-A /system/scheduler/recurring #
```

## 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 occurrence or a recurring occurrence to the schedule to deploy the pending activity.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope scheduler sched-name</b>	Enters scheduler system mode.
<b>Step 3</b>	UCS-A /system/scheduler # <b>delete occurrence one-time occurrence-name</b>	Deletes the specified one-time occurrence.
<b>Step 4</b>	UCS-A /system/scheduler # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a one time occurrence called onetimemaint from scheduler maintsched and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope scheduler maintsched
UCS-A /system/scheduler # delete occurrence one-time onetimemaint
UCS-A /system/scheduler* # commit-buffer
UCS-A /system/scheduler #
```

## 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 occurrence or a recurring occurrence to the schedule to deploy the pending activity.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope scheduler sched-name</b>	Enters scheduler system mode.
<b>Step 3</b>	UCS-A /system/scheduler # <b>delete occurrence recurring occurrence-name</b>	Deletes the specified recurring occurrence.
<b>Step 4</b>	UCS-A /system/scheduler # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a recurring occurrence called onetimemaint from scheduler maintsched and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope scheduler maintsched
UCS-A /system/scheduler # delete occurrence recurring onetimemaint
UCS-A /system/scheduler* # commit-buffer
UCS-A /system/scheduler #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope system	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>delete scheduler</b> <i>sched-name</i>	Deletes a scheduler and enters scheduler mode.
<b>Step 3</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a scheduler called maintenancesched and commits the transaction:

```
UCS-A# scope system
UCS-A /system # delete scheduler maintenancesched
UCS-A /system* # commit-buffer
UCS-A /system #
```

## Configuring Maintenance Policies

### Creating a Maintenance Policy

#### Before You Begin

If you plan to configure this maintenance policy for deferred deployment, create a schedule.

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope org <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create</b> <b>maint-policy</b> <i>policy-name</i>	Creates the specified maintenance policy and enters maintenance policy mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org/maint-policy # <b>set reboot-policy {immediate   timer-automatic   user-ack}</b>	When a service profile is associated with a server, the server needs to be rebooted to complete the association. Specifying the reboot-policy command determines when the reboot occurs for all service profiles that include this maintenance policy. Possible values include: <ul style="list-style-type: none"> <li>• <b>immediate</b>--The server reboots as soon as the change is made to the service profile.</li> <li>• <b>timer-automatic</b>--You select the schedule that specifies when maintenance operations can be applied to the server using the set scheduler command. Cisco UCS reboots the server and completes the service profile changes at the scheduled time.</li> <li>• <b>user-ack</b>--The user must explicitly acknowledge the changes by using the <b>apply pending-changes</b> command before changes are applied.</li> </ul>
<b>Step 4</b>	UCS-A /org/maint-policy # <b>set scheduler <i>scheduler-name</i></b>	(Optional)           If the reboot-policy property is set to timer-automatic, you must select the schedule that 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.
<b>Step 5</b>	UCS-A /org/maint-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a maintenance policy called maintenance, sets the system to reboot immediately when a service profile is associated with a server, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create maint-policy maintenance
UCS-A /org/maint-policy* # set reboot-policy immediate
UCS-A /org/maint-policy* # commit-buffer
UCS-A /org/maint-policy #
```

## Deleting a Maintenance Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete maint-policy <i>policy-name</i></b>	Deletes the specified maintenance policy.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a maintenance policy called maintenance and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete maint-policy maintenance
UCS-A /org/maint-policy* # commit-buffer
UCS-A /org/maint-policy #
```

## Managing Pending Activities

### Viewing Pending Activities

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>show pending-changes [detail   expand]</b>	Displays details about pending-changes.

The following example shows how to display pending changes for a service profile called accounting:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # show pending-changes detail

Pending Changes:
Scheduler:
Changed by: admin
Acked by:
Mod. date: 2010-09-20T20:36:09.254
State: Untriggered
Admin State: Untriggered
Pend. Changes: 0
Pend. Disr.: 0
UCS-A /org/service-profile #
```

### Deploying a Service Profile Change Waiting for User Acknowledgement

Cisco UCS Manager CLI cannot deploy all pending service profile changes (for multiple service profiles) waiting for user acknowledgement. To simultaneously deploy all pending service profile changes for multiple service profiles, use Cisco UCS Manager GUI.

**Important**

You cannot stop Cisco UCS Manager from rebooting the affected server after you acknowledge a pending activity.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>apply pending-changes immediate</b>	Applies the pending changes immediately. Cisco UCS Manager immediately reboots the server affected by the pending activity.

The following example shows how to apply pending changes for a service profile called accounting:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # apply pending-changes immediate
UCS-A /org/service-profile #
```

**Deploying a Scheduled Service Profile Change Immediately**

Cisco UCS Manager CLI cannot deploy all scheduled service profile changes (for multiple service profiles) at the same time. To simultaneously deploy all scheduled service profile changes for multiple service profiles, use Cisco UCS Manager GUI.

**Important**

You cannot stop Cisco UCS Manager from rebooting the affected server after you acknowledge a pending activity.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>apply pending-changes immediate</b>	Applies the pending changes immediately.

	<b>Command or Action</b>	<b>Purpose</b>
		Cisco UCS Manager immediately reboots the server affected by the pending activity.

The following example shows how to apply pending changes for a service profile called accounting:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # apply pending-changes immediate
UCS-A /org/service-profile #
```



# CHAPTER **27**

## Configuring Service Profiles

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This chapter includes the following sections:

- [Service Profiles that Inherit Server Identity, page 375](#)
- [Service Profiles that Override Server Identity, page 376](#)
- [Service Profile Templates, page 377](#)
- [Guidelines and Recommendations for Service Profiles, page 377](#)
- [Creating a Service Profile Template, page 378](#)
- [Creating a Service Profile Instance from a Service Profile Template, page 380](#)
- [Creating a Hardware Based Service Profile, page 381](#)
- [Configuring a vNIC for a Service Profile, page 384](#)
- [Configuring a vHBA for a Service Profile, page 386](#)
- [Configuring a Local Disk for a Service Profile, page 387](#)
- [Configuring Serial over LAN for a Service Profile, page 388](#)
- [Service Profile Boot Definition Configuration, page 389](#)
- [Associating a Service Profile with a Blade Server or Server Pool, page 395](#)
- [Associating a Service Profile with a Rack Server, page 395](#)
- [Disassociating a Service Profile from a Server or Server Pool, page 396](#)
- [Resetting the UUID Assigned to a Service Profile from a Pool in a Service Profile Template, page 397](#)
- [Resetting the MAC Address Assigned to a vNIC from a Pool in a Service Profile Template, page 397](#)
- [Resetting the WWPN Assigned to a vHBA from a Pool in a Service Profile Template, page 398](#)

### 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 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 instance.

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 may fail.

# 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. However, after you create the profile, it is no longer connected to the template. If you need to make changes to one or more profiles created from this template, you must change each profile individually.

### **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.

# Creating a Service Profile Template

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>profile-name</i> { <b>initial-template</b>   <b>updating-template</b> }	<p>Creates the specified service profile template and enters organization service profile mode.</p> <p>Enter a unique <i>profile-name</i> to identify this service profile template.</p> <p>This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters, and you cannot change this name after the object has been saved.</p>
<b>Step 3</b>	UCS-A /org/service-profile # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>set boot-policy</b> <i>policy-name</i>	Associates the specified boot policy with the service profile.
<b>Step 5</b>	UCS-A /org/service-profile # <b>set descr</b> <i>description</i>	<p>(Optional)</p> <p>Provides a description for the service profile.</p> <p><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.</p>
<b>Step 6</b>	UCS-A /org/service-profile # <b>set dynamic-vnic-conn-policy</b> <i>policy-name</i>	Associates the specified dynamic vNIC connection policy with the service profile.
<b>Step 7</b>	UCS-A /org/service-profile # <b>set ext-mgmt-ip-state</b> { <b>none</b>   <b>pooled</b> }	<p>Specifies how the management IP address will be assigned to the service profile.</p> <p>You can set the management IP address policy using the following options:</p> <ul style="list-style-type: none"> <li>• None-- The service profile is not assigned an IP address.</li> <li>• Pooled-- The service profile is assigned an IP address from the management IP pool.</li> </ul> <p><b>Note</b> Setting the management IP address to static for a service profile template will result in an error.</p>

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 8</b>	UCS-A /org/service-profile # <b>set host-fw-policy</b> <i>policy-name</i>	Associates the specified host firmware policy with the service profile.
<b>Step 9</b>	UCS-A /org/service-profile # <b>set identity</b> {dynamic-uuid { <i>uuid</i>   derived}   dynamic-wwnn { <i>wwnn</i>   derived}   <b>uuid-pool</b> <i>pool-name</i>   <b>wwnn-pool</b> <i>pool-name</i> }	Specifies how the server acquires a UUID or WWNN. You can do one of the following: <ul style="list-style-type: none"> <li>• Create a unique UUID in the form <i>nnnnnnnn-nnnn-nnnn-nnnnnnnnnnnn</i>.</li> <li>• Derive the UUID from the one burned into the hardware at manufacture.</li> <li>• Use a UUID pool.</li> <li>• Create a unique WWNN in the form <i>hh : hh : hh : hh : hh : hh</i>.</li> <li>• Derive the WWNN from one burned into the hardware at manufacture.</li> <li>• Use a WWNN pool.</li> </ul>
<b>Step 10</b>	UCS-A /org/service-profile # <b>set ipmi-access-profile</b> <i>profile-name</i>	Associates the specified IPMI access profile with the service profile.
<b>Step 11</b>	UCS-A /org/service-profile # <b>set local-disk-policy</b> <i>policy-name</i>	Associates the specified local disk policy with the service profile.
<b>Step 12</b>	UCS-A /org/service-profile # <b>set maint-policy</b> <i>policy-name</i>	Associates the specified maintenance policy with the service profile.
<b>Step 13</b>	UCS-A /org/service-profile # <b>set mgmt-fw-policy</b> <i>policy-name</i>	Associates the specified management firmware policy with the service profile.
<b>Step 14</b>	UCS-A /org/service-profile # <b>set power-control-policy</b> <i>policy-name</i>	Associates the specified power control policy with the service profile.
<b>Step 15</b>	UCS-A /org/service-profile # <b>set scrub-policy</b> <i>policy-name</i>	Associates the specified scrub policy with the service profile.
<b>Step 16</b>	UCS-A /org/service-profile # <b>set sol-policy</b> <i>policy-name</i>	Associates the specified serial over LAN policy with the service profile.
<b>Step 17</b>	UCS-A /org/service-profile # <b>set stats-policy</b> <i>policy-name</i>	Associates the specified statistics policy with the service profile.
<b>Step 18</b>	UCS-A /org/service-profile # <b>set user-label</b> <i>label-name</i>	Specifies the user label associated with the service profile.
<b>Step 19</b>	UCS-A /org/service-profile # <b>set vcon</b> {1   2} <b>selection</b> {all   assigned-only   exclude-dynamic   exclude-unassigned}	Specifies the selection preference for the specified vCon.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 20</b>	UCS-A /org/service-profile # <b>set vcon-profile <i>policy-name</i></b>	Associates the specified vNIC/vHBA placement profile with the service profile.  <b>Note</b> You can either assign a vNIC/vHBA placement profile to the service profile, or set vCon selection preferences for the service profile, but you do not need to do both.
<b>Step 21</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a service profile template and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create service-profile ServTemp2 updating-template
UCS-A /org/service-profile* # set bios-policy biospol1
UCS-A /org/service-profile* # set boot-policy bootpol132
UCS-A /org/service-profile* # set descr "This is a service profile example."
UCS-A /org/service-profile* # set dynamic-vnic-conn-policy mydynvnicconnpolicy
UCS-A /org/service-profile* # set ext-mgmt-ip-state pooled
UCS-A /org/service-profile* # set host-fw-policy ipmi-user987
UCS-A /org/service-profile* # set identity dynamic-uuid derived
UCS-A /org/service-profile* # set ipmi-access-profile ipmiProf16
UCS-A /org/service-profile* # set local-disk-policy localdiskpol133
UCS-A /org/service-profile* # set maint-policy maintpol4
UCS-A /org/service-profile* # set mgmt-fw-policy mgmtfpol75
UCS-A /org/service-profile* # set power-control-policy powcontrpol13
UCS-A /org/service-profile* # set scrub-policy scrubpol155
UCS-A /org/service-profile* # set sol-policy solpol2
UCS-A /org/service-profile* # set stats-policy statspol4
UCS-A /org/service-profile* # set user-label mylabel
UCS-A /org/service-profile* # vcon-policy myvconnpolicy
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to Do Next

- (Optional) Configure a boot definition for the service profile. Use this option only if you have not associated a boot policy with the service profile.
- Create a service profile instance from the service profile template.

## Creating a Service Profile Instance from a Service Profile Template

### Before You Begin

Verify that there is a service profile template from which to create a service profile instance.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>profile-name instance</i>	<p>Creates the specified service profile instance and enters organization service profile mode.</p> <p>Enter a unique <i>profile-name</i> to identify this service profile template.</p> <p>This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters, and you cannot change this name after the object has been saved.</p>
<b>Step 3</b>	UCS-A /org/service-profile # <b>set src-templ-name</b> <i>profile-name</i>	Specifies the source service profile template to apply to the service profile instance. All configuration settings from the service profile template will be applied to the service profile instance.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a service profile instance named ServProf34, applies the service profile template named ServTemp2, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create service-profile ServProf34 instance
UCS-A /org/service-profile* # set src-templ-name ServTemp2
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to Do Next

Associate the service profile to a server, rack server, or server pool.

## Creating a Hardware Based Service Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>profile-name instance</i>	<p>Creates the specified service profile instance and enters organization service profile mode.</p> <p>Enter a unique <i>profile-name</i> to identify this service profile template.</p>

	<b>Command or Action</b>	<b>Purpose</b>
		This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters, and you cannot change this name after the object has been saved.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>set boot-policy</b> <i>policy-name</i>	Associates the specified boot policy with the service profile.
<b>Step 5</b>	UCS-A /org/service-profile # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the service profile.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 6</b>	UCS-A /org/service-profile # <b>set dynamic-vnic-conn-policy</b> <i>policy-name</i>	Associates the specified dynamic vNIC connection policy with the service profile.
<b>Step 7</b>	UCS-A /org/service-profile # <b>set ext-mgmt-ip-state</b> {none   pooled   static}	Specifies how the management IP address will be assigned to the service profile.  You can set the management IP address policy using the following options: <ul style="list-style-type: none"><li>• None-- The service profile is not assigned an IP address.</li><li>• Pooled-- The service profile is assigned an IP address from the management IP pool.</li><li>• Static-- The service profile is assigned the configured static IP address.</li></ul>
<b>Step 8</b>	UCS-A /org/service-profile # <b>set host-fw-policy</b> <i>ipmi-user-name</i>	Associates the specified host forwarding policy with the service profile.
<b>Step 9</b>	UCS-A /org/service-profile # <b>set identity</b> {dynamic-uuid { <i>uuid</i>   derived}   dynamic-wwnn { <i>wwnn</i>   derived}   <b>uuid-pool</b> <i>pool-name</i>   <b>wwnn-pool</b> <i>pool-name</i> }	Specifies how the server acquires a UUID or WWNN. You can do one of the following: <ul style="list-style-type: none"><li>• Create a unique UUID in the form <i>aaaaaaaa-bbbb-cccc-dddd-aaaaaaaaaaaa</i>.</li><li>• Derive the UUID from the one burned into the hardware at manufacture.</li><li>• Use a UUID pool.</li></ul>

	<b>Command or Action</b>	<b>Purpose</b>
		<ul style="list-style-type: none"> <li>• Create a unique WWNN in the form <code>hh : hh : hh : hh : hh : hh</code>.</li> <li>• Derive the WWNN from one burned into the hardware at manufacture.</li> <li>• Use a WWNN pool.</li> </ul>
<b>Step 10</b>	UCS-A /org/service-profile # <b>set ipmi-access-profile</b> <i>profile-name</i>	Associates the specified IPMI access profile with the service profile.
<b>Step 11</b>	UCS-A /org/service-profile # <b>set local-disk-policy</b> <i>policy-name</i>	Associates the specified local disk policy with the service profile.
<b>Step 12</b>	UCS-A /org/service-profile # <b>set maint-policy</b> <i>policy-name</i>	Associates the specified maintenance policy with the service profile.
<b>Step 13</b>	UCS-A /org/service-profile # <b>set mgmt-fw-policy</b> <i>policy-name</i>	Associates the specified management forwarding policy with the service profile.
<b>Step 14</b>	UCS-A /org/service-profile # <b>set power-control-policy</b> <i>policy-name</i>	Associates the specified power control policy with the service profile.
<b>Step 15</b>	UCS-A /org/service-profile # <b>set scrub-policy</b> <i>policy-name</i>	Associates the specified scrub policy with the service profile.
<b>Step 16</b>	UCS-A /org/service-profile # <b>set sol-policy</b> <i>policy-name</i>	Associates the specified serial over LAN policy with the service profile.
<b>Step 17</b>	UCS-A /org/service-profile # <b>set stats-policy</b> <i>policy-name</i>	Associates the specified statistics policy with the service profile.
<b>Step 18</b>	UCS-A /org/service-profile # <b>set user-label</b> <i>label-name</i>	Specifies the user label associated with the service profile.
<b>Step 19</b>	UCS-A /org/service-profile # <b>set vcon</b> {1   2} selection {all   assigned-only   exclude-dynamic   exclude-unassigned}	Specifies the selection preference for the specified vCon.
<b>Step 20</b>	UCS-A /org/service-profile # <b>set vcon-policy</b> <i>policy-name</i>	<p>Associates the specified vNIC/vHBA placement policy with the service profile.</p> <p><b>Note</b> You can either assign a vNIC/vHBA placement profile to the service profile, or set vCon selection preferences for the service profile, but you do not need to do both.</p>
<b>Step 21</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a service profile instance and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create service-profile ServInst90 instance
UCS-A /org/service-profile* # set bios-policy biospol1
UCS-A /org/service-profile* # set boot-policy bootpol132
UCS-A /org/service-profile* # set descr "This is a service profile example."
UCS-A /org/service-profile* # set ext-mgmt-ip-state pooled
UCS-A /org/service-profile* # set host-fw-policy ipmi-user987
UCS-A /org/service-profile* # set identity dynamic-uuid derived
UCS-A /org/service-profile* # set ipmi-access-profile ipmiProf16
UCS-A /org/service-profile* # set local-disk-policy localdiskpol133
UCS-A /org/service-profile* # set maint-policy maintpol14
UCS-A /org/service-profile* # set mgmt-fw-policy mgmtfwpol175
UCS-A /org/service-profile* # set power-control-policy powcontrpol13
UCS-A /org/service-profile* # set scrub-policy scrubpol155
UCS-A /org/service-profile* # set sol-policy solpol2
UCS-A /org/service-profile* # set stats-policy statspol4
UCS-A /org/service-profile* # set user-label mylabel
UCS-A /org/service-profile* # vcon-policy myvconnpolicy
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to Do Next

- (Optional) Configure a boot definition for the service profile. Use this option only if you have not associated a boot policy with the service profile.
- Associate the service profile with a blade server, server pool, or rack server.

## Configuring a vNIC for a Service Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create vnic</b> <i>vnic-name</i> [ <i>eth-if eth-if-name</i> ] [ <b>fabric</b> {a   b}]	Creates a vNIC for the specified service profile and enters organization service profile vNIC mode.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set adapter-policy</b> <i>policy-name</i>	Specifies the adapter policy to use for the vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/vnic # <b>set identity</b> {dynamic-mac <i>mac-addr</i>   derived}   <b>mac-pool</b> <i>mac-pool-name</i>	<p>Specifies the identity (MAC address) for the vNIC. You can set the identity using one of the following options:</p> <ul style="list-style-type: none"> <li>• Create a unique MAC address in the form <i>nn : nn : nn : nn : nn : nn</i>.</li> <li>• Derive the MAC address from one burned into the hardware at manufacture.</li> </ul>

	<b>Command or Action</b>	<b>Purpose</b>
		• Assign a MAC address from a MAC pool.
<b>Step 6</b>	UCS-A /org/service-profile/vnic # <b>set mtu</b> <i>size-num</i>	Specified the maximum transmission unit, or packet size, that the vNIC accepts.
<b>Step 7</b>	UCS-A /org/service-profile/vnic # <b>set nw-control-policy</b> <i>policy-name</i>	Specifies the network control policy to use for the vNIC.
<b>Step 8</b>	UCS-A /org/service-profile/vnic # <b>set order</b> { <i>order-num</i>   <b>unspecified</b> }	Specifies the relative order for the vNIC.
<b>Step 9</b>	UCS-A /org/service-profile/vnic # <b>set pin-group</b> <i>group-name</i>	Specifies the pin group to use for the vNIC.
<b>Step 10</b>	UCS-A /org/service-profile/vnic # <b>set qos-policy</b> <i>policy-name</i>	Specifies the QoS policy to use for the vNIC.
<b>Step 11</b>	UCS-A /org/service-profile/vnic # <b>set stats-policy</b> <i>policy-name</i>	Specifies the stats policy to use for the vNIC.
<b>Step 12</b>	UCS-A /org/service-profile/vnic # <b>set template-name</b> <i>policy-name</i>	Specifies the dynamic vNIC connectivity policy to use for the vNIC.
<b>Step 13</b>	UCS-A /org/service-profile/vnic # <b>set vcon</b> {1   2   <b>any</b> }	Assigns the vNIC to the specified vCon. Use the <b>any</b> keyword to have Cisco UCS Manager automatically assign the vNIC.
<b>Step 14</b>	UCS-A /org/service-profile/vnic # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a vNIC for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # create vnic vnic3 fabric a
UCS-A /org/service-profile/vnic* # set adapter-policy AdaptPol2
UCS-A /org/service-profile/vnic* # set identity mac-pool MacPool13
UCS-A /org/service-profile/vnic* # set mtu 8900
UCS-A /org/service-profile/vnic* # set nw-control-policy ncp5
UCS-A /org/service-profile/vnic* # set order 0
UCS-A /org/service-profile/vnic* # set pin-group EthPinGroup12
UCS-A /org/service-profile/vnic* # set qos-policy QosPol5
UCS-A /org/service-profile/vnic* # set stats-policy StatsPol2
UCS-A /org/service-profile/vnic* # set template-name VnicConnPol3
UCS-A /org/service-profile/vnic* # set set vcon any
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic #
```

# Configuring a vHBA for a Service Profile

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create vhba</b> <i>vhba-name</i> [ <b>fabric</b> {a   b}] [ <b>fc-if</b> <i>fc-if-name</i> ]	Creates a vHBA for the specified service profile and enters organization service profile vHBA mode.
<b>Step 4</b>	UCS-A /org/service-profile/vhba # <b>set adapter-policy</b> <i>policy-name</i>	Specifies the adapter policy to use for the vHBA.
<b>Step 5</b>	UCS-A /org/service-profile/vhba # <b>set admin-vcon</b> {1   2   any}	Assigns the vHBA to one or all virtual network interface connections.
<b>Step 6</b>	UCS-A /org/service-profile/vhba # <b>set identity</b> {dynamic-wwpn} {wwpn   derived}   <b>wwpn-pool</b> <i>wwn-pool-name</i>	Specifies the storage identity (world wide port name [WWPN]) for the vHBA. You can set the storage identity using one of the following options: <ul style="list-style-type: none"> <li>• Create a unique WWPN in the form <i>hh : hh : hh : hh : hh : hh : hh</i>.</li> <li>• Derive the WWPN from one burned into the hardware at manufacture.</li> <li>• Assign a WWPN from a WWN pool.</li> </ul>
<b>Step 7</b>	UCS-A /org/service-profile/vhba # <b>set max-field-size</b> <i>size-num</i>	Specifies the maximum size of the Fibre Channel frame payload (in bytes) that the vHBA supports.
<b>Step 8</b>	UCS-A /org/service-profile/vhba # <b>set order</b> { <i>order-num</i>   unspecified}	Specifies the PCI scan order for the vHBA.
<b>Step 9</b>	UCS-A /org/service-profile/vhba # <b>set pers-bind</b> {disabled   enabled}	Disables or enables persistent binding to Fibre Channel targets.
<b>Step 10</b>	UCS-A /org/service-profile/vhba # <b>set pin-group</b> <i>group-name</i>	Specifies the pin group to use for the vHBA.
<b>Step 11</b>	UCS-A /org/service-profile/vhba # <b>set qos-policy</b> <i>policy-name</i>	Specifies the QoS policy to use for the vHBA.
<b>Step 12</b>	UCS-A /org/service-profile/vhba # <b>set stats-policy</b> <i>policy-name</i>	Specifies the stats policy to use for the vHBA.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 13</b>	UCS-A /org/service-profile/vhba # <b>set template-name <i>policy-name</i></b>	Specifies the vHBA SAN connectivity policy to use for the vHBA.
<b>Step 14</b>	UCS-A /org/service-profile/vhba # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a vHBA for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # create vhba vhba3 fabric b
UCS-A /org/service-profile/vhba* # set adapter-policy AdaptPol2
UCS-A /org/service-profile/vhba* # set set admin-vcon any
UCS-A /org/service-profile/vhba* # set admin-vcon any
UCS-A /org/service-profile/vhba* # set identity wwpn-pool SanPool17
UCS-A /org/service-profile/vhba* # set max-field-size 2112
UCS-A /org/service-profile/vhba* # set order 0
UCS-A /org/service-profile/vhba* # set pers-bind enabled
UCS-A /org/service-profile/vhba* # set pin-group FcPinGroup12
UCS-A /org/service-profile/vhba* # set qos-policy QosPol5
UCS-A /org/service-profile/vhba* # set stats-policy StatsPol2
UCS-A /org/service-profile/vhba* # set template-name SanConnPol3
UCS-A /org/service-profile/vhba* # commit-buffer
UCS-A /org/service-profile/vhba #
```

## Configuring a Local Disk for a Service Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile <i>profile-name</i></b>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create local-disk-config</b>	Creates a local disk configuration for the service profile and enters organization service profile local disk configuration mode.
<b>Step 4</b>	UCS-A /org/service-profile/local-disk-config # <b>set descr <i>description</i></b>	(Optional) Provides a description for the local disk configuration.
<b>Step 5</b>	UCS-A /org/service-profile/local-disk-config # <b>set mode {any-configuration   no-local-storage   no-raid   raid-0-striped   raid-1-mirrored   raid-5-striped-parity  </b>	Specifies the mode for the local disk.

	<b>Command or Action</b>	<b>Purpose</b>
	<b>raid-6-striped-dual-parity   raid-10-mirrored-and-striped}</b>	
<b>Step 6</b>	UCS-A /org/service-profile/local-disk-config # <b>create partition</b>	Creates a partition for the local disk and enters organization service profile local disk configuration partition mode.
<b>Step 7</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>set descr description</b>	(Optional) Provides a description for the partition.
<b>Step 8</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>set size {size-num   unspecified}</b>	Specifies the partition size in MBytes.
<b>Step 9</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>set type {ext2   ext3   fat32   none   ntfs   swap}</b>	Specifies the partition type.
<b>Step 10</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a local disk for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # scope boot-definition
UCS-A /org/service-profile # create local-disk-config
UCS-A /org/service-profile/local-disk-config* # set mode raid-1-mirrored
UCS-A /org/service-profile/local-disk-config* # create partition
UCS-A /org/service-profile/local-disk-config/partition* # set size 1000000
UCS-A /org/service-profile/local-disk-config/partition* # set type ntfs
UCS-A /org/service-profile/local-disk-config/partition* # commit-buffer
UCS-A /org/service-profile/local-disk-config/partition #
```

## Configuring Serial over LAN for a Service Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the specified service.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org/service-profile # <b>create sol-config</b>	Creates a serial over LAN configuration for the service profile and enters organization service profile SoL configuration mode.
<b>Step 4</b>	UCS-A /org/service-profile/sol-config # { <b>disable   enable</b> }	Disables or enables the serial over LAN configuration for the service profile.
<b>Step 5</b>	UCS-A /org/service-profile/sol-config # <b>set descr description</b>	(Optional) Provides a description for the serial over LAN configuration.
<b>Step 6</b>	UCS-A /org/service-profile/sol-config # <b>set speed {115200   19200   38400   57600   9600}</b>	Specifies the serial baud rate.
<b>Step 7</b>	UCS-A /org/service-profile/sol-config # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures serial over LAN for the service profile named ServInst90 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # create sol-config
UCS-A /org/service-profile/sol-config* # enable
UCS-A /org/service-profile/sol-config* # set descr "Sets serial over LAN to 9600 baud."
UCS-A /org/service-profile/sol-config* # set speed 9600
UCS-A /org/service-profile/sol-config* # commit-buffer
UCS-A /org/service-profile/sol-config #
```

## Service Profile Boot Definition Configuration

### Configuring a Boot Definition for a Service Profile

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create boot-definition</b>	Creates a boot definition for the service profile and enters organization service profile boot definition mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the boot definition.
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition # <b>set reboot-on-update</b> {no   yes}	(Optional) Specifies whether to automatically reboot all servers that use this boot definition after changes are made to the boot order. By default, the reboot on update option is disabled.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a boot definition for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # create boot-definition
UCS-A /org/service-profile/boot-definition* # set descr "This boot definition reboots on
update."
UCS-A /org/service-profile/boot-definition* # set reboot-on-update yes
UCS-A /org/service-profile/boot-definition* # commit-buffer
UCS-A /org/service-profile/boot-definition #
```

## What to Do Next

Configure one or more of the following boot options for the boot definition and set their boot order:

- **LAN Boot**—Boots from a centralized provisioning server. It is frequently used to install operating systems on a server from that server.  
If you choose the LAN Boot option, continue to [Configuring a LAN Boot for a Service Profile Boot Definition , on page 391](#).
- **Storage Boot**—Boots from an operating system image on the SAN. You can specify 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 exactly the same operating system image. Therefore, the new server appears to be exactly the same server to the network.  
If you choose the Storage Boot option, continue to [Configuring a Storage Boot for a Service Profile Boot Definition , on page 392](#).
- **Virtual Media Boot**—Mimics the insertion of a physical CD into a server. It is typically used to manually install operating systems on a server.  
If you choose the Virtual Media boot option, continue to [Configuring a Virtual Media Boot for a Service Profile Boot Definition , on page 393](#).

