Cisco UCS C-Series Servers Integrated Management Controller CLI Configuration Guide, Release 4.2

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APPENDIX A

Preface

Audience

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

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

Conventions

Text Type	Indication
GUI elements	GUI elements such as tab titles, area names, and field labels appear in **this font**. Main titles such as window, dialog box, and wizard titles appear in **this font**.
Document titles	Document titles appear in *this font*.
TUI elements	In a Text-based User Interface, text the system displays appears in `this font`.
System output	Terminal sessions and information that the system displays appear in `this font`.
CLI commands	CLI command keywords appear in **this font**. Variables in a CLI command appear in *this font*.
[ ]	Elements in square brackets are optional.

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

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

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

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

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

Warning IMPORTANT SAFETY INSTRUCTIONS

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

SAVE THESE INSTRUCTIONS

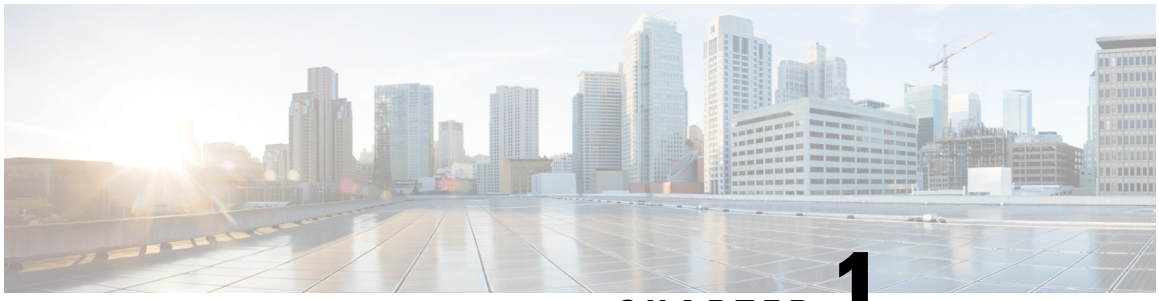
Related Cisco UCS Documentation

Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/overview/guide/UCS_roadmap.html

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/overview/guide/ucs_rack_roadmap.html.

For information on supported firmware versions and supported UCS Manager versions for the rack servers that are integrated with the UCS Manager for management, refer to Release Bundle Contents for Cisco UCS Software.



CHAPTER 1

Overview

This chapter includes the following sections:

Overview of the Cisco UCS C-Series Rack-Mount Servers

The Cisco UCS C-Series rack-mount servers include the following models:

- Cisco UCS C220 M7 Rack-Mount Server
- Cisco UCS C240 M7 Rack-Mount Server
- Cisco UCS C220 M6 Rack-Mount Server
- Cisco UCS C240 M6 Rack-Mount Server
- Cisco UCS C225 M6 Rack-Mount Server
- Cisco UCS C245 M6 Rack-Mount Server
- Cisco UCS C240 SD M5 Rack-Mount Server
- Cisco UCS C125 Rack-Mount Server
- Cisco UCS C220 M5 Rack-Mount Server
- Cisco UCS C240 M5 Rack-Mount Server
- Cisco UCS C480 M5 Rack-Mount Server
- Cisco UCS C220 M4 Rack-Mount Server
- Cisco UCS C240 M4 Rack-Mount Server
- Cisco UCS C460 M4 Rack-Mount Server

Note To determine which Cisco UCS C-Series rack-mount servers are supported by this firmware release, see the associated *Release Notes*. The C-Series release notes are available at the following URL: http://www.cisco.com/en/US/products/ps10739/prod_release_notes_list.html

Overview of the Server Software

The Cisco UCS C-Series Rack-Mount Server ships with the Cisco IMC firmware.

Cisco IMC Firmware

Cisco IMC is a separate management module built into the motherboard. A dedicated ARM-based processor, separate from the main server CPU, runs the Cisco IMC firmware. The system ships with a running version of the Cisco IMC firmware. You can update the Cisco IMC firmware, but no initial installation is needed.

Server OS

The Cisco UCS C-Series rack servers support operating systems such as Windows, Linux, Oracle and so on. For more information on supported operating systems, see the *Hardware and Software Interoperability for Standalone C-series servers* at http://www.cisco.com/en/US/products/ps10477/prod_technical_reference_list.html. You can use Cisco IMC to install an OS on the server using the KVM console and vMedia.