## Configuring a LAN Boot for a Service Profile Boot Definition

### Before You Begin

Configure a boot definition for a service profile.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile# <b>scope boot-definition</b>	Enters organization service profile boot definition mode.
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition# <b>create lan</b>	Creates a LAN boot for the service profile boot definition and enters service profile boot definition LAN mode.
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition/lan# <b>set order</b> {1   2   3   4}	Specifies the boot order for the LAN boot.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition/lan# <b>create path</b> {primary   secondary}	Creates a primary or secondary LAN boot path and enters service profile boot definition LAN path mode.
<b>Step 7</b>	UCS-A /org/service-profile/boot-definition/lan/path# <b>set vnic</b> <i>vnic-name</i>	Specifies the vNIC to use for the LAN image path.
<b>Step 8</b>	UCS-A /org/service-profile/boot-definition/lan/path# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the service profile named ServInst90, creates a LAN boot for the service profile boot definition, sets the boot order to 2, creates a primary path, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org# scope service-profile ServInst90
UCS-A /org/service-profile# scope boot-definition
UCS-A /org/service-profile/boot-definition# create lan
UCS-A /org/service-profile/boot-definition/lan# set order 2
UCS-A /org/service-profile/boot-definition/lan# create path primary
UCS-A /org/service-profile/boot-definition/lan/path# set vnic vnic3
UCS-A /org/service-profile/boot-definition/lan/path# commit-buffer
UCS-A /org/service-profile/boot-definition/lan/path#
```

## Configuring a Storage Boot for a Service Profile Boot Definition

### Before You Begin

Configure a boot definition for a service profile.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope boot-definition</b>	Enters organization service profile boot definition mode.
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition # <b>create storage</b>	Creates a storage boot for the service profile boot definition and enters service profile boot definition storage mode.
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition/storage # <b>set order</b> {1   2   3   4}	Specifies the boot order for the storage boot.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition/storage # <b>create {local   san-image {primary   secondary}}</b>	Creates a local storage boot or a SAN image boot. If a SAN image boot is created, it enters service profile boot definition storage SAN image mode.
<b>Step 7</b>	UCS-A /org/service-profile/boot-definition/storage/san-image # <b>create path {primary   secondary}</b>	Creates a primary or secondary SAN image path and enters service profile boot definition storage SAN image path 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.
<b>Step 8</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>set lun</b> <i>lun-num</i>	Specifies the LUN used for the SAN image path.
<b>Step 9</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>set vhba</b> <i>vhba-name</i>	Specifies the vHBA used for the SAN image path.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 10</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>set wwn wwn-num</b>	Specifies the WWN used for the SAN image path.
<b>Step 11</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the service profile named ServInst90, creates a storage boot for the service profile boot definition, sets the boot order to 2, creates a primary path, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # scope boot-definition
UCS-A /org/service-profile/boot-definition* # create storage
UCS-A /org/service-profile/boot-definition/storage* # create san-image primary
UCS-A /org/service-profile/boot-definition/storage* # set order 2
UCS-A /org/service-profile/boot-definition/storage/san-image* # create path primary
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # set lun 27512
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # set vhba vhba3
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # set wwn
20:00:00:00:20:00:00:23
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # commit-buffer
UCS-A /org/service-profile/boot-definition/storage/san-image/path #
```

## Configuring a Virtual Media Boot for a Service Profile Boot Definition

### Before You Begin

Configure a boot definition for a service profile.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope boot-definition</b>	Enters organization service profile boot definition mode.
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition # <b>create virtual-media {read-only   read-write}</b>	Creates a read-only or read-write virtual media boot for the service profile boot definition and enters service profile boot definition virtual media mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition/virtual-media # <b>set order {1   2   3   4}</b>	Specifies the boot order for the virtual media boot.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition/virtual-media # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the service profile named ServInst90, creates a virtual media boot with read-only privileges for the service profile boot definition, sets the boot order to 3, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # scope boot-definition
UCS-A /org/service-profile/boot-definition* # create virtual-media read-only
UCS-A /org/service-profile/boot-definition/virtual-media* # set order 1
UCS-A /org/service-profile/boot-definition/virtual-media* # commit-buffer
UCS-A /org/service-profile/boot-definition/virtual-media #
```

## Deleting a Boot Definition for a Service Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>delete boot-definition</b>	Deletes the boot definition for the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the boot definition for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # delete boot-definition
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Associating a Service Profile with a Blade 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>associate</b> { <i>server chassis-id slot-id</i>   <b>server-pool</b> <i>pool-name qualifier</i> } [ <b>restrict-migration</b> ]	Associates the service profile with a single server, or to the specified server pool with the specified server pool policy qualifications. Adding the optional the restrict-migration command prevents the service profile from being migrated to another server.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example associates the service profile named ServProf34 with the server in slot 4 of chassis 1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile* # associate server 1/4
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Associating a Service Profile with a Rack Server

Follow this procedure if you did not associate the service profile with a rack server when you created it, or to change the rack server with which a service profile is associated.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile# <b>associate server</b> <i>serv-id</i> [ <b>restrict-migration</b> ]	Associates the service profile with the specified rack server. Adding the optional the restrict-migration command prevents the service profile from being migrated to another server.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example associates the service profile named ServProf34 with the rack server 1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile* # associate server 1
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Disassociating a Service Profile from a Server or Server Pool

This procedure covers disassociating a service profile from a blade server, rack server, or server pool.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile# <b>disassociate</b>	Disassociates the service profile from the server or server pool.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disassociates the service profile named ServProf34 from the server to which it was associated and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile # disassociate
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the command mode for the organization for which you want to reset the UUID. If the system does not include multi-tenancy, type / as the <i>org-name</i> to enter the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters the service profile that requires the UUID for the associated server to be reset to a different UUID suffix pool.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set identity dynamic-uuid derived</b>	Specifies that the service profile will obtain a UUID dynamically from a pool.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

This example resets the UUID of a service profile to a different UUID suffix pool:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # set identity dynamic-uuid derived
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the command mode for the organization that contains the service profile for which you want to reset the MAC address. If the system does not include multi-tenancy, type / as the <i>org-name</i> to enter the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters the command mode for the service profile that requires the MAC address of the associated server to be reset to a different MAC address.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic</b> <i>vnic-name</i>	Enters the command mode for the vNIC for which you want to reset the MAC address.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set identity dynamic-mac derived</b>	Specifies that the vNIC will obtain a MAC address dynamically from a pool.
<b>Step 5</b>	UCS-A /org/service-profile/vnic # <b>commit-buffer</b>	Commits the transaction to the system configuration.

This example resets the MAC address of a vNIC in a service profile:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # scope vnic dynamic-prot-001
UCS-A /org/service-profile/vnic # set identity dynamic-mac derived
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters the command mode for the organization that contains the service profile for which you want to reset the WWPN. If the system does not include multi-tenancy, type / as the <i>org-name</i> to enter the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile <i>profile-name</i></b>	Enters the service profile of the vHBA for which you want to reset the WWPN.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vhba <i>vhba-name</i></b>	Enters the command mode for vHBA for which you want to reset the WWPN.
<b>Step 4</b>	UCS-A /org/service-profile/vhba # <b>set identity dynamic-wwpn derived</b>	Specifies that the vHBA will obtain a WWPN dynamically from a pool.
<b>Step 5</b>	UCS-A /org/service-profile/vhba # <b>commit-buffer</b>	Commits the transaction to the system configuration.

This example resets the WWPN of a vHBA in a service profile:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # scope vhba vhba3
UCS-A /org/service-profile/vhba # set identity dynamic-wwpn derived
UCS-A /org/service-profile/vhba* # commit-buffer
UCS-A /org/service-profile/vhba #
```





# CHAPTER **28**

## **Managing Power in Cisco UCS**

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This chapter includes the following sections:

- [Power Management in Cisco UCS , page 401](#)
- [Rack Server Power Management, page 401](#)
- [Power Management Precautions, page 401](#)
- [Configuring the Power Policy, page 402](#)
- [Configuring the Global Cap Policy, page 403](#)
- [Configuring Policy-Driven Chassis Group Power Capping, page 403](#)
- [Configuring Manual Blade-Level Power Capping, page 407](#)

### **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 instance
- 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 instance. 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope psu-policy</b>	Enters PSU policy mode.
<b>Step 3</b>	UCS-A /org/psu-policy # <b>set redundancy {grid   n-plus-1   non-redund}</b>	<p>Specifies one of the following redundancy types:</p> <ul style="list-style-type: none"> <li>• <b>grid</b>—Provides power redundancy when two power sources are used to power the chassis. If one power source fails, the surviving power supplies on the other power circuit continue to provide power to the chassis.</li> <li>• <b>n-plus-1</b>—Balances the power load for the chassis across the number of power supplies needed to satisfy non-redundancy plus one additional power supply for redundancy. If any additional power supplies are installed, they are recognized and powered off.</li> <li>• <b>non-redund</b>—Balances the power load for the chassis evenly across all installed power supplies.</li> </ul> <p>For more information about power redundancy, see the <i>Cisco UCS 5108 Server Chassis Installation Guide</i>.</p>
<b>Step 4</b>	UCS-A /org/psu-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures the power policy to use grid redundancy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope psu-policy
UCS-A /org/psu-policy # set redundancy grid
UCS-A /org/psu-policy* # commit-buffer
UCS-A /org/psu-policy #
```

# 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

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>set cap-policy {manual-blade-level-cap   policy-driven-chassis-group-cap}</b>	Sets the global cap policy to the specified power cap management mode. By default, the global cap policy is set to policy driven chassis group cap.
<b>Step 3</b>	UCS-A /power-cap-mgmt # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example sets the global cap policy to manual blade power cap and commits the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # set cap-policy manual-blade-level-cap
UCS-A /power-cap-mgmt* # commit-buffer
UCS-A /power-cap-mgmt #
```

# 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.

---

## 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 3788 AC watts should be set for each chassis. This converts to 3400 watts of DC power, which is the minimum amount of power required to power a fully-populated chassis.

If insufficient power is available, Cisco UCS Manager raises an alert.

Once a chassis is added to a power group, every service profile associated with that 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.

---

## Creating a Power Group

### Before You Begin

Make sure the global power allocation policy is set to Policy Driven Chassis Group Cap.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>create power-group power-group-name</b>	Creates a power group and enters power group mode.
<b>Step 3</b>	UCS-A /power-cap-mgmt/power-group # <b>set peak {peak-num   disabled   uninitialized}</b>	Specifies the maximum peak power (in watts) available to the power group.
<b>Step 4</b>	UCS-A /power-cap-mgmt/power-group # <b>create chassis chassis-id</b>	Adds the specified chassis to the power group and enters power group chassis mode.
<b>Step 5</b>	UCS-A /power-cap-mgmt/power-group/chassis # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a power group called powergroup1, specifies the maximum peak power for the power group (10000 watts), adds chassis 1 to the group, and commits the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # create power-group powergroup1
UCS-A /power-cap-mgmt/power-group* # set peak 10000
UCS-A /power-cap-mgmt/power-group* # create chassis 1
UCS-A /power-cap-mgmt/power-group/chassis* # commit-buffer
UCS-A /power-cap-mgmt/power-group/chassis #
```

## Deleting a Power Group

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>delete power-group power-group-name</b>	Deletes the specified power group.
<b>Step 3</b>	UCS-A /power-cap-mgmt/power-group/chassis # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a power group called powergroup1 and commits the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # delete power-group powergroup1
UCS-A /power-cap-mgmt* # commit-buffer
UCS-A /power-cap-mgmt #
```

## 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 that particular blade server. The server is allocated the maximum amount of power that that blade can reach.



**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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>create power-control-policy</b> <i>power-control-pol-name</i>	Creates a power control policy and enters power control policy mode.
<b>Step 3</b>	UCS-A /org/power-control-policy # <b>set priority</b> { <i>priority-num</i>   <b>no-cap</b> }	Specifies the priority for the power control policy.
<b>Step 4</b>	UCS-A /org/power-control-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a power control policy called powerpolicy15, sets the priority at level 2, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create power-control-policy powerpolicy15
UCS-A /org/power-control policy* # set priority 2
UCS-A /org/power-control policy* # commit-buffer
UCS-A /org/power-control policy #
```

### What to Do Next

Include the power control policy in a service profile.

## Deleting a Power Control Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>delete power-control-policy <i>power-control-pol-name</i></b>	Deletes the specified power control policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a power control policy called powerpolicy15 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete power-control-policy powerpolicy15
UCS-A /org* # commit-buffer
UCS-A /org #
```

## 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 instance.

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.

## 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.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>set power-budget committed {disabled   watts}</b>	Commits the server to one of the following power usage levels: <ul style="list-style-type: none"> <li>• <b>disabled</b> —Does not impose any power usage limitations on the server.</li> <li>• <b>watts</b> —Allows you to specify the upper level for power usage by the server. If you choose this setting, enter the maximum number of watts that the server can use. The range is 0 to 10000000 watts.</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 4</b>	UCS-A /chassis/server # <b>show power-budget</b>	(Optional) Displays the power usage level setting.

The following example limits the power usage for a server to 1000 watts and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # set power-budget committed 1000
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server # show power-budget
Power Budget:
  Committed (W): 1100
  Oper Committed (W): Disabled
UCS-A /chassis/server #
```

## Viewing the Blade-Level Power Cap

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /chassis/server # <b>show stats mb-power-stats</b>	Displays the power usage statistics collected for the server.

The following example shows the server power usage:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # show stats mb-power-stats

Mb Power Stats:
  Time Collected: 2010-04-15T21:18:04.992
  Monitored Object: sys/chassis-1/blade-2/board
  Suspect: No
  Consumed Power (W): 118.285194
  Input Voltage (V): 11.948000
  Input Current (A): 9.900000
  Thresholded: Input Voltage Min
UCS-A /chassis/server #
```





PART **VI**

## **VN-Link Configuration**

- Overview of VN-Link in Cisco UCS, page 413
- Configuring VN-Link Components and Connectivity, page 419
- Configuring Distributed Virtual Switches in Cisco UCS, page 427
- Configuring Port Profiles, page 439
- Configuring VN-Link Related Policies, page 447
- Managing Pending Deletions, page 453





# CHAPTER 29

## Overview of VN-Link in Cisco UCS

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This chapter includes the following sections:

- [Virtualization with a Virtual Interface Card Adapter, page 413](#)
- [Configuring Cisco UCS for VN-Link in Hardware, page 416](#)

### Virtualization with a Virtual Interface Card Adapter

Virtual interface card (VIC) adapters support virtualized environments with VMware. These environments support the standard VMware integration with ESX installed on the server and all virtual machine management performed through the VMware vCenter.

This virtualized adapter supports the following:

- Dynamic vNICs in a virtualized environment with VM software, such as vSphere. This solution enables you to divide a single physical blade server into multiple logical PCIE instances.
- Static vNICs in a single operating system installed on a server.

With a VIC adapter, the solution you choose determines how communication works. This type of adapter supports the following communication solutions:

- Cisco VN-Link in hardware, which is a hardware-based method of handling traffic to and from a virtual machine. Details of how to configure this solution are available in this document.
- Cisco VN-Link in software, which is a software-based method of handling traffic to and from a virtual machine and uses the Nexus 1000v virtual switch. Details of how to configure this solution are available in the Nexus 1000v documentation.
- Single operating system installed on the server without virtualization, which uses the same methods of handling traffic as the other Cisco UCS adapters.

### Cisco VN-Link

Cisco Virtual Network Link (VN-Link) is a set of features and capabilities that enable you to individually identify, configure, monitor, migrate, and diagnose virtual machine interfaces in a way that is consistent with the current network operation models for physical servers. VN-Link literally indicates the creation of a logical

link between a vNIC on a virtual machine and a Cisco UCS fabric interconnect. This mapping is the logical equivalent of using a cable to connect a NIC with a network port on an access-layer switch.

## VN-Link in Hardware

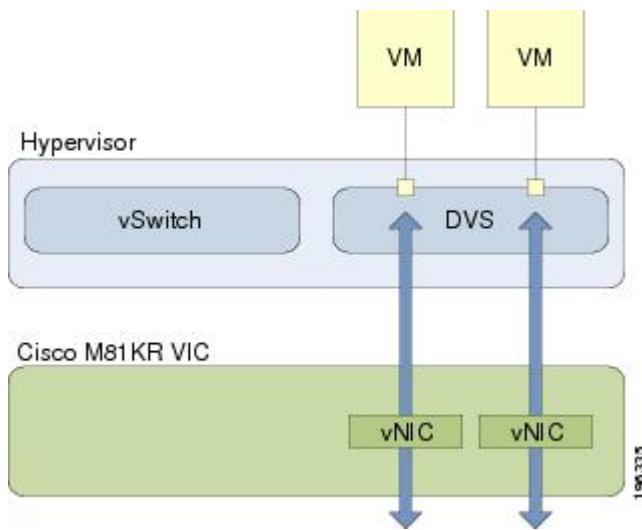
Cisco VN-Link in hardware is a hardware-based method of handling traffic to and from a virtual machine on a server with a VIC adapter. This method is sometimes referred to as pass-through switching. This solution replaces software-based switching with ASIC-based hardware switching and improves performance.

The distributed virtual switch (DVS) framework delivers VN-Link in hardware features and capabilities for virtual machines on Cisco UCS servers with VIC adapters. This approach provides an end-to-end network solution to meet the new requirements created by server virtualization.

With VN-Link in hardware, all traffic to and from a virtual machine passes through the DVS and the hypervisor, and then returns to the virtual machine on the server. Switching occurs in the fabric interconnect (hardware). As a result, network policies can be applied to traffic between virtual machines. This capability provides consistency between physical and virtual servers.

The following figure shows the traffic paths taken by VM traffic on a Cisco UCS server with a VIC adapter:

**Figure 2: Traffic Paths for VM traffic with VN-Link in Hardware**



## Extension File for Communication with VMware vCenter

For Cisco UCS instances that use VIC adapters to implement VN-Link in hardware, you must create and install an extension file to establish the relationship and communications between Cisco UCS Manager and the VMware vCenter. This extension file is an XML file that contains vital information, including the following:

- Extension key
- Public SSL certificate

If you need to have two Cisco UCS instances share the same set of distributed virtual switches in a vCenter, you can create a custom extension key and import the same SSL certificate in the Cisco UCS Manager for each Cisco UCS instance.

## Extension Key

The extension key includes the identity of the Cisco UCS instance. By default, this key has the value Cisco UCS GUID, as this value is identical across both fabric interconnects in a cluster configuration.

When you install the extension, vCenter uses the extension key to create a distributed virtual switch (DVS).

## Public SSL Certificate

Cisco UCS Manager generates a default, self-signed SSL certificate to support communication with vCenter. You can also provide your own custom certificate.

## Custom Extension Files

You can create a custom extension file for a Cisco UCS instance that does not use either or both of the default extension key or SSL certificate. For example, you can create the same custom key in two different Cisco UCS instances when they are managed by the same VMware vCenter instance.



### Important

You cannot change an extension key that is being used by a DVS or vCenter. If you want to use a custom extension key, we recommend that you create and register the custom key before you create the DVS in Cisco UCS Manager to avoid any possibility of having to delete and recreate the associated DVS.

## Distributed Virtual Switches

Each VMware ESX host has its own software-based virtual switch (vSwitch) in its hypervisor that performs the switching operations between its virtual machines (VMs). The Cisco UCS distributed virtual switch (DVS) is a software-based virtual switch that runs alongside the vSwitch in the ESX hypervisor, and can be distributed across multiple ESX hosts. Unlike vSwitch, which uses its own local port configuration, a DVS associated with multiple ESX hosts uses the same port configuration across all ESX hosts.

After associating an ESX host to a DVS, you can migrate existing VMs from the vSwitch to the DVS, and you can create VMs to use the DVS instead of the vSwitch. With the hardware-based VN-Link implementation, when a VM uses the DVS, all VM traffic passes through the DVS and ASIC-based switching is performed by the fabric interconnect.

In Cisco UCS Manager, DVSes are organized in the following hierarchy:

```

vCenter
  Folder (optional)
    Datacenter
      Folder (required)
        DVS
  
```

At the top of the hierarchy is the vCenter, which represents a VMware vCenter instance. Each vCenter contains one or more datacenters, and optionally vCenter folders with which you can organize the datacenters. Each datacenter contains one or more required datacenter folders. Datacenter folders contain the DVSes.

## Port Profiles

Port profiles contain the properties and settings used to configure virtual interfaces in Cisco UCS for VN-Link in hardware. The port profiles are created and administered in Cisco UCS Manager. There is no clear visibility into the properties of a port profile from VMware vCenter.

In VMware vCenter, a port profile is represented as a port group. Cisco UCS Manager pushes the port profile names to vCenter, which displays the names as port groups. None of the specific networking properties or settings in the port profile are visible in VMware vCenter.

After a port profile is created, assigned to, and actively used by one or more DVSes, any changes made to the networking properties of the port profile in Cisco UCS Manager are immediately applied to those DVSes.

You must configure at least one port profile client for a port profile, if you want Cisco UCS Manager to push the port profile to VMware vCenter.

### **Port Profile Clients**

The port profile client determines the DVSes to which a port profile is applied. By default, the port profile client specifies that the associated port profile applies to all DVSes in the vCenter. However, you can configure the client to apply the port profile to all DVSes in a specific datacenter or datacenter folder, or only to one DVS.

## **VN-Link in Hardware Considerations**

How you configure a Cisco UCS instance for VN-Link in hardware has several dependencies. The information you need to consider before you configure VN-Link in hardware includes the following:

- A Cisco UCS instance can have a maximum of 4 vCenters
- Each vCenter can have a maximum of 8 distributed virtual switches
- Each distributed virtual switch can have a maximum of 4096 ports
- Each port profile can have a maximum of 4096 ports
- Each Cisco UCS instance can have a maximum of 256 port profiles



**Note**

The VMware DVS implementation requires that you configure and connect a maximum of two uplinks. To fulfill this configuration requirement, you must create a maximum of two static vNICs in Cisco UCS Manager. These static vNICs only exist to fulfill the VMware vCenter uplinks requirement and do not forward any data traffic.

VMware vCenter cannot support more than two uplinks. If you attempt to create and configure a third static vNIC for VMware vCenter, a configuration error is reported.

## **Configuring Cisco UCS for VN-Link in Hardware**

You must perform some of the following high-level steps in the VMware Virtual Center (vCenter). For more information about those steps, see the VMware documentation.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Configure the VN-Link components and connectivity.	For more information, see the following chapter: <a href="#">Configuring VN-Link Components and Connectivity, on page 419</a> .
<b>Step 2</b>	In VMware vCenter, create a vCenter and datacenter.	For more information, see the VMware documentation.
<b>Step 3</b>	In Cisco UCS Manager create distributed virtual switches.	To create a distributed virtual switch (DVS), you must first create a vCenter, a datacenter under the vCenter, and a datacenter folder under the datacenter. You can then create a DVS in the datacenter folder. The vCenter name you specify in Cisco UCS Manager does not need to match the vCenter name specified in VMware vCenter; however, the datacenter name you specify in Cisco UCS Manager must match the datacenter name specified in VMware vCenter. The datacenter folder and DVS you create in Cisco UCS Manager are pushed to VMware vCenter. For more information, see the following chapter: <a href="#">Configuring Distributed Virtual Switches in Cisco UCS, on page 427</a> .
<b>Step 4</b>	In Cisco UCS Manager, create the port profile and profile clients.	The port profiles are pushed to their clients in VMware vCenter. They appear in VMware vCenter as port groups, not port profiles. For more information, see the following chapter: <a href="#">Configuring Port Profiles, on page 439</a> .
<b>Step 5</b>	In VMware vCenter, add an ESX host to the DVS.	Configure the ESX host with the option to migrate to PTS/DVS.
<b>Step 6</b>	In vCenter, create the virtual machines required for the VMs on the server.	As part of this configuration, ensure you select the port profiles (port groups) configured in Cisco UCS Manager.





# CHAPTER 30

## Configuring VN-Link Components and Connectivity

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This chapter includes the following sections:

- [Components of VN-Link in Hardware, page 419](#)
- [Configuring a VMware ESX Host for VN-Link , page 420](#)
- [Configuring a VMware vCenter Instance for VN-Link, page 421](#)
- [Configuring a Certificate for VN-Link in Hardware, page 422](#)
- [Connecting Cisco UCS Manager to VMware vCenter Using the Extension Key, page 424](#)

### Components of VN-Link in Hardware

The following three main components must be connected for VN-Link in hardware to work:

#### VMware ESX Host

A server with the VMware ESX installed. It contains a datastore and the virtual machines.

The ESX host must have a Cisco UCS M81KR Virtual Interface Card installed, and it must have uplink data connectivity to the network for communication with VMware vCenter.

#### VMware vCenter

Windows-based software used to manage one or more ESX hosts.

VMware vCenter must have connectivity to the UCS management port for management plane integration, and uplink data connectivity to the network for communication with the ESX Host. A vCenter extension key provided by Cisco UCS Manager must be registered with VMware vCenter before the Cisco UCS instance can be acknowledged.

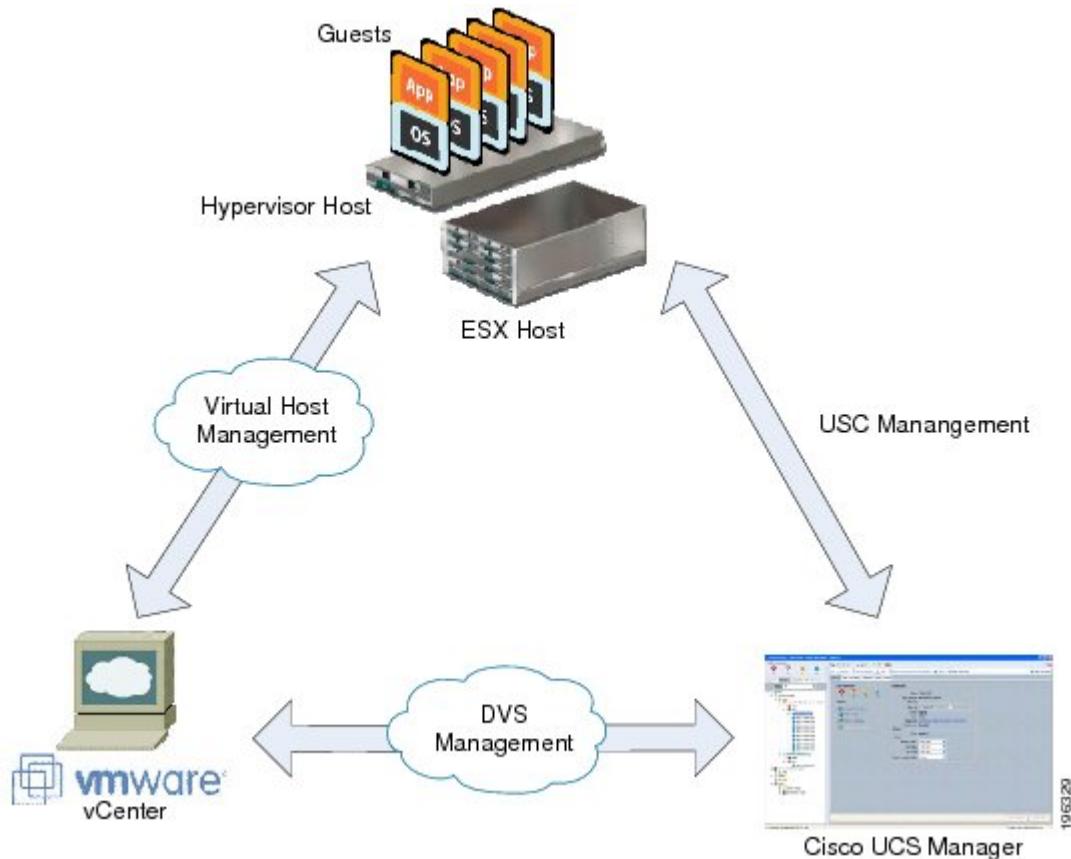
### Cisco UCS Manager

The Cisco UCS management software that integrates with VMware vCenter to handle some of the network-based management tasks.

Cisco UCS Manager must have management port connectivity to VMware vCenter for management plane integration. It also provides a vCenter extension key that represents the Cisco UCS identity. The extension key must be registered with VMware vCenter before the Cisco UCS instance can be acknowledged.

The following figure shows the three main components of VN-Link in hardware and the methods by which they are connected:

**Figure 3: Component Connectivity for VN-Link in Hardware**



## Configuring a VMware ESX Host for VN-Link

### Before You Begin

Ensure that Virtualization Technology is enabled in BIOS of the UCS server if you intend to run 64-bit VMs on the ESX host. An ESX host will not run 64-bit VMs unless Virtualization Technology is enabled.

## Procedure

---

- Step 1** If not already present, install a Cisco UCS M81KR Virtual Interface Card in the server you intend to use as the VMware ESX host. For more information about installing a Cisco UCS M81KR Virtual Interface Card, see the *Cisco UCS 5108 Server Chassis Hardware Installation Guide*.
- Step 2** Configure and associate a service profile to the server. The service profile configuration must include the following:
- A Dynamic vNIC Connection policy that determines how the VN-link connectivity between VMs and dynamic vNICs is configured.
  - Two static vNICs for each adapter on the ESX host. For ESX hosts with multiple adapters, your service profile must use either vCons or have an associated vNIC/vHBA placement profile that ensures the static vNICs are assigned to the appropriate adapters.

For more information, see the following chapter: [Configuring Service Profiles, on page 375](#).

- Step 3** Install VMware ESX 4.0 or later on the blade server. No additional drivers are required during the installation.
- 

# Configuring a VMware vCenter Instance for VN-Link

## Procedure

---

- Step 1** Configure a Window-based machine to use a static IP address. Take note of the IP address. You will use it to connect to vCenter Server.  
The Windows-based machine must have network connectivity to the Cisco UCS management port and to the uplink Ethernet port(s) being used by the ESX host. The management port connectivity is used for management plane integration between VMware vCenter and Cisco UCS Manager; the uplink Ethernet port connectivity is used for communication between VMware vCenter and the ESX host.
- Step 2** Install VMware vCenter (vCenter Server and vSphere Client 4.0 or later) on the Windows-based machine.
- Step 3** Launch vSphere Client.
- Step 4** On the vSphere Client launch page, enter the following information to connect to vCenter Server:
- a) Static IP address of the Windows-based machine.
  - b) Username and password specified while installing vCenter Server. If, during the vCenter Server installation, you chose to use the Windows login credentials, you can check the **Use Windows session credentials** check box.
- Step 5** If a Security Warning dialog box appears, click **Ignore**.
- 

## What to Do Next

Do one of the following:

- (Optional) If you plan to use a custom certificate for VN-Link in hardware, configure the certificate for VN-Link in hardware.

- Connect Cisco UCS Manager to VMware vCenter using the extension key.

## Configuring a Certificate for VN-Link in Hardware

### Certificate for VN-Link in Hardware

Cisco UCS Manager generates a default, self-signed SSL certificate to support communication with vCenter. You can also create your own custom certificate to communicate with multiple vCenter instances. When you create a custom certificate, Cisco UCS Manager recreates the extension files to include the new certificate. If you subsequently delete the custom certificate, Cisco UCS Manager recreates the extension files to include the default, self-signed SSL certificate.

To create a custom certificate, you must obtain and copy an external certificate into Cisco UCS, and then create a certificate for VN-Link in hardware that uses the certificate you copied into Cisco UCS.

### Copying a Certificate to the Fabric Interconnect

#### Before You Begin

Obtain a certificate.

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>connect local-mgmt</b>	Enters local management mode.
<b>Step 2</b>	UCS-A(local-mgmt)# <b>copy from-filesystem: [from-path] filename to-filesystem: [to-path] filename</b>	<p>Copies the certificate from its source location to its destination location. For the <i>from-filesystem:</i> argument, use one of the following syntax:</p> <ul style="list-style-type: none"> <li>• <b>ftp:// server-ip-addr</b></li> <li>• <b>scp:// username@server-ip-addr</b></li> <li>• <b>sftp:// username@server-ip-addr</b></li> <li>• <b>tftp:// server-ip-addr : port-num</b></li> </ul> <p>For the <i>to-filesystem:</i> argument, use one of the following syntax:</p> <ul style="list-style-type: none"> <li>• <b>Volatile:</b></li> <li>• <b>Workspace:</b></li> </ul>

The following example uses FTP to copy a certificate (certificate.txt) to the temp folder in the workspace:

```
UCS-A # connect local-mgmt
Cisco UCS 6100 Series Fabric Interconnect
```

TAC support: <http://www.cisco.com/tac>

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```
UCS-A(local-mgmt)# copy ftp://192.168.10.10/certs/certificate.txt
workspace:/temp/certificate.txt
UCS-A(local-mgmt)#

```

### What to Do Next

Create a certificate for VN-Link in hardware.

## Creating a Certificate for VN-Link in Hardware

### Before You Begin

Copy a certificate to the fabric interconnect.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope cert-store</b>	Enters system VM management VMware certificate store mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/cert-store # <b>create certificate certificate-name</b>	Creates the specified certificate for VN-Link in hardware and enters system VM management VMware certificate store certificate mode.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/cert-store/certificate # <b>set location</b> {volatile   workspace} <b>path path certfile</b> <b>file-name</b>	Specifies the location and filename of an existing certificate to use as the certificate for VN-Link in hardware.
<b>Step 7</b>	UCS-A /system/vm-mgmt /vmware/cert-store/certificate # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a certificate for VN-Link in hardware, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope cert-store
```

```

UCS-A /system/vm-mgmt/vmware/cert-store # create certificate VnLinkCertificate
UCS-A /system/vm-mgmt/vmware/cert-store/certificate* # set location workspace path /temp
certfile certificate.txt
UCS-A /system/vm-mgmt/vmware/cert-store/certificate* # commit-buffer
UCS-A /system/vm-mgmt/vmware/cert-store/certificate #

```

## Deleting a Certificate for VN-Link in Hardware

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope cert-store</b>	Enters system VM management VMware certificate store mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/cert-store # <b>delete certificate certificate-name</b>	Deletes the specified certificate for VN-Link in hardware.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/cert-store # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes a certificate for VN-Link in hardware, and commits the transaction:

```

UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope cert-store
UCS-A /system/vm-mgmt/vmware/cert-store # delete certificate VnLinkCertificate
UCS-A /system/vm-mgmt/vmware/cert-store* # commit-buffer
UCS-A /system/vm-mgmt/vmware/cert-store #

```

## Connecting Cisco UCS Manager to VMware vCenter Using the Extension Key

### (Optional) Modifying the vCenter Extension Key

You can modify the vCenter extension key for the following reasons:

- To provide better system identification, you can name the vCenter extension key something more meaningful than the default ID string.
- If two Cisco UCS instances want to connect to the same VMware vCenter instance, they must use the same extension key and certificate.

## Procedure

---

- Step 1** In the **Navigation** pane, click the **VM** tab.
- Step 2** On the **VM** tab, expand the **All** node.
- Step 3** On the **VM** tab, click **VMWare**.
- Step 4** In the **Work** pane, click the **General** tab.
- Step 5** In the **Actions** area, click **Modify Extension Key**.
- Step 6** In the **Modify Extension Key** dialog box, do the following:
- In the **Key** field, modify the key as needed.  
A vCenter extension key can have a maximum length of 33 characters. These characters can be letters, numbers, or hyphens. No other characters or spaces are permitted in the extension key.
  - Click **OK**.
- 

## What to Do Next

Export the vCenter extension file or files from Cisco UCS Manager.

## Exporting a vCenter Extension File from Cisco UCS Manager

Depending on the version of VMware vCenter you are using, you can either generate one extension file or a set of nine extension files.

## Procedure

---

- Step 1** In the **Navigation** pane, click the **VM** tab.
- Step 2** On the **VM** tab, expand the **All** node.
- Step 3** On the **VM** tab, click **VMWare**.
- Step 4** In the **Work** pane, click the **General** tab.
- Step 5** In the **Actions** area, click one of the following links:

Option	Description
<b>Export vCenter Extension</b>	For vCenter version 4.0 update 1 and later.
<b>Export Multiple vCenter Extensions</b>	For vCenter version 4.0.

- Step 6** In the **Export vCenter Extension** dialog box, do the following:
- In the **Save Location** field, enter the path to the directory where you want to save the extension file or files.  
If you do not know the path, click the ... button and browse to the location.
  - Click **OK**.
- Cisco UCS Manager generates the extension file(s) and saves them to the specified location.
-

### What to Do Next

Register the vCenter extension file or files in VMware vCenter.

## Registering a vCenter Extension File in VMware vCenter

In VMware vCenter, the vCenter extension files are called plug-ins.

### Before You Begin

Export the vCenter extension file(s) from Cisco UCS Manager. Ensure that the exported vCenter extension files are saved to a location that can be reached by VMware vCenter.

### Procedure

---

- Step 1** In VMware vCenter, choose **Plug-ins > Manage Plug-ins**.
  - Step 2** Right-click any empty space below the Available Plug-ins section of the **Plug-in Manager** dialog box and click **New Plug-in**.
  - Step 3** Click **Browse** and navigate to the location where the vCenter extension file(s) are saved.
  - Step 4** Choose a vCenter extension file and click **Open**.
  - Step 5** Click **Register Plug-in**.
  - Step 6** If the **Security Warning** dialog box appears, click **Ignore**.
  - Step 7** Click **OK**.  
The vCenter extension file registers as an available VMware vCenter plug-in. You do not need to install the plug-in, leave it in the available state. If you are registering multiple vCenter extension files, repeat this procedure until all files are registered.
-



# CHAPTER 31

## Configuring Distributed Virtual Switches in Cisco UCS

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This chapter includes the following sections:

- [Distributed Virtual Switches, page 427](#)
- [Configuring a Distributed Virtual Switch, page 428](#)
- [Managing Distributed Virtual Switches, page 429](#)

### Distributed Virtual Switches

Each VMware ESX host has its own software-based virtual switch (vSwitch) in its hypervisor that performs the switching operations between its virtual machines (VMs). The Cisco UCS distributed virtual switch (DVS) is a software-based virtual switch that runs alongside the vSwitch in the ESX hypervisor, and can be distributed across multiple ESX hosts. Unlike vSwitch, which uses its own local port configuration, a DVS associated with multiple ESX hosts uses the same port configuration across all ESX hosts.

After associating an ESX host to a DVS, you can migrate existing VMs from the vSwitch to the DVS, and you can create VMs to use the DVS instead of the vSwitch. With the hardware-based VN-Link implementation, when a VM uses the DVS, all VM traffic passes through the DVS and ASIC-based switching is performed by the fabric interconnect.

In Cisco UCS Manager, DVSes are organized in the following hierarchy:

```
vCenter
  Folder (optional)
    Datacenter
      Folder (required)
        DVS
```

At the top of the hierarchy is the vCenter, which represents a VMware vCenter instance. Each vCenter contains one or more datacenters, and optionally vCenter folders with which you can organize the datacenters. Each datacenter contains one or more required datacenter folders. Datacenter folders contain the DVSes.

# Configuring a Distributed Virtual Switch

## Before You Begin

You must first create a datacenter in VMware vCenter. Do not create the folder inside the datacenter or the DVS in VMware vCenter.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>create vcenter vcenter-name</b>	Creates the specified vCenter and enters system VM management VMware vCenter mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>set hostname {hostname   ip-addr}</b>	Specifies the hostname or IP address of the remote vCenter Server instance associated to the vCenter object in Cisco UCS Manager.  <b>Note</b> If you use a hostname rather than an IP address, you must configure a DNS server in Cisco UCS Manager.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>set description description</b>	Provides a description for the vCenter.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 7</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>create folder folder-name</b>	(Optional) Creates the specified vCenter folder.  <b>Note</b> A vCenter can contain multiple datacenters, none of which must be contained in a vCenter folder, so the use of vCenter folders are optionally used only for organizational purposes.
<b>Step 8</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>create data-center data-center-name</b>	Creates the specified datacenter and enters system VM management VMware vCenter datacenter mode.  The datacenter name that you specify in Cisco UCS Manager must match the name of the datacenter previously created in VMware vCenter.
<b>Step 9</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center # <b>create folder folder-name</b>	Creates the specified datacenter folder and enters system VM management VMware vCenter datacenter folder mode.

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> At least one datacenter folder is required. You cannot create a distributed virtual switch (DVS) directly under a datacenter; you must create the DVS in a datacenter folder.
<b>Step 10</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center/folder # <b>create distributed-virtual-switch</b> <i>dvs-name</i>	Creates the specified DVS and enters system VM management VMware vCenter datacenter folder distributed virtual switch mode.
<b>Step 11</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center /folder/distributed-virtual-switch # <b>{disable   enable}</b>	Disables or enables the DVS.  If you disable the DVS, Cisco UCS Manager does not push any configuration changes related to the DVS to VMware vCenter.
<b>Step 12</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center/folder /distributed-virtual-switch # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a vCenter, a datacenter with the exact same name as the datacenter in VMware vCenter, a DVS in the datacenter folder named Engineering, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # create vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # set hostname 192.168.10.10
UCS-A /system/vm-mgmt/vmware/vcenter* # set description "vCenter running on my laptop"
UCS-A /system/vm-mgmt/vmware/vcenter* # create data-center MyDatacenter
UCS-A /system/vm-mgmt/vmware/vcenter/data-center* # create folder Engineering
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder* # create distributed-virtual-switch
LabSwitch
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder/distributed-virtual-switch* # enable
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder/distributed-virtual-switch* #
commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder/distributed-virtual-switch #
```

## Managing Distributed Virtual Switches

### Adding a Folder to a vCenter

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope system	Enters system mode.
<b>Step 2</b>	UCS-A /system # scope vm-mgmt	Enters system VM management mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope vcenter vcenter-name</b>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>create folder folder-name</b>	(Optional) Creates the specified vCenter folder and enters system VM management VMware vCenter folder mode.  <b>Note</b> A vCenter can contain multiple datacenters, none of which must be contained in a vCenter folder, so the use of vCenter folders are optionally used only for organizational purposes.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/vcenter/folder # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds a vCenter folder named Lab 5 to the vCenter named MyVcenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # create folder Lab5
UCS-A /system/vm-mgmt/vmware/vcenter/folder* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/folder #
```

## Deleting a Folder from a vCenter

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope vcenter vcenter-name</b>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>delete folder folder-name</b>	(Optional) Deletes the specified vCenter folder.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the vCenter folder named Lab5 from the vCenter named MyVcenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter # delete folder Lab5
UCS-A /system/vm-mgmt/vmware/vcenter* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter #
```

## Adding a Datacenter to a vCenter

### Before You Begin

You must first create a datacenter in VMware vCenter. Do not create the folder inside the datacenter or the DVS in VMware vCenter.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope vcenter vcenter-name</b>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/vcenter # <b>scope folder folder-name</b>	(Optional) Enters system VM management VMware vCenter folder mode for the specified folder.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/vcenter/ # <b>create data-center data-center-name</b>	Creates the specified datacenter and enters system VM management VMware vCenter datacenter mode.  The datacenter name that you specify in Cisco UCS Manager must match the name of the datacenter previously created in VMware vCenter.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/vcenter/data-center # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds a datacenter named SQA-Datacenter to the vCenter named MyVcenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # create data-center SQA-Datacenter
UCS-A /system/vm-mgmt/vmware/vcenter/data-center* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/data-center #
```

## Deleting a Datacenter from vCenter

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope system	Enters system mode.
<b>Step 2</b>	UCS-A /system # scope vm-mgmt	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # scope vmware	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # scope vcenter <i>vcenter-name</i>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/vcenter # scope folder <i>folder-name</i>	(Optional) Enters system VM management VMware vCenter folder mode for the specified folder.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/vcenter # delete data-center <i>data-center-name</i>	Deletes the specified datacenter. The datacenter name that you specify in Cisco UCS Manager must exactly match the name of a datacenter previously created in vCenter Server.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/vcenter # commit-buffer	Commits the transaction to the system configuration.

The following example deletes the datacenter named SQA-Datacenter from the vCenter named MyVcenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # delete data-center SQA-Datacenter
UCS-A /system/vm-mgmt/vmware/vcenter* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter #
```

## Adding a Folder to a Datacenter

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope vcenter vcenter-name</b>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>scope folder folder-name</b>	(Optional) Enters system VM management VMware vCenter folder mode for the specified folder.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/vcenter/ # <b>scope data-center data-center-name</b>	Enters system VM management VMware vCenter datacenter mode for the specified datacenter.
<b>Step 7</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center# <b>create folder folder-name</b>	Creates the specified datacenter folder and enters system VM management VMware vCenter datacenter folder mode.
<b>Step 8</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center/folder# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds a datacenter folder named SoftwareQA to the datacenter named MyDatacenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # scope data-center MyDatacenter
UCS-A /system/vm-mgmt/vmware/vcenter/data-center* # create folder SoftwareQA
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder #
```

## Deleting a Folder from a Datacenter

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope vcenter</b> <i>vcenter-name</i>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/vcenter # <b>scope folder</b> <i>folder-name</i>	(Optional) Enters system VM management VMware vCenter folder mode for the specified folder.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/vcenter /# <b>scope data-center</b> <i>data-center-name</i>	Enters system VM management VMware vCenter datacenter mode for the specified datacenter.
<b>Step 7</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center # <b>delete folder</b> <i>folder-name</i>	Deletes the specified datacenter folder.
<b>Step 8</b>	UCS-A /system/vm-mgmt /vmware/vcenter/data-center # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the datacenter folder named SoftwareQA from the datacenter named MyDatacenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter # scope data-center MyDatacenter
UCS-A /system/vm-mgmt/vmware/vcenter/data-center # delete folder SoftwareQA
UCS-A /system/vm-mgmt/vmware/vcenter/data-center* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/data-center #
```

## Adding a Distributed Virtual Switch to a Datacenter Folder

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM

	<b>Command or Action</b>	<b>Purpose</b>
		management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope vcenter</b> <i>vcenter-name</i>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/vcenter # <b>scope folder</b> <i>folder-name</i>	(Optional) Enters system VM management VMware vCenter folder mode for the specified folder.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/vcenter/ # <b>scope data-center</b> <i>data-center-name</i>	Enters system VM management VMware vCenter datacenter mode for the specified datacenter.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/vcenter/data-center # <b>scope folder</b> <i>folder-name</i>	Enters system VM management VMware vCenter datacenter folder mode for the specified datacenter folder.
<b>Step 8</b>	UCS-A /system/vm-mgmt/vmware/vcenter/folder/data-center/folder # <b>create distributed-virtual-switch</b> <i>dvs-name</i>	Creates the specified DVS and enters system

	<b>Command or Action</b>	<b>Purpose</b>
		VM management VMware vCenter datacenter folder distributed virtual switch mode.
<b>Step 9</b>	UCS-A /system/vm-mgmt/vmware/vcenter/folder/data-center/folder/distributed-virtual-switch # {disable   enable}	Disables or enables the DVS.
<b>Step 10</b>	UCS-A /system/vm-mgmt/vmware/vcenter/folder/data-center/folder/distributed-virtual-switch # commit-buffer	Commits the transaction to the system configuration.

The following example adds a DVS named TestSwitch to the datacenter folder named Engineering, enables the DVS, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # scope data-center MyDatacenter
UCS-A /system/vm-mgmt/vmware/vcenter/data-center* # scope folder Engineering
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder* # create distributed-virtual-switch
  TestSwitch
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder/distributed-virtual-switch* # enable
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder/distributed-virtual-switch* #
  commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder/distributed-virtual-switch #
```

## Deleting a Distributed Virtual Switch from a Datacenter Folder

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope system	Enters system mode.
<b>Step 2</b>	UCS-A /system # scope vm-mgmt	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # scope vmware	Enters system VM management VMware mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope vcenter</b> <i>vcenter-name</i>	Enters system VM management VMware vCenter mode for the specified vCenter.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/vcenter # <b>scope folder</b> <i>folder-name</i>	(Optional) Enters system VM management VMware vCenter folder mode for the specified folder.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/vcenter/ # <b>scope data-center</b> <i>data-center-name</i>	Enters system VM management VMware vCenter datacenter mode for the specified datacenter.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/vcenter/data-center # <b>scope folder</b> <i>folder-name</i>	Enters system VM management VMware vCenter datacenter folder mode for the specified datacenter folder.
<b>Step 8</b>	UCS-A /system/vm-mgmt/vmware/vcenter/folder/data-center/folder # <b>delete distributed-virtual-switch</b> <i>dvs-name</i>	Deletes the specified DVS.
<b>Step 9</b>	UCS-A /system/vm-mgmt/vmware/vcenter/folder/data-center/folder # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the DVS named TestSwitch from the datacenter folder named Engineering and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope vcenter MyVcenter
UCS-A /system/vm-mgmt/vmware/vcenter* # scope data-center MyDatacenter
UCS-A /system/vm-mgmt/vmware/vcenter/data-center* # scope folder Engineering
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder* # delete distributed-virtual-switch
TestSwitch
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder* # commit-buffer
UCS-A /system/vm-mgmt/vmware/vcenter/data-center/folder #
```





# CHAPTER **32**

## Configuring Port Profiles

---

This chapter includes the following sections:

- [Port Profiles, page 439](#)
- [Port Profile Clients, page 439](#)
- [Configuring a Port Profile, page 440](#)
- [Deleting a Port Profile, page 442](#)
- [Adding a Named VLAN to a Port Profile, page 442](#)
- [Deleting a Named VLAN from a Port Profile, page 443](#)
- [Adding a Port Profile Client to a Port Profile, page 444](#)
- [Deleting a Port Profile Client from a Port Profile, page 446](#)

### Port Profiles

Port profiles contain the properties and settings used to configure virtual interfaces in Cisco UCS for VN-Link in hardware. The port profiles are created and administered in Cisco UCS Manager. There is no clear visibility into the properties of a port profile from VMware vCenter.

In VMware vCenter, a port profile is represented as a port group. Cisco UCS Manager pushes the port profile names to vCenter, which displays the names as port groups. None of the specific networking properties or settings in the port profile are visible in VMware vCenter.

After a port profile is created, assigned to, and actively used by one or more DVSes, any changes made to the networking properties of the port profile in Cisco UCS Manager are immediately applied to those DVSes.

You must configure at least one port profile client for a port profile, if you want Cisco UCS Manager to push the port profile to VMware vCenter.

### Port Profile Clients

The port profile client determines the DVSes to which a port profile is applied. By default, the port profile client specifies that the associated port profile applies to all DVSes in the vCenter. However, you can configure

the client to apply the port profile to all DVSes in a specific datacenter or datacenter folder, or only to one DVS.

## Configuring a Port Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope profile-set</b>	Enters system VM management VMware profile set mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>create port-profile</b> <i>profile-name</i>	Creates the specified port profile and enters system VM management VMware profile set port profile mode.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the port profile.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>set max-ports</b> <i>max-num</i>	Specifies the maximum number of ports the port profile can use.  The maximum number of ports that can be associated with a single distributed virtual switch (DVS) is 4096. If the DVS has only one associated port profile, that port profile can be configured with up to 4096 ports. However, if the DVS has more than one associated port profile, the total number of ports associated with all of those port profiles combined cannot exceed 4096.
<b>Step 8</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>set nw-control-policy</b> <i>policy-name</i>	Specifies the network control policy to use for the port profile.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 9</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>set pin-group</b> <i>group-name</i>	Specifies the LAN pin group to use for the port profile.
<b>Step 10</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>set qos-policy</b> <i>policy-name</i>	Specifies the QoS policy to use for the port profile.
<b>Step 11</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>create client</b> <i>client-name</i>	Creates the specified port profile client and enters system VM management VMware profile set port profile client mode.
<b>Step 12</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the port profile client.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 13</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set data-center</b> <i>data-center-name</i>	(Optional) Specifies the datacenter to which the port profile is applied.
<b>Step 14</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set folder</b> <i>folder-name</i>	(Optional) Specifies the datacenter folder to which the port profile is applied.
<b>Step 15</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set dvs</b> <i>folder-name</i>	(Optional) Specifies the DVS to which the port profile is applied.
<b>Step 16</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>commit-buffer</b>	Commits the transaction.

The following example creates a port profile client named MyClient that applies the port profile to all DVSees in the datacenter named MyDatacenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope profile-set
UCS-A /system/vm-mgmt/vmware/profile-set # create port-profile MyProfile
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # set descr "This is my port profile"
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # set max-ports 24
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # set nw-control-policy ncp5
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # set pin-group PinGroup54
```

```

UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # set qos-policy QosPolicy34
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # create client MyClient
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client* # set descr "This is the
client for my port profile"
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client* # set data-center MyDatacenter
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client* # commit-buffer
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client #

```

## Deleting a Port Profile

You cannot delete a port profile if a VM is actively using that port profile.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope profile-set</b>	Enters system VM management VMware profile set mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>delete port-profile profile-name</b>	Deletes the specified port profile.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>commit-buffer</b>	Commits the transaction. Cisco UCS Manager deletes the port profile and all associated port profile clients.

The following example deletes the port profile named MyProfile and commits the transaction:

```

UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope profile-set
UCS-A /system/vm-mgmt/vmware/profile-set # delete port-profile MyProfile
UCS-A /system/vm-mgmt/vmware/profile-set* # commit-buffer
UCS-A /system/vm-mgmt/vmware/profile-set #

```

## Adding a Named VLAN to a Port Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope profile-set</b>	Enters system VM management VMware profile set mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>scope port-profile <i>profile-name</i></b>	Enters system VM management VMware profile set port profile mode for the specified port profile.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>create vlan <i>vlan-name</i></b>	Specifies a named VLAN to use for the port profile.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/vlan # <b>set native no</b>	(Optional) Sets the named VLAN as a non-native VLAN.
<b>Step 8</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/vlan # <b>commit-buffer</b>	Commits the transaction.

The following example adds the VLAN named accounting to the port profile named MyProfile, sets the VLAN as non-native, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware# scope profile-set
UCS-A /system/vm-mgmt/vmware/profile-set # scope port-profile MyProfile
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # create vlan accounting
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/vlan* # set native no
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/vlan* # commit-buffer
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/vlan #
```

## Deleting a Named VLAN from a Port Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope profile-set</b>	Enters system VM management VMware profile set mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>scope port-profile <i>profile-name</i></b>	Enters system VM management VMware profile set port profile mode for the specified port profile.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>delete vlan <i>vlan-name</i></b>	Deletes the specified named VLAN from the port profile.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>commit-buffer</b>	Commits the transaction.

The following example deletes the VLAN named accounting from the port profile named MyProfile and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware# scope profile-set
UCS-A /system/vm-mgmt/vmware/profile-set # scope port-profile MyProfile
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # delete vlan accounting
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile #
```

## Adding a Port Profile Client to a Port Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope profile-set</b>	Enters system VM management VMware profile set mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>scope port-profile <i>profile-name</i></b>	Enters system VM management VMware profile set port profile mode for the specified port profile.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>create client <i>client-name</i></b>	Creates the specified port profile client and enters system VM management VMware profile set port profile client mode.