Server Ports

Following is a list of server ports and their default port numbers:

Table 1: Server Ports

Port Name	Port Number
LDAP Port 1	389
LDAP Port 2	389
LDAP Port 3	389
LDAP Port 4	3268
LDAP Port 5	3268
LDAP Port 6	3268
SSH Port	22
HTTP Port	80
HTTPS Port	443
SMTP Port	25

Port Name	Port Number
KVM Port	2068
Intersight Management Port	8889
Intersight Cloud Port	8888
SOL SSH Port	2400
SNMP Port	161
SNMP Traps	162
External Syslog	514

Cisco Integrated Management Controller

The Cisco IMC is the management service for the C-Series servers. Cisco IMC runs within the server.

Note The Cisco IMC management service is used only when the server is operating in Standalone Mode. If your C-Series server is integrated into a UCS system, you must manage it using UCS Manager. For information about using UCS Manager, see the configuration guides listed in the *Cisco UCS B-Series Servers Documentation Roadmap* at http://www.cisco.com/go/unifiedcomputing/b-series-doc.

Management Interfaces

You can use a web-based GUI or SSH-based CLI or an XML-based API to access, configure, administer, and monitor the server. Almost all tasks can be performed in either interface, and the results of tasks performed in one interface are displayed in another. However, you cannot do the following:

- Use Cisco IMC GUI to invoke Cisco IMC CLI
- View a command that has been invoked through Cisco IMC CLI in Cisco IMC GUI
- Generate Cisco IMC CLI output from Cisco IMC GUI

Tasks You Can Perform in Cisco IMC

You can use Cisco IMC to perform the following server management tasks:

- Power on, power off, power cycle, reset and shut down the server
- Toggle the locator LED
- Configuring BIOS settings
- Configure the server boot order
- View server properties and sensors
- Manage remote presence

- Create and manage local user accounts, and enable remote user authentication through Active Directory
- Configure network-related settings, including NIC properties, IPv4, VLANs, and network security
- Configure communication services, including HTTP, SSH, IPMI Over LAN, and SNMP.
- Manage certificates
- Configure platform event filters
- Update Cisco IMC firmware
- Monitor faults, alarms, and server status
- Set time zone and view local time
- Install and activate Cisco IMC firmware
- Install and activate BIOS firmware

No Operating System or Application Provisioning or Management

Cisco IMC 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 IMC user accounts
- Configure or manage external storage on the SAN or NAS storage

Cisco IMC CLI

The Cisco IMC CLI is a command-line management interface for Cisco UCS C-Series servers. You can launch the Cisco IMC CLI and manage the server over the network by SSH or Telnet. By default, Telnet access is disabled.

A user of the CLI will be one of three roles: admin, user (can control, cannot configure), and read-only.

Note To recover from a lost admin password, see the Cisco UCS C-Series server installation and service guide for your platform.

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 the **scope** command to move from higher-level modes to modes in the next lower level , and the **exit** command to move up one level in the mode hierarchy. The **top** command returns to the EXEC mode.

Note Most command modes are associated with managed objects. The **scope** command does 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, 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 can be an invaluable tool when you need to navigate through the hierarchy.

Command Mode Table

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

Mode Name	Command to Access	Mode Prompt
EXEC	**top** command from any mode	#
bios	**scope bios** command from EXEC mode	/bios #
advanced	**scope advanced** command from bios mode	/bios/advanced #
main	**scope main** command from bios mode	/bios/main #
server-management	**scope server-management** command from bios mode	/bios/server-management #
boot-device	**scope boot-device** command from bios mode	/bios/boot-device #
certificate	**scope certificate** command from EXEC mode	/certificate #
chassis	**scope chassis** command from EXEC mode	/chassis #
adapter	**scope adapter** *index* command from chassis mode	/chassis/adapter #

Mode Name	Command to Access	Mode Prompt
host-eth-if	**scope host-eth-if** command from adapter mode	/chassis/adapter/host-eth-if #
host-fc-if	**scope host-fc-if** command from adapter mode	/chassis/adapter/host-fc-if #
port-profiles	**scope port-profiles** command from adapter mode	/chassis/adapter/port-profiles #
dimm-summary	**scope dimm-summary** *index* command from chassis mode	/chassis/dimm-summary #
flexflash	**scope flexflash** *index* command from chassis mode	/chassis/flexflash #
operational-profiles	**scope operational-profile** command from flexflash mode	/chassis/flexflash/operational-profile #
storageadapter	**scope storageadapter** *slot* command from chassis mode	/chassis/storageadapter #
physical-drive	**scope physical-drive** command from storageadapter mode	/chassis/storageadapter/physical-drive #
virtual-drive	**scope virtual-drive** command from storageadapter mode	/chassis/storageadapter/virtual-drive #
cimc	**scope cimc** command from EXEC mode	/cimc #
firmware	**scope firmware** command from cimc mode	/cimc/firmware #
import-export	**scope import-export** command from cimc mode	/cimc/import-export #
log	**scope log** command from cimc mode	/cimc/log #
server	**scope server** *index* command from log mode	/cimc/log/server #
network	**scope network** command from cimc mode	/cimc/network #
ipblocking	**scope ipblocking** command from network mode	/cimc/network/ipblocking #
tech-support	**scope tech-support** command from cimc mode	/cimc/tech-support #
fault	**scope fault** command from EXEC mode	/fault #