	<b>Command or Action</b>	<b>Purpose</b>
		The port profile client determines the DVSes to which the port profile is applied. By default, a port profile applies to all DVSes in the vCenter; however, you can use the optional <b>set data-center</b> , <b>set folder</b> , and <b>set dvs</b> commands to apply the port profile to all DVSes in a specific datacenter or datacenter folder, or to a specific DVS.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the port profile client.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 8</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set data-center</b> <i>data-center-name</i>	(Optional) Specifies the datacenter to which the port profile is applied.
<b>Step 9</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set folder</b> <i>folder-name</i>	(Optional) Specifies the datacenter folder to which the port profile is applied.
<b>Step 10</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>set dvs</b> <i>folder-name</i>	(Optional) Specifies the DVS to which the port profile is applied.
<b>Step 11</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client # <b>commit-buffer</b>	Commits the transaction.

The following example creates a port profile client named OtherClient that applies the port profile named MyProfile to all DVSes in the datacenter named OtherDatacenter and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope profile-set
UCS-A /system/vm-mgmt/vmware/profile-set # scope port-profile MyProfile
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # create client OtherClient
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client* # set descr "This is my other
client for my port profile"
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client* # set data-center
OtherDatacenter
```

```
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client* # commit-buffer
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile/client #
```

## Deleting a Port Profile Client from a Port Profile

You cannot delete a port profile client if a VM is actively using the port profile with which the client is associated.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt/vmware # <b>scope profile-set</b>	Enters system VM management VMware profile set mode.
<b>Step 5</b>	UCS-A /system/vm-mgmt/vmware/profile-set # <b>scope port-profile</b> <i>profile-name</i>	Enters system VM management VMware profile set port profile mode for the specified port profile.
<b>Step 6</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>delete client</b> <i>client-name</i>	Deletes the specified port profile client.
<b>Step 7</b>	UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # <b>commit-buffer</b>	Commits the transaction.

The following example deletes the port profile client named OtherClient from the port profile named MyProfile and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope profile-set
UCS-A /system/vm-mgmt/vmware/profile-set # scope port-profile MyProfile
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile # delete client OtherClient
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile* # commit-buffer
UCS-A /system/vm-mgmt/vmware/profile-set/port-profile #
```



# CHAPTER 33

## Configuring VN-Link Related Policies

This chapter includes the following sections:

- [Configuring Dynamic vNIC Connection Policies, page 447](#)
- [Configuring the VM Lifecycle Policy, page 449](#)
- [Viewing Dynamic vNIC Properties in a VM, page 450](#)

## Configuring Dynamic vNIC Connection Policies

### Dynamic vNIC Connection Policy

This policy determines how the VN-link connectivity between VMs and dynamic vNICs is configured. This policy is required for Cisco UCS instances that include servers with virtual interface card adapters on which you have installed VMs and configured dynamic vNICs.



#### Note

If you Vmotion a server that is configured with dynamic vNICs, the dynamic interface used by the vNICs fails and Cisco UCS Manager raises a fault to notify you of that failure.

When the server comes back up, Cisco UCS Manager assigns new dynamic vNICs to the server. If you are monitoring traffic on the dynamic vNIC, you must reconfigure the monitoring source.

---

Each Dynamic vNIC connection policy must include an adapter policy and designate the number of vNICs that can be configured for any server associated with a service profile that includes the policy.

## Configuring a Dynamic vNIC Connection Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create dynamic-vnic-conn-policy</b> <i>policy-name</i>	Creates the specified vNIC connection policy and enters organization vNIC connection policy mode.
<b>Step 3</b>	UCS-A /org/dynamic-vnic-conn-policy # <b>set desc</b> <i>description</i>	(Optional) Provides a description for the policy.
<b>Step 4</b>	UCS-A /org/dynamic-vnic-conn-policy # <b>set adapter-policy</b> <i>policy-name</i>	Specifies the Ethernet adapter policy to use for this policy.
<b>Step 5</b>	UCS-A /org/dynamic-vnic-conn-policy # <b>set dynamic-eth</b> <i>dynamic-eth-num</i> <b>off</b>	Specifies the number of dynamic vNICs to use for this policy.
<b>Step 6</b>	UCS-A /org/dynamic-vnic-conn-policy # <b>commit-buffer</b>	Commits the transaction.

The following example creates a dynamic vNIC connection policy named MyDynVnicConnPolicy that uses the Ethernet adapter policy named EthPolicy19 for 12 dynamic vNICs and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create dynamic-vnic-conn-policy MyDynVnicConnPolicy
UCS-A /org/dynamic-vnic-conn-policy* # set adapter-policy EthPolicy19
UCS-A /org/dynamic-vnic-conn-policy* # set desc Dynamic vNIC for Eth policy
UCS-A /org/dynamic-vnic-conn-policy* # set dynamic-eth 12
UCS-A /org/dynamic-vnic-conn-policy* # commit-buffer
UCS-A /org/dynamic-vnic-conn-policy #
```

## Deleting a Dynamic vNIC Connection Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete dynamic-vnic-conn-policy</b> <i>policy-name</i>	Deletes the specified vNIC connection policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction.

The following example deletes the dynamic vNIC connection policy named MyDynVnicConnPolicy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete dynamic-vnic-conn-policy MyDynVnicConnPolicy
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Configuring the VM Lifecycle Policy

### VM Lifecycle Policy

The VM lifecycle policy determines how long Cisco UCS Manager retains offline VMs and offline dynamic vNICs in its database. If a VM or dynamic vNIC remains offline after that period, Cisco UCS Manager deletes the object from its database.

All virtual machines (VMs) on Cisco UCS servers are managed by vCenter. Cisco UCS Manager cannot determine whether an inactive VM is temporarily shutdown, has been deleted, or is in some other state that renders it inaccessible. Therefore, Cisco UCS Manager considers all inactive VMs to be in an offline state.

Cisco UCS Manager considers a dynamic vNIC to be offline when the associated VM is shutdown, or the link between the fabric interconnect and the I/O module fails. On rare occasions, an internal error can also cause Cisco UCS Manager to consider a dynamic vNIC to be offline.

The default VM and dynamic vNIC retention period is 15 minutes. You can set that for any period of time between 1 minute and 7200 minutes (or 5 days).


**Note**


---

The VMs that Cisco UCS Manager displays are for information and monitoring only. You cannot manage VMs through Cisco UCS Manager. Therefore, when you delete a VM from the Cisco UCS Manager database, you do not delete the VM from the server or from vCenter.

---

## Configuring the VM Lifecycle Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Switch-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	Switch-A /system# <b>scope vm-mgmt</b>	Enters VM management mode.
<b>Step 3</b>	Switch-A /system/vm-mgmt# <b>scope vm-life-cycle-policy</b>	Enters VM lifecycle policy mode.
<b>Step 4</b>	Switch-A /system/vm-mgmt/vm-life-cycle-policy# <b>set vmretention {minutes   1-day   1-hour   5-days}</b>	Specifies the period of time, in minutes, that an offline VM is retained in the database. If a VM remains offline after that period, it is deleted from

	<b>Command or Action</b>	<b>Purpose</b>
		the database. The <i>minutes</i> variable can be from 1 to 7200. The default is 15 minutes.
<b>Step 5</b>	Switch-A /system/vm-mgmt/vm-life-cycle-policy # <b>set vnicretention {minutes   1-day   1-hour   5-days}</b>	Specifies the period of time, in minutes, that an offline dynamic vNIC is retained in the database. If a dynamic vNIC remains offline after that period, it is deleted from the database. The <i>minutes</i> variable can be from 1 to 7200. The default is 15 minutes.
<b>Step 6</b>	Switch-A /system/vm-mgmt/vm-life-cycle-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a one day VM retention period and a one hour vNIC retention period and commits the transaction:

```
Switch-A# scope system
Switch-A /system # scope vm-mgmt
Switch-A /system/vm-mgmt # scope vm-life-cycle-policy
Switch-A /system/vm-mgmt/vm-life-cycle-policy # set vmretention 1-day
Switch-A /system/vm-mgmt/vm-life-cycle-policy* # set vnicretention 1-hour
Switch-A /system/vm-mgmt/vm-life-cycle-policy* # commit-buffer
Switch-A /system/vm-mgmt/vm-life-cycle-policy #
```

## Viewing Dynamic vNIC Properties in a VM

### Before You Begin

The VM must be running.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Switch-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	Switch-A /system # <b>scope vm-mgmt</b>	Enters VM management mode.
<b>Step 3</b>	Switch-A /system/vm-mgmt # <b>scope vmware</b>	Enters VMware mode.
<b>Step 4</b>	Switch-A /system/vm-mgmt/vmware # <b>show virtual-machine</b>	(Optional) Displays the running virtual machines.
<b>Step 5</b>	Switch-A /system/vm-mgmt/vmware # <b>scope virtual-machine uuid</b>	Enters command mode for the virtual machine that contains the dynamic vNIC.
<b>Step 6</b>	Switch-A /system/vm-mgmt/vmware/virtual-machine # <b>show vnic [detail]</b>	Displays the vNIC properties.

The following example displays the properties of a dynamic vNIC in a VM:

```
Switch-A# scope system
Switch-A /system # scope vm-mgmt
Switch-A /system/vm-mgmt # scope vmware
Switch-A /system/vm-mgmt/vmware # show virtual-machine
Virtual Machine:
    UUID: 420a00c8-934b-4ae3-6af5-2ce9b8bd0f44
    Service Profile: org-root/ls-PTS-ch6-7
    Server: sys/chassis-6/blade-7
    Status: Online
.
.
.
Switch-A /system/vm-mgmt/vmware # scope virtual-machine 420a08b0-cda7-9e0a-424f-01ec8653eea0
Switch-A /system/vm-mgmt/vmware/virtual-machine # show vnic detail

vNIC:
    Name: 4479
    Status: Online
    MAC Address: 00:50:56:8A:07:B5
    Profile Name: VM-mgmt
    Virtual Adapter: sys/chassis-1/blade-1/adapter-1/host-eth-9
    Vnic Dn: org-root/ls-PTS-ch1-1/ether-dynamic-prot-009 <--- add this vnic as source
of SPAN session
    Current Task:

Switch-A /system/vm-mgmt/vmware/virtual-machine #
```





# CHAPTER **34**

## Managing Pending Deletions

---

This chapter includes the following sections:

- [Pending Deletions for VN-Link Tasks, page 453](#)
- [Viewing Pending Deletions, page 454](#)
- [Viewing Properties for a Pending Deletion, page 454](#)
- [Deleting a Pending Deletion, page 455](#)
- [Changing Properties for a Pending Deletion, page 455](#)

### Pending Deletions for VN-Link Tasks

When you delete a DVS from Cisco UCS Manager, either explicitly or by deleting any parent object in the hierarchy, Cisco UCS Manager initiates a connection with VMware vCenter to start the process of deleting the DVS. Until the DVS is successfully deleted from VMware vCenter, Cisco UCS Manager places the DVS in a pending deletion list.

However, Cisco UCS Manager cannot successfully delete a DVS from VMware vCenter if certain situations occur, including the following:

- VMware vCenter database was corrupted
- VMware vCenter was uninstalled
- The IP address for VMware vCenter was changed

If the DVS cannot be successfully deleted from VMware vCenter, the DVS remains in the pending deletion list until the pending deletion is deleted in Cisco UCS Manager or the properties for that pending deletion are changed in a way that allows the DVS to be successfully deleted from VMware vCenter. When you delete a pending deletion, the DVS is deleted from Cisco UCS Manager but is not deleted from VMware vCenter. If the DVS remains in VMware vCenter, you must delete the DVS manually.

You can view the pending deletion list, delete a pending deletion, or change the properties for a pending deletion in Cisco UCS Manager. For example, you can correct the VMware vCenter IP address for a pending deletion so that Cisco UCS Manager can successfully initiate a connection and delete the DVS from VMware vCenter. You cannot cancel the deletion of a DVS from Cisco UCS Manager.

## Viewing Pending Deletions

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>show pending-deletion</b>	Displays the list of pending deletions.

The following example displays the list of pending deletions:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # show pending-deletion
```

Pending Deletion:			
Id	Host	Distributed Virtual Switch	
1169232	192.168.10.10	LabDVS	
1176508	192.168.100.20	OpsDVS	
1176508	192.168.1.30	MyDVS	
1176508	192.168.1.40	OtherDVS	

## Viewing Properties for a Pending Deletion

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope pending-deletion deletion-id</b>	Enters system VM management VMware pending deletion mode for the specified pending deletion.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/pending-deletion # <b>show detail</b>	Displays the properties for the pending deletion.

The following example displays the properties for pending deletion 1169232:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope pending-deletion 1169232
UCS-A /system/vm-mgmt/vmware/pending-deletion # show detail

Pending Deletion:
  Id: 1169232
  vCenter: vCenterLab
  Host: 192.168.10.10
  Data Center Folder:
    Data center: Lab
    Folder: LabFolder
    Distributed Virtual Switch: LabDVS
    Extension key: Cisco-UCSM-b32cc112-83bb-11de-acc_7
    Certificate:
      Current Task: external VM manager deletion from local fabric
(FSM-STAGE:sam:dme:ExtvmmSwitchDelTaskRemoveProvider:RemoveLocal)
```

## Deleting a Pending Deletion

When you delete a pending deletion, the DVS is deleted from Cisco UCS Manager but is not deleted from VMware vCenter. If the DVS remains in VMware vCenter, you must delete the DVS manually.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>delete pending-deletion deletion-id</b>	Deletes the specified pending deletion.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes pending deletion 1169232 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # delete pending-deletion 1169232
UCS-A /system/vm-mgmt/vmware* # commit-buffer
UCS-A /system/vm-mgmt/vmware #
```

## Changing Properties for a Pending Deletion

You can change the properties of a pending deletion, if necessary, to ensure that Cisco UCS Manager can successfully initiate a connection and delete the DVS from VMware vCenter.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope vm-mgmt</b>	Enters system VM management mode.
<b>Step 3</b>	UCS-A /system/vm-mgmt # <b>scope vmware</b>	Enters system VM management VMware mode.
<b>Step 4</b>	UCS-A /system/vm-mgmt /vmware # <b>scope pending-deletion deletion-id</b>	Enters system VM management VMware pending deletion mode for the specified pending deletion.
<b>Step 5</b>	UCS-A /system/vm-mgmt /vmware/pending-deletion # <b>set {certificate certificate-name}   data-center data-center-name   data-center-folder folder-name   folder folder-name   host {hostname   ip-addr}</b>	Changes the specified property for the pending deletion.  <b>Note</b> If you use a hostname rather than an IP address, you must configure a DNS server in Cisco UCS Manager.
<b>Step 6</b>	UCS-A /system/vm-mgmt /vmware/pending-deletion # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example changes the host IP address to 192.168.10.20 for pending deletion 1169232 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope vm-mgmt
UCS-A /system/vm-mgmt # scope vmware
UCS-A /system/vm-mgmt/vmware # scope pending-deletion 1169232
UCS-A /system/vm-mgmt/vmware/pending-deletion # set host 192.168.10.20
UCS-A /system/vm-mgmt/vmware/pending-deletion* # commit-buffer
UCS-A /system/vm-mgmt/vmware/pending-deletion #
```



PART **VII**

## System Management

- [Managing Time Zones, page 459](#)
- [Managing the Chassis, page 463](#)
- [Managing Blade Servers, page 469](#)
- [Managing Rack-Mount Servers, page 479](#)
- [Managing the I/O Modules, page 489](#)
- [Backing Up and Restoring the Configuration, page 491](#)
- [Recovering a Lost Password, page 505](#)





# CHAPTER 35

## Managing Time Zones

This chapter includes the following sections:

- [Time Zones, page 459](#)
- [Setting the Time Zone, page 459](#)
- [Configuring an NTP Server, page 461](#)
- [Deleting an NTP Server, page 462](#)
- [Setting the System Clock Manually, page 462](#)

### Time Zones

Cisco UCS requires an instance-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 instance, the time does not display correctly.

### Setting the Time Zone

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>set timezone</b>	At this point, you are prompted to enter a number corresponding to your continent, country, and time zone region. Enter the appropriate information at each prompt.  When you have finished specifying the location information, you are prompted to confirm that the

	<b>Command or Action</b>	<b>Purpose</b>
		correct time zone information is being set. Enter <b>1</b> (yes) to confirm, or <b>2</b> (no) to cancel the operation.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	UCS-A /system/services # <b>exit</b>	Enters system mode.
<b>Step 6</b>	UCS-A /system/services # <b>exit</b>	Enters EXEC mode.
<b>Step 7</b>	UCS-A /system/services # <b>show timezone</b>	Displays the configured timezone.

The following example configures the timezone to the Pacific time zone region, commits the transaction, and displays the configured timezone:

```

UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # set timezone
Please identify a location so that time zone rules can be set correctly.
Please select a continent or ocean.
1) Africa          4) Arctic Ocean    7) Australia      10) Pacific Ocean
2) Americas        5) Asia           8) Europe
3) Antarctica     6) Atlantic Ocean   9) Indian Ocean
#? Artic ocean
Please enter a number in range.
#? 2
Please select a country.
1) Anguilla        18) Ecuador       35) Paraguay
2) Antigua & Barbuda 19) El Salvador   36) Peru
3) Argentina       20) French Guiana 37) Puerto Rico
4) Aruba           21) Greenland     38) St Kitts & Nevis
5) Bahamas          22) Grenada       39) St Lucia
6) Barbados         23) Guadeloupe    40) St Pierre & Miquelon
7) Belize            24) Guatemala    41) St Vincent
8) Bolivia           25) Guyana        42) Suriname
9) Brazil            26) Haiti          43) Trinidad & Tobago
10) Canada          27) Honduras      44) Turks & Caicos Is
11) Cayman Islands  28) Jamaica       45) United States
12) Chile             29) Martinique   46) Uruguay
13) Colombia         30) Mexico         47) Venezuela
14) Costa Rica       31) Montserrat   48) Virgin Islands (UK)
15) Cuba              32) Netherlands Antilles 49) Virgin Islands (US)
16) Dominica         33) Nicaragua
17) Dominican Republic 34) Panama
#? 45
Please select one of the following time zone regions.
1) Eastern Time
2) Eastern Time - Michigan - most locations
3) Eastern Time - Kentucky - Louisville area
4) Eastern Time - Kentucky - Wayne County
5) Eastern Standard Time - Indiana - most locations
6) Eastern Standard Time - Indiana - Crawford County
7) Eastern Standard Time - Indiana - Starke County
8) Eastern Standard Time - Indiana - Switzerland County
9) Central Time
10) Central Time - Michigan - Wisconsin border
11) Central Time - North Dakota - Oliver County
12) Mountain Time
13) Mountain Time - south Idaho & east Oregon
14) Mountain Time - Navajo
15) Mountain Standard Time - Arizona
16) Pacific Time

```

```

17) Alaska Time
18) Alaska Time - Alaska panhandle
19) Alaska Time - Alaska panhandle neck
20) Alaska Time - west Alaska
21) Aleutian Islands
22) Hawaii
#? 16

```

The following information has been given:

```

United States
Pacific Time

```

```

Therefore timezone 'America/Los_Angeles' will be set.
Local time is now:      Fri May 15 07:39:25 PDT 2009.
Universal Time is now:  Fri May 15 14:39:25 UTC 2009.
Is the above information OK?
1) Yes
2) No
#? 1
UCS-A /system/services* # commit-buffer
UCS-A /system/services # exit
UCS-A /system # exit
UCS-A# show timezone
Timezone: America/Los_Angeles (Pacific Time)
UCS-A#

```

## Configuring an NTP Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>create ntp-server {hostname   ip-addr}</b>	Configures the system to use the NTP server with the specified hostname or IP address.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures an NTP server with the IP address 192.168.200.101 and commits the transaction:

```

UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # create ntp-server 192.168.200.101
UCS-A /system/services* # commit-buffer
UCS-A /system/services #

```

## Deleting an NTP Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>delete ntp-server {hostname   ip-addr}</b>	Deletes the NTP server with the specified IP address.

The following example deletes the NTP server with the IP address 192.168.200.101 and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # delete ntp-server 192.168.200.101
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```

## Setting the System Clock Manually

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope services</b>	Enters system services mode.
<b>Step 3</b>	UCS-A /system/services # <b>set clock mon date year hour min sec</b>	Configures the system clock.
<b>Step 4</b>	UCS-A /system/services # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures the system clock and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope services
UCS-A /system/services # set clock apr 14 2010 15 27 00
UCS-A /system/services* # commit-buffer
UCS-A /system/services #
```



# CHAPTER 36

## Managing the Chassis

---

This chapter includes the following sections:

- [Guidelines for Removing and Decommissioning Chassis, page 463](#)
- [Acknowledging a Chassis, page 464](#)
- [Decommissioning a Chassis, page 464](#)
- [Removing a Chassis, page 465](#)
- [Recommissioning a Chassis, page 465](#)
- [Renumbering a Chassis, page 466](#)
- [Toggling the Locator LED, page 468](#)

## 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 traffic 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>acknowledge chassis <i>chassis-num</i></b>	Acknowledges the specified chassis.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example acknowledges chassis 2 and commits the transaction:

```
UCS-A# acknowledge chassis 2
UCS-A* # commit-buffer
UCS-A #
```

## Decommissioning a Chassis

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>decommission chassis <i>chassis-num</i></b>	Decommissions the specified chassis.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The decommission may take several minutes to complete.

The following example decommissions chassis 2 and commits the transaction:

```
UCS-A# decommission chassis 2
UCS-A* # commit-buffer
UCS-A # show chassis

Chassis:
  Chassis      Overall Status          Admin State
  -----  -----
    1 Operable           Acknowledged
    2 Accessibility Problem     Decommission
UCS-A #
```

# Removing a Chassis

## Before You Begin

Physically remove the chassis before performing the following procedure.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>remove chassis</b> <i>chassis-num</i>	Removes the specified chassis.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The removal may take several minutes to complete.

The following example removes chassis 2 and commits the transaction:

```
UCS-A# remove chassis 2
UCS-A* # commit-buffer
UCS-A #
```

# Recommissioning a 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.

## Before You Begin

Collect the following information about the chassis to be recommissioned:

- Vendor name
- Model name
- Serial number

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>recommission chassis</b> <i>vendor-name model-name serial-num</i>	Recommissions the specified chassis.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example recommissions a Cisco UCS 5108 chassis and commits the transaction:

```
UCS-A# show chassis

Chassis:
  Chassis      Overall Status      Admin State
  -----      -----
  1 Accessibility Problem      Decommission

UCS-A# recommission chassis "Cisco Systems Inc" "Cisco UCS 5108" FOX1252GNNN
UCS-A* # commit-buffer
UCS-A #
```

## Renumbering a Chassis



**Note** Chassis renumbering is supported in Cisco UCS Manager 1.4(2) and later releases. You cannot renumber a chassis in a prior release.

### 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

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>show chassis inventory</b>	Displays information about your chassis.
<b>Step 2</b>	Verify that the chassis inventory does not include the following:	<ul style="list-style-type: none"> <li>• The chassis you want to renumber</li> <li>• A chassis with the number you want to use</li> </ul> <p>If either of these chassis are listed in the chassis inventory, decommission those chassis. You must wait until the decommission FSM is complete and the chassis are not listed in the chassis inventory before continuing. This might take several minutes.</p> <p>To see which chassis have been decommissioned, issue the <b>show chassis decommissioned</b> command.</p>
<b>Step 3</b>	UCS-A# <b>recommission chassis vendor-name model-name serial-num [chassis-num]</b>	Recommissions and renames the specified chassis.
<b>Step 4</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example decommissions two Cisco UCS 5108 chassis (chassis 7 and 8), switches their IDs, and commits the transaction:

```
UCS-A# show chassis inventory

Chassis      PID      Vendor      Serial (SN)  HW Revision
```

```

-----
1 N20-C6508 Cisco Systems Inc FOX1252GAAA 0
2 N20-C6508 Cisco Systems Inc FOX1252GBBB 0
3 N20-C6508 Cisco Systems Inc FOX1252GCC 0
4 N20-C6508 Cisco Systems Inc FOX1252GDDD 0
5 N20-C6508 Cisco Systems Inc FOX1252GEEE 0
6 N20-C6508 Cisco Systems Inc FOX1252GFFF 0
7 N20-C6508 Cisco Systems Inc FOX1252GGGG 0
8 N20-C6508 Cisco Systems Inc FOX1252GHHH 0
9 N20-C6508 Cisco Systems Inc FOX1252GIII 0
10 N20-C6508 Cisco Systems Inc FOX1252GJJJ 0
11 N20-C6508 Cisco Systems Inc FOX1252GKKK 0
12 N20-C6508 Cisco Systems Inc FOX1252GLLL 0
13 N20-C6508 Cisco Systems Inc FOX1252GMMM 0
14 N20-C6508 Cisco Systems Inc FOX1252GNNN 0

UCS-A# decommission chassis "Cisco Systems Inc" "Cisco UCS 5108" FOX1252GHHH
UCS-A*# commit-buffer
UCS-A# decommission chassis "Cisco Systems Inc" "Cisco UCS 5108" FOX1252GIII
UCS-A*# commit-buffer
UCS-A# show chassis inventory

Chassis      PID      Vendor      Serial (SN)  HW Revision
-----
1 N20-C6508 Cisco Systems Inc FOX1252GAAA 0
2 N20-C6508 Cisco Systems Inc FOX1252GBBB 0
3 N20-C6508 Cisco Systems Inc FOX1252GCC 0
4 N20-C6508 Cisco Systems Inc FOX1252GDDD 0
5 N20-C6508 Cisco Systems Inc FOX1252GEEE 0
6 N20-C6508 Cisco Systems Inc FOX1252GFFF 0
7 N20-C6508 Cisco Systems Inc FOX1252GGGG 0
10 N20-C6508 Cisco Systems Inc FOX1252GJJJ 0
11 N20-C6508 Cisco Systems Inc FOX1252GKKK 0
12 N20-C6508 Cisco Systems Inc FOX1252GLLL 0
13 N20-C6508 Cisco Systems Inc FOX1252GMMM 0
14 N20-C6508 Cisco Systems Inc FOX1252GNNN 0

UCS-A# show chassis decommissioned

Chassis      PID      Vendor      Serial (SN)  HW Revision
-----
8 N20-C6508 Cisco Systems Inc FOX1252GHHH 0
9 N20-C6508 Cisco Systems Inc FOX1252GIII 0

UCS-A# recommission chassis "Cisco Systems Inc" "Cisco UCS 5108" FOX1252GHHH 9
UCS-A* # commit-buffer
UCS-A# recommission chassis "Cisco Systems Inc" "Cisco UCS 5108" FOX1252GIII 8
UCS-A* # commit-buffer
UCS-A # show chassis inventory

Chassis      PID      Vendor      Serial (SN)  HW Revision
-----
1 N20-C6508 Cisco Systems Inc FOX1252GAAA 0
2 N20-C6508 Cisco Systems Inc FOX1252GBBB 0
3 N20-C6508 Cisco Systems Inc FOX1252GCC 0
4 N20-C6508 Cisco Systems Inc FOX1252GDDD 0
5 N20-C6508 Cisco Systems Inc FOX1252GEEE 0
6 N20-C6508 Cisco Systems Inc FOX1252GFFF 0
7 N20-C6508 Cisco Systems Inc FOX1252GGGG 0
8 N20-C6508 Cisco Systems Inc FOX1252GIII 0
9 N20-C6508 Cisco Systems Inc FOX1252GHHH 0
10 N20-C6508 Cisco Systems Inc FOX1252GJJJ 0
11 N20-C6508 Cisco Systems Inc FOX1252GKKK 0
12 N20-C6508 Cisco Systems Inc FOX1252GLLL 0
13 N20-C6508 Cisco Systems Inc FOX1252GMMM 0
14 N20-C6508 Cisco Systems Inc FOX1252GNNN 0

```

# Toggling the Locator LED

## Turning On the Locator LED for a Chassis

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope chassis <i>chassis-num</i></b>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>enable locator-led</b>	Turns on the chassis locator LED.
<b>Step 3</b>	UCS-A /chassis # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example turns on the locator LED for chassis 2 and commits the transaction:

```
UCS-A# scope chassis 2
UCS-A /chassis # enable locator-led
UCS-A /chassis* # commit-buffer
UCS-A /chassis #
```

## Turning Off the Locator LED for a Chassis

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope chassis <i>chassis-num</i></b>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>disable locator-led</b>	Turns off the chassis locator LED.
<b>Step 3</b>	UCS-A /chassis # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example turns off the locator LED for chassis 2 and commits the transaction:

```
UCS-A# scope chassis 2
UCS-A /chassis # disable locator-led
UCS-A /chassis* # commit-buffer
UCS-A /chassis #
```



# CHAPTER 37

## Managing Blade Servers

---

This chapter includes the following sections:

- [Blade Server Management, page 469](#)
- [Guidelines for Removing and Decommissioning Blade Servers, page 470](#)
- [Booting a Blade Server, page 470](#)
- [Shutting Down a Blade Server, page 471](#)
- [Power Cycling a Blade Server, page 472](#)
- [Performing a Hard Reset on a Blade Server, page 472](#)
- [Acknowledging a Blade Server, page 473](#)
- [Removing a Blade Server from a Chassis, page 473](#)
- [Decommissioning a Blade Server, page 474](#)
- [Turning On the Locator LED for a Blade Server, page 474](#)
- [Turning Off the Locator LED for a Blade Server, page 475](#)
- [Resetting the CMOS for a Blade Server, page 475](#)
- [Resetting the CIMC for a Blade Server, page 476](#)
- [Recovering the Corrupt BIOS on a Blade Server, page 476](#)

### Blade Server Management

You can manage and monitor all blade servers in a Cisco UCS instance 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.

# Booting a Blade Server

## Before You Begin

Associate a service profile with a blade server or server pool.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /org/service-profile # <b>power up</b>	Boots the blade server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example boots the blade server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile* # power up
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## 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.

### Before You Begin

Associate a service profile with a blade server or server pool.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile profile-name</b>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power down</b>	Shuts down the blade server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example shuts down the blade server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServProf34
UCS-A /org/service-profile # power down
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Power Cycling a Blade Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-num / server-num</b>	Enters chassis server mode for the specified blade server.
<b>Step 2</b>	UCS-A /chassis/server # <b>cycle {cycle-immediate   cycle-wait}</b>	Power cycles the blade server. Use the <b>cycle-immediate</b> keyword to immediately begin power cycling the blade server; use the <b>cycle-wait</b> keyword to schedule the power cycle to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example immediately power cycles blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # cycle cycle-immediate
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Performing a Hard Reset on 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.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-num / server-num</b>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset {hard-reset-immediate   hard-reset-wait}</b>	Performs a hard reset of the blade server. Use the <b>hard-reset-immediate</b> keyword to immediately begin hard resetting the server; use the <b>hard-reset-wait</b> keyword to schedule the hard reset to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example performs an immediate hard reset of blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # reset hard-reset-immediate
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Acknowledging 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>acknowledge server <i>chassis-num</i> / <i>server-num</i></b>	Acknowledges the specified blade server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example acknowledges server 4 in chassis 2 and commits the transaction:

```
UCS-A# acknowledge server 2/4
UCS-A* # commit-buffer
UCS-A #
```

## Removing a Blade Server from a Chassis

### Before You Begin

Physically remove the server from its chassis before performing the following procedure.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>remove server <i>chassis-num</i> / <i>server-num</i></b>	Removes the specified blade server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example removes blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# remove server 2/4
UCS-A* # commit-buffer
UCS-A #
```

### 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 [Acknowledging a Blade Server, on page 473](#).

## Decommissioning a Blade Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>decommission server <i>chassis-num / server-num</i></b>	Decommissions the specified blade server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example decommissions blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# decommission server 2/4
UCS-A* # commit-buffer
UCS-A #
```

## Turning On the Locator LED for a Blade Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server <i>chassis-num / server-num</i></b>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server# <b>enable locator-led</b>	Turns on the blade server locator LED.
<b>Step 3</b>	UCS-A /chassis/server# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example turns on the locator LED for blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # enable locator-led
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Turning Off the Locator LED for a Blade Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-num / server-num</b>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>disable locator-led</b>	Turns off the blade server locator LED.
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example turns off the locator LED for blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope chassis 2/4
UCS-A /chassis/server # disable locator-led
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-num / server-num</b>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset-cmos</b>	Resets the CMOS for the blade server.
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example resets the CMOS for blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # reset-cmos
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server chassis-num / server-num</b>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope CIMC</b>	Enters chassis server CIMC mode
<b>Step 3</b>	UCS-A /chassis/server/CIMC # <b>reset</b>	Resets the CIMC for the blade server.
<b>Step 4</b>	UCS-A /chassis/server/CIMC # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example resets the CIMC for blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # scope CIMC
UCS-A /chassis/server/cimc # reset
UCS-A /chassis/server/cimc* # commit-buffer
UCS-A /chassis/server/cimc #
```

## Recovering the Corrupt BIOS on a Blade Server

On rare occasions, an issue with a blade 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 blade server boots with the running version of the firmware for that 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified blade server in the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>recover-bios</b> <i>version</i> [ <b>ignorecompcheck</b> ]	Loads and activates the specified BIOS version. To activate the firmware without making sure that it is compatible first, include the <b>ignorecompcheck</b> keyword. We recommend that you use this option only when explicitly directed to do so by a technical support representative.
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction.

The following example shows how to recover the BIOS:

```
UCS-A# scope server 1/7
UCS-A /chassis/server # recover-bios S5500.0044.0.3.1.010620101125
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```





# CHAPTER **38**

## Managing Rack-Mount Servers

---

This chapter includes the following sections:

- [Rack-Mount Server Management, page 479](#)
- [Guidelines for Removing and Decommissioning Rack-Mount Servers, page 480](#)
- [Booting a Rack-Mount Server, page 480](#)
- [Shutting Down a Rack-Mount Server, page 481](#)
- [Power Cycling a Rack-Mount Server, page 482](#)
- [Performing a Hard Reset on a Rack-Mount Server, page 482](#)
- [Acknowledging a Rack-Mount Server, page 483](#)
- [Decommissioning a Rack-Mount Server, page 483](#)
- [Removing a Rack-Mount Server, page 484](#)
- [Turning On the Locator LED for a Rack-Mount Server, page 484](#)
- [Turning Off the Locator LED for a Rack-Mount Server, page 485](#)
- [Resetting the CMOS for a Rack-Mount Server, page 485](#)
- [Resetting the CIMC for a Rack-Mount Server, page 486](#)
- [Recovering the Corrupt BIOS on a Rack-Mount Server, page 486](#)
- [Showing the Status for a Rack-Mount Server, page 487](#)

### Rack-Mount Server Management

You can manage and monitor all rack-mount servers that have been integrated with a Cisco UCS instance 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 hardware installation guide for that server.

## 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.

## Booting a Rack-Mount Server

### **Before You Begin**

Associate a service profile with a rack-mount server.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power up</b>	Boots the rack-mount server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example boots the rack-mount server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile # power up
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## 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.

**Before You Begin**

Associate a service profile with a rack-mount server.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power down</b>	Shuts down the rack-mount server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example shuts down the rack-mount server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServProf34
UCS-A /org/service-profile # power down
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Power Cycling a Rack-Mount Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>cycle</b> { <b>cycle-immediate</b>   <b>cycle-wait</b> }	Power cycles the rack-mount server. Use the <b>cycle-immediate</b> keyword to immediately begin power cycling the rack-mount server; use the <b>cycle-wait</b> keyword to schedule the power cycle to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example immediately power cycles rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # cycle cycle-immediate
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Performing a Hard Reset on 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.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>reset</b> { <b>hard-reset-immediate</b>   <b>hard-reset-wait</b> }	Performs a hard reset of the rack-mount server. Use the <b>hard-reset-immediate</b> keyword to immediately begin hard resetting the rack-mount server; use the <b>hard-reset-wait</b> keyword to schedule the hard reset to

	<b>Command or Action</b>	<b>Purpose</b>
		begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example performs an immediate hard reset of rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset hard-reset-immediate
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Acknowledging 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>acknowledge server server-num</b>	Acknowledges the specified rack-mount server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example acknowledges rack-mount server 2 and commits the transaction:

```
UCS-A# acknowledge server 2
UCS-A* # commit-buffer
UCS-A #
```

## Decommissioning a Rack-Mount Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>decommission server server-num</b>	Decommissions the specified rack-mount server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example decommissions rack-mount server 2 and commits the transaction:

```
UCS-A# decommission server 2
UCS-A* # commit-buffer
UCS-A #
```

## Removing a Rack-Mount Server

### Before You Begin

Physically disconnect the CIMC LOM cables that connect the rack-mount server to the fabric extender before performing the following procedure. For high availability setups, remove both cables.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>remove server <i>server-num</i></b>	Removes the specified rack-mount server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example removes rack-mount server 4 and commits the transaction:

```
UCS-A# remove server 4
UCS-A* # commit-buffer
UCS-A #
```

### What to Do Next

If you physically reconnect the rack-mount server, you must re-acknowledge it to have Cisco UCS Manager rediscover the server.

For more information, see [Acknowledging a Rack-Mount Server, on page 483](#).

## Turning On the Locator LED for a Rack-Mount Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server <i>server-num</i></b>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>enable locator-led</b>	Turns on the rack-mount server locator LED.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example turns on the locator LED for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # enable locator-led
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Turning Off the Locator LED for a Rack-Mount Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>disable locator-led</b>	Turns off the rack-mount server locator LED.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example turns off the locator LED for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # disable locator-led
UCS-A /server* # commit-buffer
UCS-A /server #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>reset-cmos</b>	Resets the CMOS for the rack-mount server.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example resets the CMOS for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset-cmos
UCS-A /server* # commit-buffer
UCS-A /server #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>scope CIMC</b>	Enters server CIMC mode
<b>Step 3</b>	UCS-A /server/CIMC # <b>reset</b>	Resets the CIMC for the rack-mount server.
<b>Step 4</b>	UCS-A /server/CIMC # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example resets the CIMC for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # scope CIMC
UCS-A /server/cimc # reset
UCS-A /server/cimc* # commit-buffer
UCS-A /server/cimc #
```

## Recovering the Corrupt BIOS on a Rack-Mount Server

On rare occasions, an issue with a rack-mount server may require you to recover the corrupted BIOS. This procedure is not part of the normal maintenance of a rack-mount server. After you recover the BIOS, the rack-mount server boots with the running version of the firmware for that 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-id</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>recover-bios</b> <i>version</i> [ <b>ignorecompcheck</b> ]	Loads and activates the specified BIOS version.

	<b>Command or Action</b>	<b>Purpose</b>
		To activate the firmware without making sure that it is compatible first, include the <b>ignorecompcheck</b> keyword. We recommend that you use this option only when explicitly directed to do so by a technical support representative.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction.

The following example shows how to recover the BIOS:

```
UCS-A# scope server 1
UCS-A /server # recover-bios S5500.0044.0.3.1.010620101125
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Showing the Status for a Rack-Mount Server

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>show server status</b>	Shows the status for all servers in the Cisco UCS instance.

The following example shows the status for all servers in the Cisco UCS instance. The servers numbered 1 and 2 do not have a slot listed in the table because they are rack-mount servers.

Server	Slot	Status	Availability	Overall Status	Discovery
1/1		Equipped	Unavailable	Ok	Complete
1/2		Equipped	Unavailable	Ok	Complete
1/3		Equipped	Unavailable	Ok	Complete
1/4		Empty	Unavailable	Ok	Complete
1/5		Equipped	Unavailable	Ok	Complete
1/6		Equipped	Unavailable	Ok	Complete
1/7		Empty	Unavailable	Ok	Complete
1/8		Empty	Unavailable	Ok	Complete
1		Equipped	Unavailable	Ok	Complete
2		Equipped	Unavailable	Ok	Complete





# CHAPTER 39

## Managing the I/O Modules

This chapter includes the following sections:

- [I/O Module Management in Cisco UCS Manager GUI , page 489](#)
- [Resetting the IOM, page 489](#)

### I/O Module Management in Cisco UCS Manager GUI

You can manage and monitor all I/O modules in a Cisco UCS instance through Cisco UCS Manager GUI.

### Resetting the IOM

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope iom</b> { <b>a b</b> }	Enters chassis IOM mode for the specified IOM.
<b>Step 3</b>	UCS-A /chassis/iom # <b>reset</b>	Resets the IOM.
<b>Step 4</b>	UCS-A /chassis/iom # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example resets the IOM on fabric A and commits the transaction:

```
UCS-A# scope chassis 1
UCS-A /chassis # scope iom a
UCS-A /chassis/iom # reset
UCS-A /chassis/iom* # commit-buffer
UCS-A /chassis/iom #
```





# CHAPTER 40

## Backing Up and Restoring the Configuration

This chapter includes the following sections:

- [Backup and Export Configuration, page 491](#)
- [Backup Types, page 491](#)
- [Considerations and Recommendations for Backup Operations, page 492](#)
- [Import Configuration, page 493](#)
- [Import Methods, page 493](#)
- [System Restore, page 493](#)
- [Required User Role for Backup and Import Operations, page 493](#)
- [Backup Operations, page 494](#)
- [Import Operations, page 498](#)
- [Restoring the Configuration for a Fabric Interconnect, page 502](#)
- [Erasing the Configuration, page 503](#)

### 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 Manager:

- **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.

- **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.
- **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 cannot schedule a backup operation. You can, however, 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 the Cisco UCS Manager system configuration.

### Backwards Compatibility

Starting with Release 1.1(1) of the Cisco UCS Manager, full state backups are encrypted so that passwords and other sensitive information are not exported as clear text. As a result, full state backups made from Release 1.1(1) or later cannot be restored to a Cisco UCS instance running an earlier software release.

## Import Configuration

You can import any configuration file that was exported from Cisco UCS Manager. The file does not need to have been exported from the same Cisco UCS Manager.

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 Manager 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.

## Import Methods

You can use one of the following methods to import and update a system configuration through Cisco UCS Manager:

- **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 instance 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 restore a system configuration from any full state backup file that was exported from Cisco UCS Manager. The file does not need to have been exported from the Cisco UCS Manager on the system that you are restoring.

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.

You can use the restore function for disaster recovery.

## 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.

# Backup Operations

## Creating a Backup Operation

### Before You Begin

Obtain the backup server IP address and authentication credentials.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>create backup URL</b> <b>backup-type {disabled   enabled}</b>	<p>Creates a backup operation. Specify the <i>URL</i> for the backup file using one of the following syntax:</p> <ul style="list-style-type: none"> <li>• <b>ftp:// username@hostname / path</b></li> <li>• <b>scp:// username@hostname / path</b></li> <li>• <b>sftp:// username@hostname / path</b></li> <li>• <b>tftp:// hostname : port-num / path</b></li> </ul> <p>The <i>backup-type</i> argument can be one of the following values:</p> <ul style="list-style-type: none"> <li>• <b>all-configuration</b>—Backs up the server-, fabric-, and system-related configuration</li> <li>• <b>logical-configuration</b>—Backs up the fabric- and service profile-related configuration</li> <li>• <b>system-configuration</b>—Backs up the system-related configuration</li> <li>• <b>full-state</b>—Backs up the full state for disaster recovery</li> </ul> <p><b>Note</b> Full-state backup files cannot be imported using an import operation. They are used only to restore the configuration for a fabric interconnect.</p> <p>You can save multiple backup operations, but only one operation for each hostname is saved.</p> <p>If you use the <b>enable</b> keyword, the backup operation automatically runs as soon as you enter the <b>commit-buffer</b> command. If you use the <b>disable</b> keyword, the backup operation will not run until it is enabled. When enabling a backup operation, you must specify the hostname you used when creating the backup operation.</p>
<b>Step 3</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction.

The following example creates a disabled all-configuration backup operation for hostname host35 and commits the transaction:

```
UCS-A# scope system
UCS-A /system* # create backup scp://user@host35/backups/all-config9.bak all-configuration
  disabled
Password:
UCS-A /system* # commit-buffer
UCS-A /system #
```

## Running a Backup Operation

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope backup hostname</b>	Enters system backup mode for the specified hostname.
<b>Step 3</b>	UCS-A /system/backup # <b>enable</b>	Enables the backup operation. <b>Note</b> For backup operations using FTP, SCP, SFTP, you are prompted for the password. Enter the password before committing the transaction.
<b>Step 4</b>	UCS-A /system/backup # <b>commit-buffer</b>	Commits the transaction.

The following example enables a backup operation named host35, enters the password for the SCP protocol, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope backup host35
UCS-A /system/backup # enable
Password:
UCS-A /system/backup* # commit-buffer
UCS-A /system/backup #
```

## 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.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope backup hostname</b>	Enters system backup mode for the specified hostname.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /system/backup # <b>disable</b>	(Optional) Disables an enabled backup operation so that it does not automatically run when the transaction is committed.
<b>Step 4</b>	UCS-A /system/backup # <b>enable</b>	(Optional) Automatically runs the backup operation as soon as you commit the transaction.
<b>Step 5</b>	UCS-A /system/backup # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the backup operation. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any show command output.
<b>Step 6</b>	UCS-A /system/backup # <b>set protocol</b> {ftp   scp   sftp   tftp}	(Optional) Specifies the protocol to use when communicating with the remote server.
<b>Step 7</b>	UCS-A /system/backup # <b>set remote-file</b> <i>filename</i>	(Optional) Specifies the name of the configuration file that is being backed up.
<b>Step 8</b>	UCS-A /system/backup # <b>set type</b> <i>backup-type</i>	(Optional) Specifies the type of backup file to be made. The <i>backup-type</i> argument can be one of the following values: <ul style="list-style-type: none"><li>• <b>all-configuration</b>—Backs up the server, fabric, and system related configuration</li><li>• <b>logical-configuration</b>—Backs up the fabric and service profile related configuration</li><li>• <b>system-configuration</b>—Backs up the system related configuration</li><li>• <b>full-state</b>—Backs up the full state for disaster recovery</li></ul> <b>Note</b> Full-state backup files cannot be imported using an import operation. They are used only to restore the configuration for a fabric interconnect.
<b>Step 9</b>	UCS-A /system/backup # <b>set preserve-pooled-values</b> {no   yes}	(Optional) Specifies whether pool-derived identity values, such as vHBA WWPN, vNIC MAC, WWNN, and UUID, will be saved with the backup.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 10</b>	UCS-A /system/backup # <b>set user</b> <i>username</i>	(Optional) Specifies the username the system should use to log in to the remote server. This step does not apply if the TFTP protocol is used.
<b>Step 11</b>	UCS-A /system/backup # <b>set password</b> <i>password</i>	(Optional) Specifies the password for the remote server username. This step does not apply if the TFTP protocol is used. <b>Note</b> 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.
<b>Step 12</b>	UCS-A /system/backup # <b>commit-buffer</b>	Commits the transaction.

The following example adds a description and changes the protocol, username, and password for the host35 backup operation and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope backup host35
UCS-A /system/backup # set descr "This is a backup operation for host35."
UCS-A /system/backup* # set protocol sftp
UCS-A /system/backup* # set user UserName32
UCS-A /system/backup* # set password
Password:
UCS-A /system/backup* # set preserve-pooled-values no
UCS-A /system/backup* # commit-buffer
UCS-A /system #
```

## Deleting a Backup Operation

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>delete backup</b> <i>hostname</i>	Deletes the backup operation for the specified hostname.
<b>Step 3</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction.

The following example deletes a backup operation for the host35 hostname and commits the transaction:

```
UCS-A# scope system
UCS-A /system # delete backup host35
UCS-A /system* # commit-buffer
UCS-A /system #
```

# 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>create import-config URL {disabled   enabled} {merge   replace}</b>	<p>Creates an import operation. Specify the URL for the file being imported using one of the following syntax:</p> <ul style="list-style-type: none"> <li>• <b>ftp:// username@hostname / path</b></li> <li>• <b>scp:// username@hostname / path</b></li> <li>• <b>sftp:// username@hostname / path</b></li> <li>• <b>tftp:// hostname : port-num / path</b></li> </ul> <p>You can save multiple import operations, but only one operation for each hostname is saved.</p> <p>If you use the <b>enable</b> keyword, the import operation automatically runs as soon as you enter the <b>commit-buffer</b> command. If you use the <b>disable</b> keyword, the import operation will not run until it is enabled. When enabling an import operation, you must specify the hostname you used when creating the import operation.</p> <p>If you use the <b>merge</b> keyword, 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. If you use the <b>replace</b> keyword, the system takes each object in the import configuration file and overwrites the corresponding object in the current configuration.</p>

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 3</b>	UCS-A /system/import-config# <b>set descr</b> <i>description</i>	(Optional) Provides a description for the import operation. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any show command output.
<b>Step 4</b>	UCS-A /system/import-config # <b>commit-buffer</b>	Commits the transaction.

The following example creates a disabled import operation for hostname host35 that replaces the existing configuration and commits the transaction:

```
UCS-A# scope system
UCS-A /system* # create import-config scp://user@host35/backups/all-config9.bak disabled
replace
Password:
UCS-A /system/import-config* # commit-buffer
UCS-A /system/import-config #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope import-config</b> <i>hostname</i>	Enters system backup mode for the specified hostname.
<b>Step 3</b>	UCS-A /system/import-config # <b>enable</b>	Enables the import operation.
<b>Step 4</b>	UCS-A /system/import-config # <b>commit-buffer</b>	Commits the transaction.

The following example enables an import operation for the host35 hostname and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope import-config host35
UCS-A /system/import-config # enable
UCS-A /system/import-config* # commit-buffer
UCS-A /system/import-config #
```

## Modifying an Import Operation

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope import-config hostname</b>	Enters system import configuration mode for the specified hostname.
<b>Step 3</b>	UCS-A /system/import-config # <b>disable</b>	(Optional) Disables an enabled import operation so that it does not automatically run when the transaction is committed.
<b>Step 4</b>	UCS-A /system/import-config # <b>enable</b>	(Optional) Automatically runs the import operation as soon as you commit the transaction.
<b>Step 5</b>	UCS-A /system/import-config # <b>set action {merge   replace}</b>	(Optional) Specifies one of the following action types to use for the import operation: <ul style="list-style-type: none"> <li>• <b>Merge</b> —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.</li> <li>• <b>Replace</b> —The system takes each object in the import configuration file and overwrites the corresponding object in the current configuration.</li> </ul>
<b>Step 6</b>	UCS-A /system/import-config # <b>set descr description</b>	(Optional) Provides a description for the import operation. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any show command output.
<b>Step 7</b>	UCS-A /system/import-config # <b>set password password</b>	(Optional) Specifies the password for the remote server username. This step does not apply if the TFTP protocol is used. <b>Note</b> 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.
<b>Step 8</b>	UCS-A /system/import-config # <b>set protocol {ftp   scp   sftp   tftp}</b>	(Optional) Specifies the protocol to use when communicating with the remote server.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 9</b>	UCS-A /system/import-config # <b>set remote-file</b> <i>filename</i>	(Optional) Specifies the name of the configuration file that is being imported.
<b>Step 10</b>	UCS-A /system/import-config # <b>set user</b> <i>username</i>	(Optional) Specifies the username the system should use to log in to the remote server. This step does not apply if the TFTP protocol is used.
<b>Step 11</b>	UCS-A /system/import-config # <b>commit-buffer</b>	Commits the transaction.

The following example adds a description, changes the password, protocol and username for the host35 import operation, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope import-config host35
UCS-A /system/import-config # set descr "This is an import operation for host35."
UCS-A /system/import-config* # set password
Password:
UCS-A /system/import-config* # set protocol sftp
UCS-A /system/import-config* # set user jforlenz32
UCS-A /system/import-config* # commit-buffer
UCS-A /system/import-config #
```

## Deleting an Import Operation

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>delete import-config</b> <i>hostname</i>	Deletes the import operation for the specified hostname.
<b>Step 3</b>	UCS-A /system # <b>commit-buffer</b>	Commits the transaction.

The following example deletes the import operation for the host35 hostname and commits the transaction:

```
UCS-A# scope system
UCS-A /system # delete import-config host35
UCS-A /system* # commit-buffer
UCS-A /system #
```

# 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 IP address and subnet mask
- Default gateway IP address
- Backup server IP 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 **console**.

**Step 4** Enter **restore** to restore the configuration from a full-state backup.

**Step 5** Enter **y** to confirm that you want to restore from a full-state backup.

**Step 6** Enter the IP address for the management port on the fabric interconnect.

**Step 7** Enter the subnet mask for the management port on the fabric interconnect.

**Step 8** Enter the IP address for the default gateway.

**Step 9** Enter one of the following protocols to use when retrieving the backup configuration file:

- **scp**
- **ftp**
- **tftp**
- **sftp**

**Step 10** Enter the IP address of the backup server.

**Step 11** Enter the full path and filename of the Full State backup file.

**Step 12** Enter the username and password to access the backup server.

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 synchronizes the configuration with the primary fabric interconnect.

The following example restores a system configuration from the Backup.bak file, which was retrieved from the 20.10.20.10 backup server using FTP:

```

Enter the configuration method. (console/gui) ? console
Enter the setup mode; setup newly or restore from backup. (setup/restore) ? restore
NOTE:
To configure Fabric interconnect using a backup file on a remote server,
you will need to setup management interface.
The management interface will be re-configured (if necessary),
based on information stored in the backup file.