Mode Name	Command to Access	Mode Prompt
pef	**scope pef** command from fault mode	/fault/pef #
http	**scope http** command from EXEC mode	/http #
ipmi	**scope ipmi** command from EXEC mode	/ipmi #
kvm	**scope kvm** command from EXEC mode	/kvm #
ldap	**scope ldap** command from EXEC mode	/ldap #
role-group	**scope role-group** command from ldap mode	/ldap/role-group #
power-cap	**scope power-cap** command from EXEC mode	/power-cap #
sel	**scope sel** command from EXEC mode	/sel #
sensor	**scope sensor** command from EXEC mode	/sensor #
snmp	**scope snmp** command from EXEC mode	/snmp #
trap-destinations	**scope trap-destinations** command from snmp mode	/snmp/trap-destinations #
v3users	**scope v3users** command from snmp mode	/snmp/v3users #
sol	**scope sol** command from EXEC mode	/sol #
ssh	**scope ssh** command from EXEC mode	/ssh #
user	**scope user** *user-number* command from EXEC mode	/user #
user-session	**scope user-session** *session-number* command from EXEC mode	/user-session #
vmedia	**scope vmedia** command from EXEC mode	/vmedia #
xmlapi	**scope xmlapi** command from EXEC mode	/xmlapi #

Mode Name	Command to Access	Mode Prompt
dimm-blacklisting	**scope dimm-blacklisting** command from EXEC mode	/dimm-blacklisting #
reset-ecc	**scope reset-ecc** command from EXEC mode	/ reset-ecc #

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 press **Enter**.

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** command. Until committed, a configuration command is pending and can be discarded by entering a **discard** command. When any command is pending, an asterisk (*) appears before the command prompt. The asterisk disappears when you enter the **commit** command, as shown in this example:

```
Server# scope chassis
Server /chassis # set locator-led off
Server /chassis *# commit
Server /chassis #
```

You can accumulate pending changes in multiple command modes and apply them together with a single **commit** 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.

Command Output Formats

Most CLI **show** commands accept an optional **detail** keyword that causes the output information to be displayed as a list rather than a table. You can configure either of two presentation formats for displaying the output information when the **detail** keyword is used. The format choices are as follows:

- Default—For easy viewing, the command output is presented in a compact list.

  This example shows command output in the default format:

```
Server /chassis # set cli output default
Server /chassis # show hdd detail
Name HDD_01_STATUS:
    Status : present
Name HDD_02_STATUS:
    Status : present
Name HDD_03_STATUS:
    Status : present
Name HDD_04_STATUS:
    Status : present

Server /chassis #
```

- YAML—For easy parsing by scripts, the command output is presented in the YAML (YAML Ain't Markup Language) data serialization language, delimited by defined character strings.

  This example shows command output in the YAML format:

```
Server /chassis # set cli output yaml
Server /chassis # show hdd detail
---
    name: HDD_01_STATUS
    hdd-status: present

---
    name: HDD_02_STATUS
    hdd-status: present

---
    name: HDD_03_STATUS
    hdd-status: present

---
    name: HDD_04_STATUS
    hdd-status: present

...

Server /chassis #
```

  For detailed information about YAML, see http://www.yaml.org/about.html.

In most CLI command modes, you can enter **set cli output default** to configure the default format, or **set cli output yaml** to configure the YAML format.

Smart Access: Serial

The Smart Access: Serial allows offline configuration of C-series servers using the command line interface (CLI) through serial connection. With this setup, you are not required to connect the Cisco IMC to the network in order to access the command line interface.

The serial connection can be accessed using either the KVM dongle (DB9), or the serial port (RJ-45) at the rear of the chassis.

Once you have completed the setup and the BIOS and OS messages are visible on the console, you can view the Cisco IMC CLI by pressing **Esc+9**. You are required to authenticate the connection with Cisco IMC user credentials. The default user name is **admin** and default password is **password**. You can press **Esc+8** to switch back to the BIOS or OS on the same console.