Continue to restore this Fabric interconnect from a backup file (yes/no) ? yes
Physical Switch Mgmt0 IPv4 address : 192.168.10.10
Physical Switch Mgmt0 IPv4 netmask : 255.255.255.0
IPv4 address of the default gateway : 192.168.10.1
Enter the protocol to get backup file (scp/ftp/tftp/sftp) ? scp
Enter the IP address of backup server: 20.10.20.10
Enter fully qualified backup file name: Backup.bak
Enter user ID: user
Enter password:
Retrieved backup configuration file.
Configuration file - Ok

Cisco UCS 6100 Series Fabric Interconnect
UCS-A login:

```

## Erasing the Configuration


**Caution**

You should erase the configuration only when it is necessary. Erasing the configuration completely removes the configuration and reboots the system in an unconfigured state. You must then either restore the configuration from a backup file or perform an initial system setup. For more information on performing an initial system setup, see [System Configuration, on page 49](#).

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>connect local-mgmt</b>	Enters the local management CLI.
<b>Step 2</b>	UCS-A(local-mgmt)# <b>erase configuration</b>	Erases the configuration. You are prompted to confirm that you want to erase the configuration. Entering <b>yes</b> erases the configuration and reboots the system in an unconfigured state.

The following example erases the configuration:

```

UCS-A# connect local-mgmt
UCS-A(local-mgmt)# erase configuration
All UCS configurations will be erased and system will reboot. Are you sure? (yes/no): yes

```





# CHAPTER 41

## Recovering a Lost Password

---

This chapter includes the following sections:

- [Password Recovery for the Admin Account, page 505](#)
- [Determining the Leadership Role of a Fabric Interconnect, page 506](#)
- [Recovering the Admin Account Password in a Standalone Configuration, page 506](#)
- [Recovering the Admin Account Password in a Cluster Configuration, page 507](#)

## 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 instance.

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 instance. As a result, all data transmission in the instance is stopped until you restart the fabric interconnects.

---

## Determining the Leadership Role of a Fabric Interconnect

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>UCS-A# show cluster state</b>	Displays the operational state and leadership role for both fabric interconnects in a cluster.

The following example displays the leadership role for both fabric interconnects in a cluster, where fabric interconnect A has the primary role and fabric interconnect B has the subordinate role:

```
UCS-A# show cluster state
Cluster Id: 0x4432f72a371511de-0xb97c000de1b1ada4
A: UP, PRIMARY
B: UP, SUBORDINATE

HA READY
```

## 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 instance.

### 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 instance.

## 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 **VIII**

## **System Monitoring**

- [Monitoring Traffic, page 513](#)
- [Monitoring Hardware, page 523](#)
- [Configuring Statistics-Related Policies, page 527](#)
- [Configuring Call Home, page 543](#)
- [Managing the System Event Log, page 565](#)
- [Configuring Settings for Faults, Events, and Logs, page 573](#)





# CHAPTER 42

## Monitoring Traffic

---

This chapter includes the following sections:

- [Traffic Monitoring, page 513](#)
- [Guidelines and Recommendations for Traffic Monitoring, page 514](#)
- [Creating a Traffic Monitoring Session, page 515](#)
- [Adding Traffic Sources to the Monitoring Session, page 516](#)
- [Activating a Traffic Monitoring Session, page 520](#)
- [Deleting a Traffic Monitoring Session, page 521](#)

## 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).

### 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
- Server 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.
- To monitor traffic from a server, add all vNICs from the service profile corresponding to the server.
- To monitor traffic from a VM, you must first determine the identity of the dynamic vNIC assigned to the VM. Follow the procedure in [to find the vNIC and view its identity properties, then add the vNIC as a source for the monitoring session. If you later move the VM using VMotion, a new dynamic vNIC is assigned and you must reconfigure the monitoring source.](#)

### [Viewing Dynamic vNIC Properties in a VM, on page 450](#)

- 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.

- 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 a Traffic Monitoring Session



**Note**

This procedure describes creating an Ethernet traffic monitoring session. To create a Fibre Channel traffic monitoring session, the following changes are required:

- Enter the **scope fc-traffic-mon** command instead of the **scope eth-traffic-mon** command in Step 1.
- Enter the **create fc-mon-session** command instead of the **create eth-mon-session** command in Step 3.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-traffic-mon</b>	Enters Ethernet traffic monitoring command mode.
<b>Step 2</b>	UCS-A /eth-traffic-mon # <b>scope fabric {a   b}</b>	Enters traffic monitoring command mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-traffic-mon/fabric # <b>create eth-mon-session session-name</b>	Creates a traffic monitoring session with the specified name.
<b>Step 4</b>	UCS-A /eth-traffic-mon/fabric/eth-mon-session # <b>create dest-interface slot-num port-num</b>	Configures the interface at the specified slot and port number to be the destination for the traffic monitoring session. Enters the command mode for the interface.
<b>Step 5</b>	UCS-A /eth-traffic-mon/fabric/eth-mon-session/dest-interface # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates an Ethernet traffic monitoring session to copy and forward traffic to the destination port at slot 2, port 12, and commits the transaction:

```
UCS-A# scope eth-traffic-mon
UCS-A /eth-traffic-mon # scope fabric a
UCS-A /eth-traffic-mon/fabric # create eth-mon-session Monitor33
UCS-A /eth-traffic-mon/fabric/eth-mon-session* # create dest-interface 2 12
UCS-A /eth-traffic-mon/fabric/eth-mon-session/dest-interface* # commit-buffer
UCS-A /eth-traffic-mon/fabric/eth-mon-session/dest-interface #
```

### What to Do Next

- Add traffic sources to the traffic monitoring session.

- Activate the traffic monitoring session.

## Adding Traffic Sources to the Monitoring Session

### Adding an Uplink Source Port to a Monitoring Session



**Note**

This procedure describes adding an Ethernet uplink port as a source for a traffic monitoring session. To add a Fibre Channel uplink port as a source, enter the **scope fc-uplink** command instead of the **scope eth-uplink** command in Step 1.

#### Before You Begin

A traffic monitoring session must be created.

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink command mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters uplink fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>scope interface slot-num port-num</b>	Enters the interface command mode for the specified uplink port.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/interface # <b>create mon-src session-name</b>	Adds the uplink port as a source to the specified monitoring session.
<b>Step 5</b>	UCS-A /eth-uplink/fabric/interface/mon-src # <b>set direction {both   receive   transmit}</b>	(Optional) Specifies the traffic direction to be monitored.
<b>Step 6</b>	UCS-A /eth-uplink/fabric/interface/mon-src # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds the ingress traffic on Ethernet uplink port 3 on slot 2 of fabric A as a source for a monitoring session and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # scope interface 2 3
UCS-A /eth-uplink/fabric/interface # create mon-src Monitor23
UCS-A /eth-uplink/fabric/interface/mon-src* # set direction receive
UCS-A /eth-uplink/fabric/interface/mon-src* # commit-buffer
UCS-A /eth-uplink/fabric/interface/mon-src #
```

#### What to Do Next

You can add additional sources to the traffic monitoring session.

## Adding a vNIC or vHBA Source to a Monitoring Session


**Note**

This procedure describes adding a vNIC as a source for a traffic monitoring session. To add a vHBA as a source, enter the **scope vhba** command instead of the **scope vnic** command in Step 2.

### Before You Begin

A traffic monitoring session must be created.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope service-profile org <i>org-name</i> <i>profile-name</i></b>	Enters organization service profile mode for the specified organization and service profile.
<b>Step 2</b>	UCS-A /org/service-profile # <b>scope vnic <i>vnic-name</i></b>	Enters the command mode for the specified vNIC.
<b>Step 3</b>	UCS-A /org/service-profile/vnic # <b>create mon-src <i>session-name</i></b>	Adds the vNIC as a source to the specified monitoring session.
<b>Step 4</b>	UCS-A /org/service-profile/vnic/mon-src # <b>set direction {both   receive   transmit}</b>	(Optional) Specifies the traffic direction to be monitored.
<b>Step 5</b>	UCS-A /org/service-profile/vnic/mon-src # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds the ingress traffic on a dynamic vNIC as a source for a monitoring session and commits the transaction:

```
UCS-A# scope service-profile org / sp1
UCS-A /org/service-profile # scope vnic ether-dynamic-prot-009
UCS-A /org/service-profile/vnic # create mon-src Monitor23
UCS-A /org/service-profile/vnic/mon-src* # set direction receive
UCS-A /org/service-profile/vnic/mon-src* # commit-buffer
UCS-A /org/service-profile/vnic/mon-src *
```

### What to Do Next

You can add additional sources to the traffic monitoring session.

## Adding a VLAN or VSAN Source to a Monitoring Session



**Note** This procedure describes adding a VLAN as a source for a traffic monitoring session. To add a VSAN as a source, the following changes are required:

- Enter the **scope fc-uplink** command instead of the **scope eth-uplink** command in Step 1.
- Enter the **create vsan** command instead of the **create vlan** command in Step 3.

### Before You Begin

A traffic monitoring session must be created.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink command mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope fabric {a   b}</b>	Enters uplink fabric mode for the specified fabric. <b>Note</b> This step is required when adding a local VLAN as a source. To add a global VLAN as a source, omit this step.
<b>Step 3</b>	UCS-A /eth-uplink/fabric # <b>create vlan vlan-name vlan-id</b>	Creates a named VLAN, specifies the VLAN name and VLAN ID, and enters uplink VLAN mode.
<b>Step 4</b>	UCS-A /eth-uplink/fabric/vlan # <b>create mon-src session-name</b>	Adds the VLAN as a source to the specified monitoring session.
<b>Step 5</b>	UCS-A /eth-uplink/fabric/vlan/mon-src # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds a local VLAN as a source for an Ethernet monitoring session and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope fabric a
UCS-A /eth-uplink/fabric # create vlan vlan23 23
UCS-A /eth-uplink/fabric/vlan # create mon-src Monitor23
UCS-A /eth-uplink/fabric/vlan/mon-src* # commit-buffer
UCS-A /eth-uplink/fabric/vlan/mon-src #
```

### What to Do Next

You can add additional sources to the traffic monitoring session.

## Adding a Storage Port Source to a Monitoring Session


**Note**

This procedure describes adding a Fibre Channel storage port as a source for a Fibre Channel traffic monitoring session. To add an FCoE storage port as a source for an Ethernet traffic monitoring session, enter the **create interface fcoe** command instead of the **create interface fc** command in Step 3.

### Before You Begin

A traffic monitoring session must be created.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-storage</b>	Enters Fibre Channel storage port command mode.
<b>Step 2</b>	UCS-A /fc-storage # <b>scope fabric {a   b}</b>	Enters Fibre Channel storage port fabric mode for the specified fabric.
<b>Step 3</b>	UCS-A /fc-storage/fabric # <b>create interface fc slot-num port-num</b>	Creates a Fibre Channel storage port interface and enters the interface command mode.
<b>Step 4</b>	UCS-A /fc-storage/fabric/fc # <b>create mon-src session-name</b>	Adds the storage port as a source to the specified monitoring session.
<b>Step 5</b>	UCS-A /fc-storage/fabric/fc/mon-src # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example adds a Fibre Channel storage port on port 3 of slot 2 as a source for a Fibre Channel monitoring session and commits the transaction:

```
UCS-A# scope fc-storage
UCS-A /fc-storage # scope fabric a
UCS-A /fc-storage/fabric # create interface fc 2 3
UCS-A /fc-storage/fabric/fc* # create mon-src Monitor23
UCS-A /fc-storage/fabric/fc/mon-src* # commit-buffer
UCS-A /fc-storage/fabric/fc/mon-src #
```

### What to Do Next

You can add additional sources to the traffic monitoring session.

**Note**

This procedure describes activating an Ethernet traffic monitoring session. To activate a Fibre Channel traffic monitoring session, the following changes are required:

- Enter the **scope fc-traffic-mon** command instead of the **scope eth-traffic-mon** command in Step 1.
- Enter the **scope fc-mon-session** command instead of the **scope eth-mon-session** command in Step 3.

**Before You Begin**

Configure a traffic monitoring session.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-traffic-mon</b>	Enters Ethernet traffic monitoring command mode.
<b>Step 2</b>	UCS-A /eth-traffic-mon # <b>scope fabric {a   b}</b>	Enters traffic monitoring command mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-traffic-mon/fabric # <b>scope eth-mon-session session-name</b>	Enters the command mode of the traffic monitoring session with the specified name.
<b>Step 4</b>	UCS-A /eth-traffic-mon/fabric/eth-mon-session # <b>enable   disable</b>	Disables or enables the traffic monitoring session.
<b>Step 5</b>	UCS-A /eth-traffic-mon/fabric/eth-mon-session # <b>commit-buffer</b>	Commits the transaction to the system configuration.

When activated, the traffic monitoring session begins forwarding traffic to the destination as soon as a traffic source is configured.

The following example activates an Ethernet traffic monitoring session and commits the transaction:

```
UCS-A# scope eth-traffic-mon
UCS-A /eth-traffic-mon # scope fabric a
UCS-A /eth-traffic-mon/fabric # scope eth-mon-session Monitor33
UCS-A /eth-traffic-mon/fabric/eth-mon-session # enable
UCS-A /eth-traffic-mon/fabric/eth-mon-session* # commit-buffer
UCS-A /eth-traffic-mon/fabric/eth-mon-session # show
```

Ether Traffic Monitoring Session:				
Name	Admin State	Oper State	Oper State Reason	
Monitor33	Enabled	Up	Active	

```
UCS-A /eth-traffic-mon/fabric/eth-mon-session #
```

## Deleting a Traffic Monitoring Session



**Note**

This procedure describes deleting an Ethernet traffic monitoring session. To delete a Fibre Channel traffic monitoring session, the following changes are required:

- Enter the **scope fc-traffic-mon** command instead of the **scope eth-traffic-mon** command in Step 1.
- Enter the **delete fc-mon-session** command instead of the **delete eth-mon-session** command in Step 3.

---

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-traffic-mon</b>	Enters Ethernet traffic monitoring command mode.
<b>Step 2</b>	UCS-A /eth-traffic-mon # <b>scope fabric {a   b}</b>	Enters traffic monitoring command mode for the specified fabric.
<b>Step 3</b>	UCS-A /eth-traffic-mon/fabric # <b>delete eth-mon-session session-name</b>	Deletes the traffic monitoring session with the specified name.
<b>Step 4</b>	UCS-A /eth-traffic-mon/fabric # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes an Ethernet traffic monitoring session and commits the transaction:

```
UCS-A# scope eth-traffic-mon
UCS-A /eth-traffic-mon # scope fabric a
UCS-A /eth-traffic-mon/fabric # delete eth-mon-session Monitor33
UCS-A /eth-traffic-mon/fabric* # commit-buffer
UCS-A /eth-traffic-mon/fabric #
```





# CHAPTER 43

## Monitoring Hardware

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This chapter includes the following sections:

- [Monitoring Management Interfaces, page 523](#)

## 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 end-points.

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.

**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 end-point through the subordinate fabric interconnect does not exist.
- The management interface for the subordinate fabric interconnect has failed.
- The path to the end-point through the subordinate fabric interconnect has failed.

## Configuring the Management Interfaces Monitoring Policy

### Procedure

**Step 1** Enter monitoring mode.

UCS-A# **scope monitoring**

**Step 2** Enable or disable the management interfaces monitoring policy.

UCS-A /monitoring # **set mgmt-if-mon-policy admin-state {enabled | disabled}**

**Step 3** Specify the number of seconds that the system should wait between data recordings.

UCS-A /monitoring # **set mgmt-if-mon-policy poll-interval**

Enter an integer between 90 and 300.

**Step 4** Specify the maximum number of monitoring attempts that can fail before the system assumes that the management interface is unavailable and generates a fault message.

UCS-A /monitoring # **set mgmt-if-mon-policy max-fail-reports num-mon-attempts**

Enter an integer between 2 and 5.

**Step 5** Specify the monitoring mechanism that you want the system to use.

UCS-A /monitoring # **set mgmt-if-mon-policy monitor-mechanism {mii-status | ping-arp-targets | ping-gateway}**

- **mii-status** —The system monitors the availability of the Media Independent Interface (MII).
- **ping-arp-targets** —The system pings designated targets using the Address Resolution Protocol (ARP).
- **ping-gateway** —The system pings the default gateway address specified for this Cisco UCS instance in the management interface.

**Step 6** If you selected **mii-status** as your monitoring mechanism, configure the following properties:

- a) Specify the number of seconds that the system should wait before requesting another response from the MII if a previous attempt fails.

UCS-A /monitoring # **set mgmt-if-mon-policy mii-retry-interval num-seconds**

Enter an integer between 3 and 10.

- b) Specify the number of times that the system polls the MII until the system assumes that the interface is unavailable.

UCS-A /monitoring # **set mgmt-if-mon-policy mii-retry-count num-retries**

Enter an integer between 1 and 3.

**Step 7** If you selected **ping-arp-targets** as your monitoring mechanism, configure the following properties:

- a) Specify the first IP address the system pings.

UCS-A /monitoring # **set mgmt-if-mon-policy arp-target1 ip-addr**

Type 0.0.0.0 to remove the ARP target.

- b) Specify the second IP address the system pings.

UCS-A /monitoring # **set mgmt-if-mon-policy arp-target2 ip-addr**

Type 0.0.0.0 to remove the ARP target.

- c) Specify the third IP address the system pings.

UCS-A /monitoring # **set mgmt-if-mon-policy arp-target3 ip-addr**

Type 0.0.0.0 to remove the ARP target.

- d) Specify the number of ARP requests to send to the target IP addresses.

UCS-A /monitoring # **set mgmt-if-mon-policy arp-requests num-requests**

Enter an integer between 1 and 5.

- e) Specify the number of seconds to wait for responses from the ARP targets before the system assumes that they are unavailable.

UCS-A /monitoring # **set mgmt-if-mon-policy arp-deadline num-seconds**

Enter a number between 5 and 15.

**Step 8** If you selected **ping-gateway** as your monitoring mechanism, configure the following properties:

- a) Specify the number of times the system should ping the gateway.

UCS-A /monitoring # **set mgmt-if-mon-policy ping-requests**

Enter an integer between 1 and 5.

- b) Specify the number of seconds to wait for a response from the gateway until the system assumes that the address is unavailable.

UCS-A /monitoring # **set mgmt-if-mon-policy ping-deadline**

Enter an integer between 5 and 15.

**Step 9** Commit the transaction to the system configuration.

UCS-A /monitoring # **commit-buffer**

The following example creates a monitoring interface management policy using the Media Independent Interface (MII) monitoring mechanism and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # set mgmt-if-mon-policy admin-state enabled
UCS-A /monitoring* # set mgmt-if-mon-policy poll-interval 250
UCS-A /monitoring* # set mgmt-if-mon-policy max-fail-reports 2
UCS-A /monitoring* # set mgmt-if-mon-policy monitor-mechanism set mii-status
UCS-A /monitoring* # set mgmt-if-mon-policy mii-retry-count 3
UCS-A /monitoring* # set mgmt-if-mon-policy mii-retry-interval 7
UCS-A /monitoring* # commit-buffer
UCS-A /monitoring #
```





# CHAPTER 44

## Configuring Statistics-Related Policies

This chapter includes the following sections:

- [Statistics Collection Policies, page 527](#)
- [Statistics Threshold Policies, page 528](#)

### 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.

## Configuring a Statistics Collection Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A/monitoring# <b>scope stats-collection-policy {adapter   chassis   host   port   server}</b>	Enters statistics collection policy mode for the specified policy type.
<b>Step 3</b>	UCS-A /monitoring/stats-collection-policy # <b>set collection-interval {1minute   2minutes   30seconds   5minutes}</b>	Specifies the interval at which statistics are collected from the system.
<b>Step 4</b>	UCS-A /monitoring/stats-collection-policy # <b>set reporting-interval {15minutes   30minutes   60minutes}</b>	Specifies the interval at which collected statistics are reported.
<b>Step 5</b>	UCS-A /monitoring/stats-collection-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a statistics collection policy for ports, sets the collection interval to one minute, the reporting interval to 30 minutes, and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope stats-collection-policy port
UCS-A /monitoring/stats-collection-policy* # set collection-interval 1minute
UCS-A /monitoring/stats-collection-policy* # set reporting-interval 30minutes
UCS-A /monitoring/stats-collection-policy* # commit-buffer
UCS-A /monitoring/stats-collection-policy #
```

## 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.

## Server and Server Component Statistics Threshold Policy Configuration

### Configuring a Server and Server Component Statistics Threshold Policy

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org <i>org-name</i></b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create stats-threshold-policy <i>policy-name</i></b>	Creates the specified statistics threshold policy and enters organization statistics threshold policy mode.
<b>Step 3</b>	UCS-A /org/stats-threshold-policy # <b>set descr <i>description</i></b>	(Optional) Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the server and server component statistics threshold policy named ServStatsPolicy, provides a description for the policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create stats-threshold-policy ServStatsPolicy
UCS-A /org/stats-threshold-policy* # set descr "Server stats threshold policy."
UCS-A /org/stats-threshold-policy* # commit-buffer
UCS-A /org/stats-threshold-policy #
```

#### What to Do Next

Configure one or more policy classes for the statistics threshold policy. For more information, see "[Configuring a Server and Server Component Statistics Threshold Policy Class, on page 530](#)."

## Deleting a Server and Server Component Statistics Threshold Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete stats-threshold-policy</b> <i>policy-name</i>	Deletes the specified statistics threshold policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server and server component statistics threshold policy named ServStatsPolicy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete stats-threshold-policy ServStatsPolicy
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Configuring a Server and Server Component Statistics Threshold Policy Class

### Before You Begin

Configure or identify the server and server component statistics threshold policy that will contain the policy class. For more information, see "[Configuring a Server and Server Component Statistics Threshold Policy, on page 529](#)."

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope stats-threshold-policy</b> <i>policy-name</i>	Enters organization statistics threshold policy mode.
<b>Step 3</b>	UCS-A /org/stats-threshold-policy # <b>create class</b> <i>class-name</i>	Creates the specified statistics threshold policy class and enters organization statistics threshold policy class mode. The <i>class-name</i> argument can be any of the class name keywords available for the particular statistics threshold policy being configured. To see a list of the available class name keywords, enter the <b>create class ?</b> command in organization statistics threshold policy mode.  <b>Note</b> You can configure multiple classes for the statistics threshold policy.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /org/stats-threshold-policy /class # <b>create property</b> <i>property-name</i>	Creates the specified statistics threshold policy class property and enters organization statistics threshold policy class property mode. The <i>property-name</i> argument can be any of the property name keywords available for the particular policy class being configured. To see a list of the available property name keywords, enter the <b>create property ?</b> command in organization statistics threshold policy class mode.  <b>Note</b> You can configure multiple properties for the policy class.
<b>Step 5</b>	UCS-A /org/stats-threshold-policy/class/property # <b>set normal-value</b> <i>value</i>	Specifies the normal value for the class property. The <i>value</i> format can vary depending on the class property being configured. To see the required format, enter the <b>set normal-value ?</b> command in organization statistics threshold policy class property mode.
<b>Step 6</b>	UCS-A /org/stats-threshold-policy /class/property # <b>create threshold-value</b> {above-normal   below-normal} {cleared   condition   critical   info   major   minor   warning}	Creates the specified threshold value for the class property and enters organization statistics threshold policy class property threshold value mode.  <b>Note</b> You can configure multiple threshold values for the class property.
<b>Step 7</b>	UCS-A /org/stats-threshold-policy /class/property/threshold-value # <b>set</b> {deescalating   escalating} <i>value</i>	Specifies the de-escalating or escalating class property threshold value. The <i>value</i> format can vary depending on the class property threshold value being configured. To see the required format, enter the <b>set deescalating ?</b> or <b>set escalating ?</b> command in organization statistics threshold policy class property threshold value mode.  <b>Note</b> You can specify both de-escalating and escalating class property threshold values.
<b>Step 8</b>	UCS-A /org/stats-threshold-policy /class/property/threshold-value # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the server and server component statistics threshold policy class for CPU statistics, creates a CPU temperature property, specifies that the normal CPU temperature is 48.5° C, creates an above normal warning threshold of 50° C, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope stats-threshold-policy ServStatsPolicy
UCS-A /org/stats-threshold-policy* # create class cpu-stats
UCS-A /org/stats-threshold-policy/class* # create property cpu-temp
UCS-A /org/stats-threshold-policy/class/property* # set normal-value 48.5
UCS-A /org/stats-threshold-policy/class/property* # create threshold-value above-normal
warning
UCS-A /org/stats-threshold-policy/class/property/threshold-value* # set escalating 50.0
UCS-A /org/stats-threshold-policy/class/property/threshold-value* # commit-buffer
UCS-A /org/stats-threshold-policy/class/property/threshold-value #
```

## Deleting a Server and Server Component Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope stats-threshold-policy</b> <i>policy-name</i>	Enters the specified statistics threshold policy.
<b>Step 3</b>	UCS-A /org/stats-threshold-policy # <b>delete class</b> <i>class-name</i>	Deletes the specified statistics threshold policy class from the policy.
<b>Step 4</b>	UCS-A /org/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server and server component statistics threshold policy class for CPU statistics and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope stats-threshold-policy ServStatsPolicy
UCS-A /org/stats-threshold-policy* # delete class cpu-stats
UCS-A /org/stats-threshold-policy* # commit-buffer
UCS-A /org/stats-threshold-policy #
```

## Uplink Ethernet Port Statistics Threshold Policy Configuration

### Configuring an Uplink Ethernet Port Statistics Threshold Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope stats-threshold-policy default</b>	Enters Ethernet uplink statistics threshold policy mode. <b>Note</b> You cannot create (or delete) an uplink Ethernet port statistics threshold policy. You can only enter (scope to) the existing default policy.
<b>Step 3</b>	UCS-A /eth-uplink/stats-threshold-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /eth-uplink/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the default uplink Ethernet port threshold policy, provides a description for the policy, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink* # scope stats-threshold-policy default
UCS-A /eth-uplink/stats-threshold-policy* # set descr "Uplink Ethernet port stats threshold
policy."
UCS-A /eth-uplink/stats-threshold-policy* # commit-buffer
UCS-A /eth-uplink/stats-threshold-policy #
```

### What to Do Next

Configure one or more policy classes for the statistics threshold policy. For more information, see "[Configuring an Uplink Ethernet Port Statistics Threshold Policy Class, on page 533](#)."

## Configuring an Uplink Ethernet Port Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope stats-threshold-policy default</b>	Enters Ethernet uplink statistics threshold policy mode.
<b>Step 3</b>	UCS-A /eth-uplink/stats-threshold-policy # <b>create class</b> <i>class-name</i>	Creates the specified statistics threshold policy class and enters Ethernet uplink statistics threshold policy class mode. The <i>class-name</i> argument can be any of the class name keywords available for the particular statistics threshold policy being configured. To see a list of the available class name keywords, enter the <b>create class ?</b> command in Ethernet uplink statistics threshold policy mode.  <b>Note</b> You can configure multiple classes for the statistics threshold policy.
<b>Step 4</b>	UCS-A /eth-uplink/stats-threshold-policy /class # <b>create property</b> <i>property-name</i>	Creates the specified statistics threshold policy class property and enters Ethernet uplink statistics threshold policy class property mode. The <i>property-name</i> argument can be any of the property name keywords available for the particular policy class being configured. To see a list of the available property name keywords, enter the <b>create property ?</b> command in Ethernet uplink statistics threshold policy class mode.  <b>Note</b> You can configure multiple properties for the policy class.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /eth-uplink/stats-threshold-policy /class/property # <b>set normal-value</b> <i>value</i>	Specifies the normal value for the class property. The <i>value</i> format can vary depending on the class property being configured. To see the required format, enter the <b>set normal-value ?</b> command in Ethernet uplink statistics threshold policy class property mode.
<b>Step 6</b>	UCS-A /eth-uplink/stats-threshold-policy /class/property # <b>create</b> <b>threshold-value {above-normal   below-normal} {cleared   condition   critical   info   major   minor   warning}</b>	Creates the specified threshold value for the class property and enters Ethernet uplink statistics threshold policy class property threshold value mode. <b>Note</b> You can configure multiple threshold values for the class property.
<b>Step 7</b>	UCS-A /eth-uplink/stats-threshold-policy /class/property/threshold-value # <b>set {deescalating   escalating}</b> <i>value</i>	Specifies the de-escalating or escalating class property threshold value. The <i>value</i> format can vary depending on the class property threshold value being configured. To see the required format, enter the <b>set deescalating ?</b> or <b>set escalating ?</b> command in Ethernet uplink statistics threshold policy class property threshold value mode. <b>Note</b> You can specify both de-escalating and escalating class property threshold values.
<b>Step 8</b>	UCS-A /eth-uplink/stats-threshold-policy /class/property/threshold-value # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the uplink Ethernet port statistics threshold policy class for Ethernet error statistics, creates a cyclic redundancy check (CRC) error count property, specifies that the normal CRC error count for each polling interval is 1000, creates an above normal warning threshold of 1250, and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink* # scope stats-threshold-policy default
UCS-A /eth-uplink/stats-threshold-policy* # create class ether-error-stats
UCS-A /eth-uplink/stats-threshold-policy/class* # create property crc-delta
UCS-A /eth-uplink/stats-threshold-policy/class/property* # set normal-value 1000
UCS-A /eth-uplink/stats-threshold-policy/class/property* # create threshold-value above-normal
warning
UCS-A /eth-uplink/stats-threshold-policy/class/property/threshold-value* # set escalating
1250
UCS-A /eth-uplink/stats-threshold-policy/class/property/threshold-value* # commit-buffer
UCS-A /eth-uplink/stats-threshold-policy/class/property/threshold-value #
```

## Deleting an Uplink Ethernet Port Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-uplink</b>	Enters Ethernet uplink mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope stats-threshold-policy default</b>	Enters Ethernet uplink statistics threshold policy mode.
<b>Step 3</b>	UCS-A /eth-uplink/stats-threshold-policy # <b>delete class <i>class-name</i></b>	Deletes the specified statistics threshold policy class from the policy.
<b>Step 4</b>	UCS-A /eth-uplink/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the uplink Ethernet port statistics threshold policy class for Ethernet error statistics and commits the transaction:

```
UCS-A# scope eth-uplink
UCS-A /eth-uplink # scope stats-threshold-policy default
UCS-A /eth-uplink/stats-threshold-policy # delete class ether-error-stats
UCS-A /eth-uplink/stats-threshold-policy* # commit-buffer
UCS-A /eth-uplink/stats-threshold-policy #
```

## Server Port, Chassis, and Fabric Interconnect Statistics Threshold Policy Configuration

### Configuring a Server Port, Chassis, and Fabric Interconnect Statistics Threshold Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-server</b>	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # <b>scope stats-threshold-policy default</b>	Enters Ethernet server statistics threshold policy mode. <b>Note</b> You cannot create (or delete) a server port, chassis, and fabric interconnect statistics threshold policy. You can only enter (scope to) the existing default policy.
<b>Step 3</b>	UCS-A /eth-server/stats-threshold-policy # <b>set descr</b> <i>description</i>	(Optional) Provides a description for the policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /eth-server/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the default server port, chassis, and fabric interconnect statistics threshold policy, provides a description for the policy, and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server* # scope stats-threshold-policy default
UCS-A /eth-server/stats-threshold-policy* # set descr "Server port, chassis, and fabric
interconnect stats threshold policy."
UCS-A /eth-server/stats-threshold-policy* # commit-buffer
UCS-A /eth-server/stats-threshold-policy #
```

### What to Do Next

Configure one or more policy classes for the statistics threshold policy. For more information, see "[Configuring a Server Port, Chassis, and Fabric Interconnect Statistics Threshold Policy Class, on page 536](#)."

## Configuring a Server Port, Chassis, and Fabric Interconnect Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# scope eth-server	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # scope stats-threshold-policy default	Enters Ethernet server statistics threshold policy mode.
<b>Step 3</b>	UCS-A /eth-server/stats-threshold-policy # <b>create class</b> <i>class-name</i>	Creates the specified statistics threshold policy class and enters Ethernet server statistics threshold policy class mode. The <i>class-name</i> argument can be any of the class name keywords available for the particular statistics threshold policy being configured. To see a list of the available class name keywords, enter the <b>create class ?</b> command in Ethernet server statistics threshold policy mode.  <b>Note</b> You can configure multiple classes for the statistics threshold policy.
<b>Step 4</b>	UCS-A /eth-server/stats-threshold-policy /class # <b>create property</b> <i>property-name</i>	Creates the specified statistics threshold policy class property and enters Ethernet server statistics threshold policy class property mode. The <i>property-name</i> argument can be any of the property name keywords available for the particular policy class being configured. To see a list of the available property name keywords, enter the <b>create property ?</b> command in Ethernet server statistics threshold policy class mode.  <b>Note</b> You can configure multiple properties for the policy class.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /eth-server/stats-threshold-policy /class/property # <b>set normal-value</b> <i>value</i>	Specifies the normal value for the class property. The <i>value</i> format can vary depending on the class property being configured. To see the required format, enter the <b>set normal-value ?</b> command in Ethernet server statistics threshold policy class property mode.
<b>Step 6</b>	UCS-A /eth-server/stats-threshold-policy /class/property # <b>create</b> <b>threshold-value {above-normal   below-normal} {cleared   condition   critical   info   major   minor   warning}</b>	Creates the specified threshold value for the class property and enters Ethernet server statistics threshold policy class property threshold value mode. <b>Note</b> You can configure multiple threshold values for the class property.
<b>Step 7</b>	UCS-A /eth-server/stats-threshold-policy /class/property/threshold-value # <b>set {deescalating   escalating}</b> <i>value</i>	Specifies the de-escalating or escalating class property threshold value. The <i>value</i> format can vary depending on the class property threshold value being configured. To see the required format, enter the <b>set deescalating ?</b> or <b>set escalating ?</b> command in Ethernet server statistics threshold policy class property threshold value mode. <b>Note</b> You can specify both de-escalating and escalating class property threshold values.
<b>Step 8</b>	UCS-A /eth-server/stats-threshold-policy /class/property/threshold-value # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the server port, chassis, and fabric interconnect statistics threshold policy class for chassis statistics, creates an input power (Watts) property, specifies that the normal power is 8kW, creates an above normal warning threshold of 11kW, and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server* # scope stats-threshold-policy default
UCS-A /eth-server/stats-threshold-policy* # create class chassis-stats
UCS-A /eth-server/stats-threshold-policy/class* # create property input-power
UCS-A /eth-server/stats-threshold-policy/class/property* # set normal-value 8000.0
UCS-A /eth-server/stats-threshold-policy/class/property* # create threshold-value above-normal
warning
UCS-A /eth-server/stats-threshold-policy/class/property/threshold-value* # set escalating
11000.0
UCS-A /eth-server/stats-threshold-policy/class/property/threshold-value* # commit-buffer
UCS-A /eth-server/stats-threshold-policy/class/property/threshold-value #
```

## Deleting a Server Port, Chassis, and Fabric Interconnect Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope eth-server</b>	Enters Ethernet server mode.
<b>Step 2</b>	UCS-A /eth-server # <b>scope stats-threshold-policy default</b>	Enters Ethernet server statistics threshold policy mode.
<b>Step 3</b>	UCS-A /eth-server/stats-threshold-policy # <b>delete class class-name</b>	Deletes the specified statistics threshold policy class from the policy.
<b>Step 4</b>	UCS-A /eth-server/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the server port, chassis, and fabric interconnect statistics threshold policy class for chassis statistics and commits the transaction:

```
UCS-A# scope eth-server
UCS-A /eth-server* # scope stats-threshold-policy default
UCS-A /eth-server/stats-threshold-policy* # delete class chassis-stats
UCS-A /eth-server/stats-threshold-policy* # commit-buffer
UCS-A /eth-server/stats-threshold-policy #
```

## Fibre Channel Port Statistics Threshold Policy Configuration

### Configuring a Fibre Channel Port Statistics Threshold Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope stats-threshold-policy default</b>	Enters Fibre Channel uplink statistics threshold policy mode.  <b>Note</b> You cannot create (or delete) an uplink Fibre Channel port statistics threshold policy. You can only enter (scope to) the existing default policy.
<b>Step 3</b>	UCS-A /fc-uplink/stats-threshold-policy # <b>set descr description</b>	(Optional) Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /fc-uplink/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enters the default uplink Fibre Channel port statistics threshold policy, provides a description for the policy, and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink* # scope stats-threshold-policy default
UCS-A /fc-uplink/stats-threshold-policy* # set descr "Uplink Fibre Channel stats threshold policy."
UCS-A /fc-uplink/stats-threshold-policy* # commit-buffer
UCS-A /fc-uplink/stats-threshold-policy #
```

### What to Do Next

Configure one or more policy classes for the statistics threshold policy. For more information, see "[Configuring a Fibre Channel Port Statistics Threshold Policy Class, on page 539](#)."

## Configuring a Fibre Channel Port Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope stats-threshold-policy default</b>	Enters Fibre Channel uplink statistics threshold policy mode.
<b>Step 3</b>	UCS-A /fc-uplink/stats-threshold-policy # <b>create class</b> <i>class-name</i>	Creates the specified statistics threshold policy class and enters Fibre Channel uplink statistics threshold policy class mode. The <i>class-name</i> argument can be any of the class name keywords available for the particular statistics threshold policy being configured. To see a list of the available class name keywords, enter the <b>create class ?</b> command in Fibre Channel uplink statistics threshold policy mode.  <b>Note</b> You can configure multiple classes for the statistics threshold policy.
<b>Step 4</b>	UCS-A /fc-uplink/stats-threshold-policy /class # <b>create property</b> <i>property-name</i>	Creates the specified statistics threshold policy class property and enters Fibre Channel uplink statistics threshold policy class property mode. The <i>property-name</i> argument can be any of the property name keywords available for the particular policy class being configured. To see a list of the available property name keywords, enter the <b>create property ?</b> command in Fibre Channel uplink statistics threshold policy class mode.  <b>Note</b> You can configure multiple properties for the policy class.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 5</b>	UCS-A /fc-uplink/stats-threshold-policy /class/property # <b>set normal-value</b> <i>value</i>	Specifies the normal value for the class property. The <i>value</i> format can vary depending on the class property being configured. To see the required format, enter the <b>set normal-value ?</b> command in Fibre Channel uplink statistics threshold policy class property mode.
<b>Step 6</b>	UCS-A /fc-uplink/stats-threshold-policy /class/property # <b>create threshold-value {above-normal   below-normal} {cleared   condition   critical   info   major   minor   warning}</b>	Creates the specified threshold value for the class property and enters Fibre Channel uplink statistics threshold policy class property threshold value mode. <b>Note</b> You can configure multiple threshold values for the class property.
<b>Step 7</b>	UCS-A /fc-uplink/stats-threshold-policy /class/property/threshold-value # <b>set {deescalating   escalating}</b> <i>value</i>	Specifies the de-escalating or escalating class property threshold value. The <i>value</i> format can vary depending on the class property threshold value being configured. To see the required format, enter the <b>set deescalating ?</b> or <b>set escalating ?</b> command in Fibre Channel uplink statistics threshold policy class property threshold value mode. <b>Note</b> You can specify both de-escalating and escalating class property threshold values.
<b>Step 8</b>	UCS-A /fc-uplink/stats-threshold-policy /class/property/threshold-value # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates the uplink Fibre Channel port statistics threshold policy class for Fibre Channel statistics, creates an average bytes received property, specifies that the normal average number of bytes received for each polling interval is 150MB, creates an above normal warning threshold of 200MB, and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink* # scope stats-threshold-policy default
UCS-A /fc-uplink/stats-threshold-policy* # create class fc-stats
UCS-A /fc-uplink/stats-threshold-policy/class* # create property bytes-rx-avg
UCS-A /fc-uplink/stats-threshold-policy/class/property* # set normal-value 150000000
UCS-A /fc-uplink/stats-threshold-policy/class/property* # create threshold-value above-normal
warning
UCS-A /fc-uplink/stats-threshold-policy/class/property/threshold-value* # set escalating
200000000
UCS-A /fc-uplink/stats-threshold-policy/class/property/threshold-value* # commit-buffer
UCS-A /fc-uplink/stats-threshold-policy/class/property/threshold-value #
```

## Deleting an Uplink Fibre Channel Port Statistics Threshold Policy Class

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope fc-uplink</b>	Enters Fibre Channel uplink mode.
<b>Step 2</b>	UCS-A /fc-uplink # <b>scope stats-threshold-policy default</b>	Enters Fibre Channel uplink statistics threshold policy mode.
<b>Step 3</b>	UCS-A /fc-uplink/stats-threshold-policy # <b>delete class <i>class-name</i></b>	Deletes the specified statistics threshold policy class from the policy.
<b>Step 4</b>	UCS-A /fc-uplink/stats-threshold-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the uplink Fibre Channel port statistics threshold policy class for Fibre Channel statistics and commits the transaction:

```
UCS-A# scope fc-uplink
UCS-A /fc-uplink # scope stats-threshold-policy default
UCS-A /fc-uplink/stats-threshold-policy # delete class fc-stats
UCS-A /fc-uplink/stats-threshold-policy* # commit-buffer
UCS-A /fc-uplink/stats-threshold-policy #
```





# CHAPTER 45

## Configuring Call Home

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This chapter includes the following sections:

- [Call Home, page 543](#)
- [Call Home Considerations and Guidelines, page 545](#)
- [Cisco UCS Faults and Call Home Severity Levels, page 546](#)
- [Cisco Smart Call Home, page 547](#)
- [Configuring Call Home, page 548](#)
- [Disabling Call Home, page 550](#)
- [Enabling Call Home, page 550](#)
- [Configuring System Inventory Messages, page 551](#)
- [Configuring Call Home Profiles, page 552](#)
- [Sending a Test Call Home Alert, page 555](#)
- [Configuring Call Home Policies, page 556](#)
- [Example: Configuring Call Home for Smart Call Home, page 559](#)

## 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.

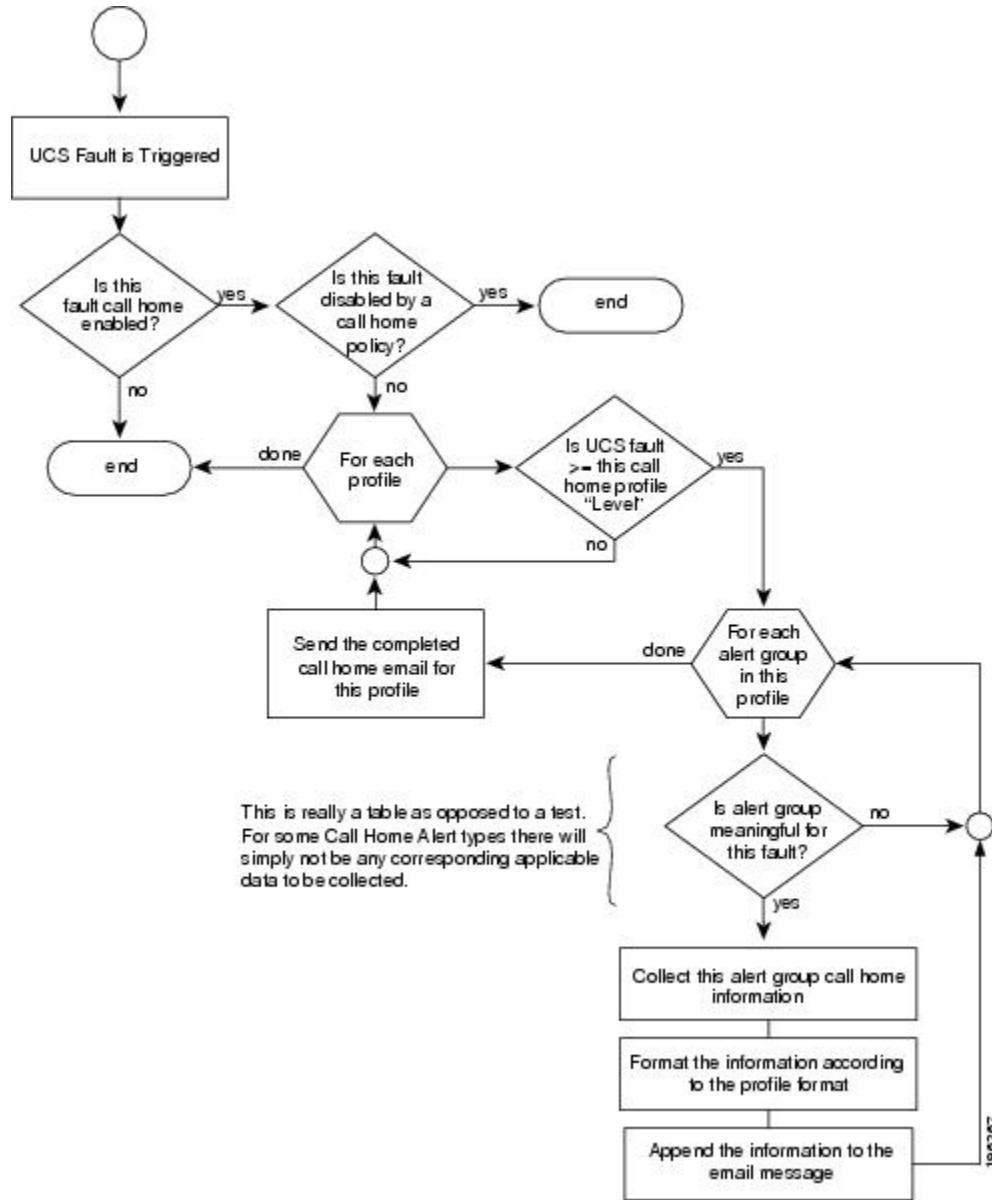
Cisco UCS delivers Call Home messages in the following formats:

- 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 is triggered in a system with Call Home configured:

**Figure 4: Flow of Events after a Fault is Triggered**



## 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 instance.

Cisco Smart Call Home sends the registration email to this email address after you send a system inventory to begin the registration process.

## 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 14: 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.
(6) Critical	Critical	Critical conditions, immediate attention needed.

Call Home Severity	Cisco UCS Fault	Call Home Meaning
(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 instance 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring# <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome# <b>enable</b>	Enables Call Home.
<b>Step 4</b>	UCS-A /monitoring/callhome # <b>set contact</b> <i>name</i>	Specifies the name of the main Call Home contact person.
<b>Step 5</b>	UCS-A /monitoring/callhome # <b>set email</b> <i>email-addr</i>	Specifies the email address of the main Call Home contact person.
<b>Step 6</b>	UCS-A /monitoring/callhome # <b>set phone-contact</b> <i>phone-num</i>	Specifies the phone number of the main Call Home contact person. The phone number must be in international format, starting with a + (plus sign) and a country code.
<b>Step 7</b>	UCS-A /monitoring/callhome # <b>set street-address</b> <i>street-addr</i>	Specifies the street address of the main Call Home contact person.
<b>Step 8</b>	UCS-A /monitoring/callhome # <b>set customer-id</b> <i>id-num</i>	Specifies the CCO identification number that includes the contract numbers for the support contract in its entitlements. The number can be up to 255 alphanumeric characters in free format.
<b>Step 9</b>	UCS-A /monitoring/callhome # <b>set contract-id</b> <i>id-num</i>	Specifies the contract identification number from the service agreement. The number can be up to 255 alphanumeric characters in free format.
<b>Step 10</b>	UCS-A /monitoring/callhome # <b>set site-id</b> <i>id-num</i>	Specifies the site identification number from the service agreement. The number can be up to 255 alphanumeric characters in free format.
<b>Step 11</b>	UCS-A /monitoring/callhome # <b>set from-email</b> <i>email-addr</i>	Specifies the email address to use for the From field in Call Home messages.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 12</b>	UCS-A /monitoring/callhome # <b>set reply-to-email</b> <i>email-addr</i>	Specifies the email address to use for the Reply To field in Call Home messages.
<b>Step 13</b>	UCS-A /monitoring/callhome # <b>set hostname</b> { <i>hostname</i>   <i>ip-addr</i> }	Specifies the hostname or IP address of the SMTP server that Call Home uses to send email messages.
<b>Step 14</b>	UCS-A /monitoring/callhome # <b>set port</b> <i>port-num</i>	Specifies the SMTP server port that Call Home uses to send email messages. Valid port numbers are 1 to 65535.
<b>Step 15</b>	UCS-A /monitoring/callhome # <b>set throttling</b> { <b>off</b>   <b>on</b> }	Enables or disables Call Home throttling. When enabled, throttling prevents too many Call Home email messages from being sent for the same event. By default, throttling is enabled.
<b>Step 16</b>	UCS-A /monitoring/callhome # <b>set urgency</b> { <b>alerts</b>   <b>critical</b>   <b>debugging</b>   <b>emergencies</b>   <b>errors</b>   <b>information</b>   <b>notifications</b>   <b>warnings</b> }	Specifies the urgency level for Call Home email messages. In the context of a large UCS deployment with several pairs of fabric interconnects, the urgency level potentially allows you to attach significance to Call Home messages from one particular UCS instance versus another. In the context of a small UCS deployment involving only two fabric interconnects, the urgency level holds little meaning.
<b>Step 17</b>	UCS-A /monitoring/callhome # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures Call Home and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring* # scope callhome
UCS-A /monitoring/callhome* # enable
UCS-A /monitoring/callhome* # set contact "Steve Jones"
UCS-A /monitoring/callhome* # set email admin@MyCompany.com
UCS-A /monitoring/callhome* # set phone-contact +1-001-408-555-1234
UCS-A /monitoring/callhome* # set street-address "123 N. Main Street, Anytown, CA, 99885"
UCS-A /monitoring/callhome* # set customer-id 1234567
UCS-A /monitoring/callhome* # set contract-id 99887766
UCS-A /monitoring/callhome* # set site-id 5432112
UCS-A /monitoring/callhome* # set from-email person@MyCompany.com
UCS-A /monitoring/callhome* # set reply-to-email person@MyCompany.com
UCS-A /monitoring/callhome* # set hostname 192.168.100.12
UCS-A /monitoring/callhome* # set port 25
UCS-A /monitoring/callhome* # set throttling on
UCS-A /monitoring/callhome* # set urgency information
UCS-A /monitoring/callhome* # commit-buffer
UCS-A /monitoring/callhome #
```

## Disabling Call Home

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>disable</b>	Enables Call Home.
<b>Step 4</b>	UCS-A /monitoring/callhome # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disables Call Home and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # disable
UCS-A /monitoring/callhome* # commit-buffer
UCS-A /monitoring/callhome #
```

## Enabling Call Home

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>enable</b>	Enables Call Home.
<b>Step 4</b>	UCS-A /monitoring/callhome # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables Call Home and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # enable
UCS-A /monitoring/callhome* # commit-buffer
UCS-A /monitoring/callhome #
```

# Configuring System Inventory Messages

## Configuring System Inventory Messages

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>scope inventory</b>	Enters monitoring call home inventory mode.
<b>Step 4</b>	UCS-A /monitoring/callhome/inventory # <b>set send-periodically {off   on}</b>	Enables or disables the sending of inventory messages. When the <b>on</b> keyword is specified, inventory messages are automatically sent to the Call Home database.
<b>Step 5</b>	UCS-A /monitoring/callhome/inventory # <b>set interval-days interval-num</b>	Specifies the time interval (in days) at which inventory messages will be sent.
<b>Step 6</b>	UCS-A /monitoring/callhome/inventory # <b>set timeofday-hour hour</b>	Specifies the hour (using 24-hour format) that inventory messages are sent.
<b>Step 7</b>	UCS-A /monitoring/callhome/inventory # <b>set timeofday-minute minute</b>	Specifies the number of minutes after the hour that inventory messages are sent.
<b>Step 8</b>	UCS-A /monitoring/callhome/inventory # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures Call Home system inventory messages and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring* # scope callhome
UCS-A /monitoring/callhome* # scope inventory
UCS-A /monitoring/callhome/inventory* # set send-periodically on
UCS-A /monitoring/callhome/inventory* # set interval-days 15
UCS-A /monitoring/callhome/inventory* # set timeofday-hour 21
UCS-A /monitoring/callhome/inventory* # set timeofday-minute 30
UCS-A /monitoring/callhome/inventory* # commit-buffer
UCS-A /monitoring/callhome/inventory #
```

## 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>scope inventory</b>	Enters monitoring call home inventory mode.
<b>Step 4</b>	UCS-A /monitoring/callhome/inventory # <b>send</b>	Sends the system inventory message to the Call Home database.

The following example sends the system inventory message to the Call Home database:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # scope inventory
UCS-A /monitoring/callhome/inventory* # send
```

## 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.

Each alert that Cisco UCS generates fits into a category represented by an alert group, such as the following:

- Environmental alerts, including fans and power supplies
- Diagnostic alerts, such as POST completion failure on a server

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.

## Configuring 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>create profile <i>profile-name</i></b>	Enters monitoring call home profile mode.
<b>Step 4</b>	UCS-A /monitoring/callhome/profile # <b>set level {critical   debug   disaster   fatal   major   minor   normal   notification   warning}</b>	Specifies the event level for the profile. Each profile can have its own unique event level. Cisco UCS faults that are greater than or equal to the event level will trigger this profile.
<b>Step 5</b>	UCS-A /monitoring/callhome/profile # <b>set alertgroups <i>group-name</i></b> <ul style="list-style-type: none"><li>• <b>ciscotac</b></li><li>• <b>diagnostic</b></li><li>• <b>environmental</b></li><li>• <b>inventory</b></li><li>• <b>license</b></li><li>• <b>lifecycle</b></li><li>• <b>linecard</b></li><li>• <b>supervisor</b></li><li>• <b>syslogport</b></li><li>• <b>system</b></li><li>• <b>test</b></li></ul>	Specifies one or more groups that are alerted based on the profile. The <i>group-name</i> argument can be one or more of the following keywords entered on the same command line:
<b>Step 6</b>	UCS-A /monitoring/callhome/profile # <b>add alertgroups <i>group-names</i></b>	(Optional) Adds one or more groups to the existing list of groups that are alerted based on the Call Home profile.

	<b>Command or Action</b>	<b>Purpose</b>
		<b>Note</b> You must use the <b>add alertgroups</b> command to add more alert groups to the existing alert group list. Using the <b>set alertgroups</b> command will replace any pre-existing alert groups with a new group list.
<b>Step 7</b>	UCS-A /monitoring/callhome/profile # <b>set format {shorttxt   xml}</b>	Specifies the formatting method to use for the e-mail messages.
<b>Step 8</b>	UCS-A /monitoring/callhome/profile # <b>set maxsize <i>id-num</i></b>	Specifies the maximum size (in characters) of the email message.
<b>Step 9</b>	UCS-A /monitoring/callhome/profile # <b>create destination <i>email-addr</i></b>	Specifies the email address to which Call Home alerts should be sent. Use multiple <b>create destination</b> commands in monitoring call home profile mode to specify multiple email recipients. Use the <b>delete destination</b> command in monitoring call home profile mode to delete a specified email recipient.
<b>Step 10</b>	UCS-A /monitoring/callhome/profile/destination # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures a Call Home profile and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring* # scope callhome
UCS-A /monitoring/callhome* # create profile TestProfile
UCS-A /monitoring/callhome/profile* # set level normal
UCS-A /monitoring/callhome/profile* # set alertgroups test diagnostic
UCS-A /monitoring/callhome/profile* # set format xml
UCS-A /monitoring/callhome/profile* # set maxsize 100000
UCS-A /monitoring/callhome/profile* # create destination admin@MyCompany.com
UCS-A /monitoring/callhome/profile/destination* # commit-buffer
UCS-A /monitoring/callhome/profile/destination #
```

## Deleting a Call Home Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>delete profile <i>profile-name</i></b>	Deletes the specified profile.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /monitoring/callhome# <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the Call Home profile named TestProfile and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # delete profile TestProfile
UCS-A /monitoring/callhome* # commit-buffer
UCS-A /monitoring/callhome #
```

## Sending a Test Call Home Alert

### Before You Begin

Configure Call Home and a Call Home Profile

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # send-test-alert {[alert-group {diagnostic   environmental}] [alert-level {critical   debug   fatal   major   minor   normal   notify   warning}] [alert-message-type {conf   diag   env   inventory   syslog   test}] [alert-message-subtype {delta   full   goldmajor   goldminor   goldnormal   major   minor   nosubtype   test}] [alert-description description]}}	<p>Sends a test Call Home alert. The test Call Home alert must specify all <b>alert-*</b> parameters or Cisco UCS Manager cannot generate the test message. The <b>alert-*</b> parameters include the following :</p> <ul style="list-style-type: none"> <li>• <b>alert-description</b>—Alert description</li> <li>• <b>alert-group</b>—Alert group</li> <li>• <b>alert-level</b>—Event severity level</li> <li>• <b>alert-message-type</b>—Message type</li> <li>• <b>alert-message-subtype</b>—Message subtype</li> </ul> <p>When a test Call Home alert is sent, Call Home responds as it would to any other alert and delivers it to the configured destination email addresses.</p>

The following example sends a test Call Home alert to the configured destination email address of the environmental alert group:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # send-test-alert alert-description "This is a test alert"
alert-group diagnostic alert-level critical alert-message-subtype
```

```
major alert-message-type diag
```

# 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.

By default, Cisco UCS sends Call Home alerts for each of the following types of faults and system events:

- **association-failed**
- **configuration-failure**
- **connectivity-problem**
- **election-failure**
- **equipment-inaccessible**
- **equipment-inoperable**
- **equipment-problem**
- **fru-problem**
- **identity-unestablishable**
- **link-down**
- **management-services-failure**
- **management-services-unresponsive**
- **power-problem**
- **thermal-problem**
- **unspecified**
- **version-incompatible**
- **voltage-problem**

## Configuring a Call Home Policy



**Tip**

---

By default, email alerts are sent for all critical system events. However, you can optionally configure Call Home policies to enable or disable sending email alerts for other critical system events.

---

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>create policy {equipment-inoperable   fru-problem   identity-unestablishable   thermal-problem   voltage-problem}</b>	Creates the specified policy and enters monitoring call home policy mode.
<b>Step 4</b>	UCS-A /monitoring/callhome/policy # <b>{disabled   enabled}</b>	Disables or enables the sending of email alerts for the specified policy.
<b>Step 5</b>	UCS-A /monitoring/callhome/policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example creates a Call Home policy that disables the sending of email alerts for system events pertaining to voltage problems and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring* # scope callhome
UCS-A /monitoring/callhome* # create policy voltage-problem
UCS-A /monitoring/callhome/policy* # disabled
UCS-A /monitoring/callhome/policy* # commit-buffer
UCS-A /monitoring/callhome/policy #
```

## Disabling a Call Home Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>scope policy {equipment-inoperable   fru-problem   identity-unestablishable   thermal-problem   voltage-problem}</b>	Enters monitoring call home policy mode for the specified policy.
<b>Step 4</b>	UCS-A /monitoring/callhome/policy # <b>disable</b>	Disables the specified policy.
<b>Step 5</b>	UCS-A /monitoring/callhome/policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example disables the Call Home policy named voltage-problem and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # scope policy voltage-problem
UCS-A /monitoring/callhome/policy # disable
UCS-A /monitoring/callhome/policy* # commit-buffer
UCS-A /monitoring/callhome/policy #
```

## Enabling a Call Home Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>scope policy {equipment-inoperable   fru-problem   identity-unestablishable   thermal-problem   voltage-problem}</b>	Enters monitoring call home policy mode for the specified policy.
<b>Step 4</b>	UCS-A /monitoring/callhome/policy # <b>enable</b>	Enables the specified policy.
<b>Step 5</b>	UCS-A /monitoring/callhome/policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example enables the Call Home policy named voltage-problem and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # scope policy voltage-problem
UCS-A /monitoring/callhome/policy # enable
UCS-A /monitoring/callhome/policy* # commit-buffer
UCS-A /monitoring/callhome/policy #
```

## Deleting a Call Home Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>delete policy {equipment-inoperable   fru-problem   identity-unestablishable   thermal-problem   voltage-problem}</b>	Deletes the specified policy

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 4</b>	UCS-A /monitoring/callhome # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example deletes the Call Home policy named voltage-problem and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # scope callhome
UCS-A /monitoring/callhome # delete policy voltage-problems
UCS-A /monitoring/callhome* # commit-buffer
UCS-A /monitoring/callhome #
```

## Example: Configuring Call Home for Smart Call Home

### Configuring Smart Call Home

#### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope callhome</b>	Enters monitoring call home mode.
<b>Step 3</b>	UCS-A /monitoring/callhome # <b>enable</b>	Enables Call Home.
<b>Step 4</b>	UCS-A /monitoring/callhome # <b>set contact name</b>	Specifies the name of the main Call Home contact person.
<b>Step 5</b>	UCS-A /monitoring/callhome # <b>set email email-addr</b>	Specifies the email address of the main Call Home contact person.
<b>Step 6</b>	UCS-A /monitoring/callhome # <b>set phone-contact phone-num</b>	Specifies the phone number of the main Call Home contact person. The phone number must be in international format, starting with a + (plus sign) and a country code.
<b>Step 7</b>	UCS-A /monitoring/callhome # <b>set street-address street-addr</b>	Specifies the street address of the main Call Home contact person.
<b>Step 8</b>	UCS-A /monitoring/callhome # <b>set customer-id id-num</b>	Specifies the CCO identification number that includes the contract numbers for the support contract in its entitlements. The number can be up to 255 alphanumeric characters in free format.
<b>Step 9</b>	UCS-A /monitoring/callhome # <b>set contract-id id-num</b>	Specifies the contract identification number from the service agreement. The number can be up to 255 alphanumeric characters in free format.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 10</b>	UCS-A /monitoring/callhome # <b>set site-id</b> <i>id-num</i>	Specifies the site identification number from the service agreement. The number can be up to 255 alphanumeric characters in free format.
<b>Step 11</b>	UCS-A /monitoring/callhome # <b>set from-email</b> <i>email-addr</i>	Specifies the email address to use for the From field in Call Home messages.
<b>Step 12</b>	UCS-A /monitoring/callhome # <b>set reply-to-email</b> <i>email-addr</i>	Specifies the email address to use for the Reply To field in Call Home messages.
<b>Step 13</b>	UCS-A /monitoring/callhome # <b>set hostname</b> { <i>hostname</i>   <i>ip-addr</i> }	Specifies the hostname or IP address of the SMTP server that Call Home uses to send email messages.
<b>Step 14</b>	UCS-A /monitoring/callhome # <b>set port</b> <i>port-num</i>	Specifies the SMTP server port that Call Home uses to send email messages. Valid port numbers are 1 to 65535.
<b>Step 15</b>	UCS-A /monitoring/callhome # <b>set throttling</b> { <b>off</b>   <b>on</b> }	Enables or disables Call Home throttling. When enabled, throttling prevents too many Call Home email messages from being sent for the same event. By default, throttling is enabled.
<b>Step 16</b>	UCS-A /monitoring/callhome # <b>set urgency</b> { <b>alerts</b>   <b>critical</b>   <b>debugging</b>   <b>emergencies</b>   <b>errors</b>   <b>information</b>   <b>notifications</b>   <b>warnings</b> }	Specifies the urgency level for Call Home email messages.
<b>Step 17</b>	UCS-A /monitoring/callhome # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures Call Home and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring* # scope callhome
UCS-A /monitoring/callhome* # enable
UCS-A /monitoring/callhome* # set contact "Steve Jones"
UCS-A /monitoring/callhome* # set email admin@MyCompany.com
UCS-A /monitoring/callhome* # set phone-contact +1-001-408-555-1234
UCS-A /monitoring/callhome* # set street-address "123 N. Main Street, Anytown, CA, 99885"
UCS-A /monitoring/callhome* # set customer-id 1234567
UCS-A /monitoring/callhome* # set contract-id 99887766
UCS-A /monitoring/callhome* # set site-id 5432112
UCS-A /monitoring/callhome* # set from-email person@MyCompany.com
UCS-A /monitoring/callhome* # set reply-to-email person@MyCompany.com
UCS-A /monitoring/callhome* # set hostname 192.168.100.12
UCS-A /monitoring/callhome* # set port 25
UCS-A /monitoring/callhome* # set throttling on
UCS-A /monitoring/callhome* # set urgency information
UCS-A /monitoring/callhome* # commit-buffer
UCS-A /monitoring/callhome #
```

## What to Do Next

Continue to "[Configuring the Default Cisco TAC-1 Profile, on page 561](#)" to configure a Call Home profile for use with Smart Call Home.

## 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

### Before You Begin

Complete the "[Configuring Smart Call Home, on page 559](#)" section.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A /monitoring/callhome # <b>scope profile CiscoTac-1</b>	Enters monitoring call home profile mode for the default Cisco TAC-1 profile.
<b>Step 2</b>	UCS-A /monitoring/callhome/profile # <b>set level normal</b>	Specifies the <b>normal</b> event level for the profile.
<b>Step 3</b>	UCS-A /monitoring/callhome/profile # <b>set alertgroups ciscotac</b>	Specifies the <b>ciscotac</b> alert group for the profile.
<b>Step 4</b>	UCS-A /monitoring/callhome/profile # <b>set format xml</b>	Specifies the e-mail message format to <b>xml</b> .
<b>Step 5</b>	UCS-A /monitoring/callhome/profile # <b>set maxsize 5000000</b>	Specifies the maximum size of <b>5000000</b> for email messages.
<b>Step 6</b>	UCS-A /monitoring/callhome/profile # <b>create destination callhome@cisco.com</b>	Specifies the email recipient to <b>callhome@cisco.com</b> .
<b>Step 7</b>	UCS-A /monitoring/callhome/profile/destination # <b>exit</b>	Exits to monitoring call home profile mode.
<b>Step 8</b>	UCS-A /monitoring/callhome/profile # <b>exit</b>	Exits to monitoring call home mode.

The following example configures the default Cisco TAC-1 profile for use with Smart Call Home:

```
UCS-A /monitoring/callhome* # scope profile CiscoTac-1
UCS-A /monitoring/callhome/profile* # set level normal
UCS-A /monitoring/callhome/profile* # set alertgroups ciscotac
UCS-A /monitoring/callhome/profile* # set format xml
UCS-A /monitoring/callhome/profile* # set maxsize 5000000
UCS-A /monitoring/callhome/profile* # create destination callhome@cisco.com
UCS-A /monitoring/callhome/profile/destination* # exit
UCS-A /monitoring/callhome/profile* # exit
UCS-A /monitoring/callhome* #
```

## What to Do Next

Continue to "[Configuring a System Inventory Message for Smart Call Home, on page 562](#)" to configure system inventory messages for use with Smart Call Home.

# Configuring a System Inventory Message for Smart Call Home

## Before You Begin

Complete the "[Configuring the Default Cisco TAC-1 Profile, on page 561](#)" section.

## Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A /monitoring/callhome # <b>scope inventory</b>	Enters monitoring call home inventory mode.
<b>Step 2</b>	UCS-A /monitoring/callhome/inventory # <b>set send-periodically {off   on}</b>	Enables or disables the sending of inventory messages. When the <b>on</b> keyword is specified, inventory messages are automatically sent to the Call Home database.
<b>Step 3</b>	UCS-A /monitoring/callhome/inventory # <b>set interval-days <i>interval-num</i></b>	Specifies the time interval (in days) at which inventory messages will be sent.
<b>Step 4</b>	UCS-A /monitoring/callhome/inventory # <b>set timeofday-hour <i>hour</i></b>	Specifies the hour (using 24-hour format) that inventory messages are sent.
<b>Step 5</b>	UCS-A /monitoring/callhome/inventory # <b>set timeofday-minute <i>minute</i></b>	Specifies the number of minutes after the hour that inventory messages are sent.
<b>Step 6</b>	UCS-A /monitoring/callhome/inventory # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example configures Call Home system inventory messages and commits the transaction:

```
UCS-A /monitoring/callhome* # scope inventory
UCS-A /monitoring/callhome/inventory* # set send-periodically on
UCS-A /monitoring/callhome/inventory* # set interval-days 15
UCS-A /monitoring/callhome/inventory* # set timeofday-hour 21
UCS-A /monitoring/callhome/inventory* # set timeofday-minute 30
UCS-A /monitoring/callhome/inventory* # commit-buffer
UCS-A /monitoring/callhome/inventory #
```

## What to Do Next

Continue to "[Registering Smart Call Home, on page 563](#)" to send an inventory message that starts the Smart Call Home registration process.

## Registering Smart Call Home

### Before You Begin

Complete the "[Configuring a System Inventory Message for Smart Call Home, on page 562](#)" section.

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A /monitoring/callhome/inventory # <b>send</b>	Sends the system inventory message to the Smart Call Home database.  When Cisco receives the system inventory, a Smart Call Home registration email is sent to the email address that you configured as the email address for the main Smart Call Home contact .

The following example sends the system inventory message to the Smart Call Home database:

```
UCS-A /monitoring/callhome/inventory # send
```

### What to Do Next

When you receive the registration email from Cisco, do the following to complete registration for Smart Call Home:

- 1 Click the link in the email.

The link opens the [Cisco Smart Call Home portal](#) in your web browser.

- 2 Log into the Cisco Smart Call Home portal.

- 3 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 instance is complete.





# CHAPTER 46

## Managing the System Event Log

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This chapter includes the following sections:

- [System Event Log, page 565](#)
- [Viewing the System Event Log for a Server, page 566](#)
- [Configuring the SEL Policy, page 567](#)
- [Backing Up the System Event Log for a Server, page 569](#)
- [Clearing the System Event Log for a Server, page 570](#)

### 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.

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 a Server

## Viewing the System Event Log from Exec Mode

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>show sel <i>chassis-id / blade-id</i></b>	Displays the system event log for the specified server.

The following example displays the system event log from Exec mode for blade 3 in chassis 1.

```
UCS-A# show sel 1/3
  1 | 01/01/1970 01:23:27 | System Event 0x83 | Timestamp clock synch | SEL timestamp
clock updated, event is f
irst of pair | Asserted
  2 | 01/01/1970 01:23:28 | Drive slot(Bay) SAS0_LINK_STATUS | Transition to Degraded |
Asserted
  3 | 01/01/1970 01:23:28 | Drive slot(Bay) SAS0_LINK_STATUS | Transition to On Line |
Deasserted
  4 | 01/01/1970 01:23:28 | Platform alert LED_SAS0_FAULT | LED is blinking fast |
Asserted
  5 | 01/01/1970 01:23:28 | Platform alert LED_SAS0_FAULT | LED is on | Deasserted
  6 | 01/01/1970 01:23:28 | Platform alert LED_FPID | LED is on | Asserted
  7 | 01/01/1970 01:23:28 | Platform alert LED_FPID | LED is off | Deasserted
  8 | 01/01/1970 01:23:29 | Entity presence MAIN_POWER | Device Absent | Asserted
  9 | 01/01/1970 01:23:29 | Entity presence MAIN_POWER | Device Present | Deasserted
 a | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED is on | Asserted
 b | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED color is green | Asserted

  c | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED is blinking fast |
Deasserted
  d | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED color is amber | Deasserted
      e | 01/01/1970 00:00:22 | Drive slot(Bay) SAS0_LINK_STATUS | Transition to Degraded |
Asserted
      f | 01/01/1970 00:00:22 | Entity presence MEZZ_PRS | Device Present | Asserted
  10 | 01/01/1970 00:00:22 | Entity presence HDD1_PRS | Device Absent | Asserted
```

## Viewing the System Event Log from Chassis Server Mode

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server <i>chassis-id / blade-id</i></b>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>show sel</b>	Displays the system event log.

The following example displays the system event log from chassis server mode for blade 3 in chassis 1.

```
UCS-A# scope server 1/3
UCS-A /chassis/server # show sel
  1 | 01/01/1970 01:23:27 | System Event 0x83 | Timestamp clock synch | SEL timestamp
clock updated, event is f
irst of pair | Asserted
  2 | 01/01/1970 01:23:28 | Drive slot(Bay) SAS0_LINK_STATUS | Transition to Degraded |
Asserted
  3 | 01/01/1970 01:23:28 | Drive slot(Bay) SAS0_LINK_STATUS | Transition to On Line |
Deasserted
  4 | 01/01/1970 01:23:28 | Platform alert LED_SAS0_FAULT | LED is blinking fast |
Asserted
  5 | 01/01/1970 01:23:28 | Platform alert LED_SAS0_FAULT | LED is on | Deasserted
  6 | 01/01/1970 01:23:28 | Platform alert LED_FPID | LED is on | Asserted
  7 | 01/01/1970 01:23:28 | Platform alert LED_FPID | LED is off | Deasserted
  8 | 01/01/1970 01:23:29 | Entity presence MAIN_POWER | Device Absent | Asserted
  9 | 01/01/1970 01:23:29 | Entity presence MAIN_POWER | Device Present | Deasserted
  a | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED is on | Asserted
  b | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED color is green | Asserted
  c | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED is blinking fast |
Deasserted
  d | 01/01/1970 01:23:29 | Platform alert LED_SAS0_FAULT | LED color is amber | Deasserted
  e | 01/01/1970 00:00:22 | Drive slot(Bay) SAS0_LINK_STATUS | Transition to Degraded |
Asserted
  f | 01/01/1970 00:00:22 | Entity presence MEZZ_PRS | Device Present | Asserted
  10 | 01/01/1970 00:00:22 | Entity presence HDD1_PRS | Device Absent | Asserted
```

## Configuring the SEL Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>scope ep-log-policy sel</b>	Enters organization endpoint log policy mode and scopes the SEL policy.
<b>Step 3</b>	UCS-A /org/ep-log-policy# <b>set description</b> <i>description</i>	(Optional) Provides a description for the policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/ep-log-policy# <b>set backup action</b> {log-full} [on-change-of-association] [on-clear] [timer] [none]	Specifies an action or actions that will trigger a backup operation.
<b>Step 5</b>	UCS-A /org/ep-log-policy# <b>set backup clear-on-backup</b> {no   yes}	Specifies whether to clear the system event log after a backup operation occurs.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 6</b>	UCS-A /org/ep-log-policy # <b>set backup destination</b> <i>URL</i>	<p>Specifies the protocol, user, password, remote hostname, and remote path for the backup operation. Depending on the protocol used, specify the URL using one of the following syntax:</p> <ul style="list-style-type: none"> <li>• <b>ftp:// username@hostname / path</b></li> <li>• <b>scp:// username @ hostname / path</b></li> <li>• <b>sftp:// username @ hostname / path</b></li> <li>• <b>tftp:// hostname : port-num / path</b></li> </ul> <p><b>Note</b> You can also specify the backup destination by using the <b>set backup hostname</b>, <b>set backup password</b>, <b>set backup protocol</b>, <b>set backup remote-path</b>, <b>set backup user</b> commands, or by using the <b>set backup destination</b> command. Use either method to specify the backup destination.</p>
<b>Step 7</b>	UCS-A /org/ep-log-policy # <b>set backup format</b> { <i>ascii</i>   <i>binary</i> }	Specifies the format for the backup file.
<b>Step 8</b>	UCS-A /org/ep-log-policy # <b>set backup hostname</b> { <i>hostname</i>   <i>ip-addr</i> }	Specifies the hostname or IP address of the remote server.
<b>Step 9</b>	UCS-A /org/ep-log-policy # <b>set backup interval</b> { <b>1-hour</b>   <b>2-hours</b>   <b>4-hours</b>   <b>8-hours</b>   <b>24-hours</b>   <b>never</b> }	Specifies the time interval for the automatic backup operation. Specifying the <b>never</b> keyword means that automatic backups will not be made.
<b>Step 10</b>	UCS-A /org/ep-log-policy # <b>set backup password</b> <i>password</i>	Specifies the password for the username. This step does not apply if the TFTP protocol is used.
<b>Step 11</b>	UCS-A /org/ep-log-policy # <b>set backup protocol</b> { <b>ftp</b>   <b>scp</b>   <b>sftp</b>   <b>tftp</b> }	Specifies the protocol to use when communicating with the remote server.
<b>Step 12</b>	UCS-A /org/ep-log-policy # <b>set backup remote-path</b> <i>path</i>	Specifies the path on the remote server where the backup file is to be saved.
<b>Step 13</b>	UCS-A /org/ep-log-policy # <b>set backup user</b> <i>username</i>	Specifies the username the system should use to log in to the remote server. This step does not apply if the TFTP protocol is used.
<b>Step 14</b>	UCS-A /org/ep-log-policy # <b>commit-buffer</b>	Commits the transaction.

The following example configures the SEL policy to back up the system event log (in ascii format) every 24 hours or when the log is full and clear the system event log after a backup operation occurs and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ep-log-policy sel
UCS-A /org/ep-log-policy # set backup destination scp://user@192.168.1.10/logs
Password:
UCS-A /org/ep-log-policy* # set backup action log-full
UCS-A /org/ep-log-policy* # set backup clear-on-backup yes
UCS-A /org/ep-log-policy* # set backup format ascii
UCS-A /org/ep-log-policy* # set backup interval 24-hours
UCS-A /org/ep-log-policy* # commit-buffer
UCS-A /org/ep-log-policy #
```

## Backing Up the System Event Log for a Server

### Backing Up the System Event Log from Exec Mode

#### 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A /chassis/server # <b>backup sel chassis-id / blade-id</b>	Clears the system event log.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction.

The following example backs up the system event log from exec mode for blade 3 in chassis 1 and commits the transaction.

```
UCS-A# backup sel 1/3
UCS-A* # commit-buffer
UCS-A#
```

### Backing Up the System Event Log from Chassis Server Mode

#### 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / blade-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>backup sel</b>	Clears the system event log.
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction.

The following example backs up the system event log from chassis server mode for blade 3 in chassis 1 and commits the transaction.

```
UCS-A# scope server 1/3
UCS-A /chassis/server # backup sel
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Clearing the System Event Log for a Server

### Clearing the System Event Log from Exec Mode

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>clear sel</b> <i>chassis-id / blade-id</i>	Clears the system event log.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction.

The following example clears the system event log from Exec mode for blade 3 in chassis 1 and commits the transaction:

```
UCS-A# clear sel 1/3
UCS-A* # commit-buffer
UCS-A#
```

### Clearing the System Event Log from Chassis Server Mode

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / blade-id</i>	Enters chassis server mode for the specified server.

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 2</b>	UCS-A /chassis/server # <b>clear sel</b>	Clears the system event log.
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction.

The following example clears the system event log from chassis server mode for blade 3 in chassis 1 and commits the transaction:

```
UCS-A# scope server 1/3
UCS-A /chassis/server # clear sel
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```





# CHAPTER 47

## Configuring Settings for Faults, Events, and Logs

This chapter includes the following sections:

- [Configuring Settings for the Fault Collection Policy, page 573](#)
- [Configuring Settings for the Core File Exporter, page 574](#)
- [Configuring the Syslog, page 576](#)

### Configuring Settings for the Fault Collection Policy

#### Fault Collection Policy

The fault collection policy controls the lifecycle of a fault in a Cisco UCS instance, 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 is cleared if the time between the fault being raised and the condition being cleared is greater than the flapping interval, otherwise, the fault remains raised but its status changes to soaking-clear. 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 fault collection policy.
- 3 If the condition reoccurs during the flapping interval, the fault remains raised and its status changes to flapping. If the condition does not reoccur during the flapping interval, the fault is cleared.
- 4 When a fault is cleared, it is deleted if the clear action is set to delete, or if the fault was previously acknowledged; otherwise, it is retained until either the retention interval expires, or if the fault is acknowledged.
- 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 Fault Collection Policy

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope fault policy</b>	Enters monitoring fault policy mode.
<b>Step 3</b>	UCS-A /monitoring/fault-policy # <b>set clear-action {delete   retain}</b>	Specifies whether to retain or delete all cleared messages. If the <b>retain</b> option is specified, then the length of time that the messages are retained is determined by the <b>set retention-interval</b> command.
<b>Step 4</b>	UCS-A /monitoring/fault-policy # <b>set flap-interval seconds</b>	Specifies the time interval (in seconds) the system waits before changing a fault state. Flapping occurs when a fault is raised and cleared several times in rapid succession. To prevent this, the system does not allow a fault to change state until the flapping interval has elapsed after the last state change. If the fault is raised again during the flapping interval, it returns to the active state, otherwise, the fault is cleared.
<b>Step 5</b>	UCS-A /monitoring/fault-policy # <b>set retention-interval {days hours minutes seconds   forever}</b>	Specifies the time interval the system retains all cleared fault messages before deleting them. The system can retain cleared fault messages forever, or for the specified number of days, hours, minutes, and seconds.
<b>Step 6</b>	UCS-A /monitoring/fault-policy # <b>commit-buffer</b>	Commits the transaction.

This example configures the fault collection policy to retain cleared fault messages for 30 days, sets the flapping interval to 10 seconds, and commits the transaction.

```
UCS-A# scope monitoring
UCS-A /monitoring # scope fault policy
UCS-A /monitoring/fault-policy # set clear-action retain
UCS-A /monitoring/fault-policy* # set flap-interval 10
UCS-A /monitoring/fault-policy* # set retention-interval 30 0 0 0
UCS-A /monitoring/fault-policy* # commit-buffer
UCS-A /monitoring/fault-policy #
```

## Configuring Settings for the Core File Exporter

### Core File Exporter

Cisco UCS Manager 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

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope sysdebug</b>	Enters monitoring system debug mode.
<b>Step 3</b>	UCS-A /monitoring/sysdebug # <b>enable core-export-target</b>	Enables the core file exporter. When the core file exporter is enabled and an error causes the server to perform a core dump, the system exports the core file via TFTP to the specified remote server.
<b>Step 4</b>	UCS-A /monitoring/sysdebug # <b>set core-export-target path <i>path</i></b>	Specifies the path to use when exporting the core file to the remote server.
<b>Step 5</b>	UCS-A /monitoring/sysdebug # <b>set core-export-target port <i>port-num</i></b>	Specifies the port number to use when exporting the core file via TFTP. The range of valid values is 1 to 65,535.
<b>Step 6</b>	UCS-A /monitoring/sysdebug # <b>set core-export-target server-description <i>description</i></b>	Provides a description for the remote server used to store the core file.
<b>Step 7</b>	UCS-A /monitoring/sysdebug # <b>set core-export-target server-name <i>hostname</i></b>	Specifies the hostname of the remote server to connect with via TFTP.
<b>Step 8</b>	UCS-A /monitoring/sysdebug # <b>commit-buffer</b>	Commits the transaction.

The following example enables the core file exporter, specifies the path and port to use when sending the core file, specifies the remote server hostname, provides a description for the remote server, and commits the transaction.

```
UCS-A# scope monitoring
UCS-A /monitoring # scope sysdebug
UCS-A /monitoring/sysdebug # enable core-export-target
UCS-A /monitoring/sysdebug* # set core-export-target path /root/CoreFiles/core
UCS-A /monitoring/sysdebug* # set core-export-target port 45000
UCS-A /monitoring/sysdebug* # set core-export-target server-description CoreFile102.168.10.10
UCS-A /monitoring/sysdebug* # set core-export-target server-name 192.168.10.10
UCS-A /monitoring/sysdebug* # commit-buffer
UCS-A /monitoring/sysdebug #
```

## Disabling the Core File Exporter

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # <b>scope sysdebug</b>	Enters monitoring system debug mode.
<b>Step 3</b>	UCS-A /monitoring/sysdebug # <b>disable core-export-target</b>	Disables the core file exporter. When the core file exporter is disabled core files are not automatically exported.
<b>Step 4</b>	UCS-A /monitoring/sysdebug # <b>commit-buffer</b>	Commits the transaction.

The following example disables the core file exporter and commits the transaction.

```
UCS-A# scope monitoring
UCS-A /monitoring # scope sysdebug
UCS-A /monitoring/sysdebug # disable core-export-target
UCS-A /monitoring/sysdebug* # commit-buffer
UCS-A /monitoring/sysdebug #
```

## Configuring the Syslog

### Procedure

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope monitoring</b>	Enters monitoring mode.
<b>Step 2</b>	UCS-A /monitoring # {enable   disable} <b>syslog console</b>	Enables or disables the sending of syslogs to the console.
<b>Step 3</b>	UCS-A /monitoring # <b>set syslog console level {emergencies   alerts   critical}</b>	(Optional) Select the lowest message level that you want displayed. If syslogs are enabled, the system displays that level and above on the console. The level options are listed in order of decreasing urgency. The default level is Critical.
<b>Step 4</b>	UCS-A /monitoring # {enable   disable} <b>syslog monitor</b>	Enables or disables the monitoring of syslog information by the operating system.
<b>Step 5</b>	UCS-A /monitoring # <b>set syslog monitor level {emergencies   alerts   critical   errors   warnings   notifications   information   debugging}</b>	(Optional) Select the lowest message level that you want displayed. If the monitor state is enabled, the system displays that level and above. The level options are

	<b>Command or Action</b>	<b>Purpose</b>
		listed in order of decreasing urgency. The default level is Critical.  <b>Note</b> Messages at levels below Critical are displayed on the terminal monitor only if you have entered the <b>terminal monitor</b> command.
<b>Step 6</b>	UCS-A /monitoring # {enable   disable} <b>syslog file</b>	Enables or disables the writing of syslog information to a syslog file.
<b>Step 7</b>	UCS-A /monitoring # <b>set syslog file name</b> <i>filename</i>	The name of the file in which the messages are logged. Up to 16 characters are allowed in the file name.
<b>Step 8</b>	UCS-A /monitoring # <b>set syslog file level</b> {emergencies   alerts   critical   errors   warnings   notifications   information   debugging}	(Optional) Select the lowest message level that you want stored to a file. If the file state is enabled, the system stores that level and above in the syslog file. The level options are listed in order of decreasing urgency. The default level is Critical.
<b>Step 9</b>	UCS-A /monitoring # <b>set syslog file size</b> <i>filesize</i>	(Optional) The maximum file size, in bytes, before the system begins to write over the oldest messages with the newest ones. The range is 4096 to 4194304 bytes.
<b>Step 10</b>	UCS-A /monitoring # {enable   disable} <b>syslog remote-destination</b> {server-1   server-2   server-3}	Enables or disables the sending of syslog messages to up to three external syslog servers.
<b>Step 11</b>	UCS-A /monitoring # <b>set syslog remote-destination</b> {server-1   server-2   server-3} <b>level</b> {emergencies   alerts   critical   errors   warnings   notifications   information   debugging}	(Optional) Select the lowest message level that you want stored to the external log. If the remote-destination is enabled, the system sends that level and above to the external server. The level options are listed in order of decreasing urgency. The default level is Critical.
<b>Step 12</b>	UCS-A /monitoring # <b>set syslog remote-destination</b> {server-1   server-2   server-3} <b>hostname</b> <i>hostname</i>	The hostname or IP address of the specified remote syslog server. Up to 256 characters are allowed in the hostname.
<b>Step 13</b>	UCS-A /monitoring # <b>set syslog remote-destination</b> {server-1   server-2   server-3} <b>facility</b> {local0   local1   local2   local3   local4   local5   local6   local7}	(Optional) The facility level contained in the syslog messages sent to the specified remote syslog server.
<b>Step 14</b>	UCS-A /monitoring # <b>commit-buffer</b>	Commits the transaction.

This example shows how to enable the storage of syslog messages in a local file and commits the transaction:

```
UCS-A# scope monitoring
UCS-A /monitoring # disable syslog console
```

```
UCS-A /monitoring* # disable syslog monitor
UCS-A /monitoring* # enable syslog file
UCS-A /monitoring* # set syslog file name SysMsgsUCSA
UCS-A /monitoring* # set syslog file level notifications
UCS-A /monitoring* # set syslog file size 4194304
UCS-A /monitoring* # disable syslog remote-destination server-1
UCS-A /monitoring* # disable syslog remote-destination server-2
UCS-A /monitoring* # disable syslog remote-destination server-3
UCS-A /monitoring* # commit-buffer
UCS-A /monitoring #
```



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