When the session is created, the session is visible on the Web UI sessions tab as a serial connection.

Note Note the following limitations while using the CLI through a serial connection:

- You cannot use the arrow keys to revert to previously executed commands.
- The CLI is not visible when the terminal type is set to either **VT100+** or **VTUFT8**.
- The smart access feature does not work as expected after an OS boot unless the "`console`" property in the grub configuration file of the OS is set to **ttyS0**. You must set the "`console`" property in the grub configuration file of the OS to **ttyS0** for it to work as expected.

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.

Logging In to Cisco IMC

Procedure

Step 1 Connect to the console port.

Step 2 When logging in to an unconfigured system for the first time, use **admin** as the username and **password** as the password.

The following situations occur when you login to the CLI for the first time:

- You cannot perform any operation until you change default admin credentials on the Cisco IMC web UI or CLI.

Note After an upgrade from Cisco IMC version 1.5(x) or 2.0(1) to the latest version, or when you do a factory reset, during first login Cisco IMC prompts for a password change. You cannot choose the word 'password' as your new password. If this creates problems for any scripts you may be running, you could change it to password by logging back into the user management options, but this is ENTIRELY at your own risk. It is not recommended by Cisco.

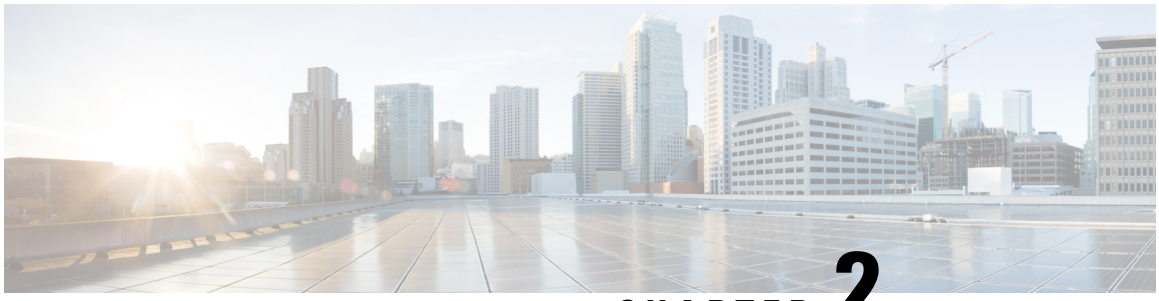
Example

The following example shows how to login in to Cisco IMC first time:

```
Login as # admin
admin10.101.255.255's password # password

**********WARNING**********
Default credentials were used for login.
Administration passwords needs to be changed for security purpose.
*************************************************************

Enter current password # abcxyz
Re-enter new password # abcxyz
Updating password...
Password updated successfully.
Server #
```



CHAPTER 2

Installing the Server OS

This chapter includes the following sections:

OS Installation Methods

C-Series servers support several operating systems. Regardless of the OS being installed, you can install it on your server using one of the following tools:

- KVM console
- PXE installation server

For more information on Cisco UCS Server Configuration Utility, see Cisco UCS Server Configuration Utility Quick Start Guide.

Virtual KVM Console

The vKVM console is an interface accessible from Cisco IMC that emulates a direct keyboard, video, and mouse (vKVM) connection to the server. The vKVM console allows you to connect to the server from a remote location.

Here are a few major advantages of using Cisco KVM Console:

- The Cisco KVM console provides connection to KVM, SOL, and vMedia whereas the Avocent KVM provides connection only to KVM and vMedia.
- In the KVM Console, the vMedia connection is established at the KVM Launch Manager and is available for all users.
- The KVM console offers you an advanced character replacement options for the unsupported characters while pasting text from the guest to the host.
- The KVM console provides you an ability to store the vMedia mappings on CIMC.

Instead of using CD/DVD or floppy drives physically connected to the server, the vKVM console uses virtual media, which are actual disk drives or disk image files that are mapped to virtual CD/DVD or floppy drives. You can map any of the following to a virtual drive:

- CD/DVD or floppy drive on your computer
- Disk image files (ISO or IMG files) on your computer
- USB flash drive on your computer
- CD/DVD or floppy drive on the network
- Disk image files (ISO or IMG files) on the network
- USB flash drive on the network

You can use the vKVM console to install an OS on the server.

Note The vKVM Console is operated only through the GUI. To launch the vKVM Console, see the instructions in the *Cisco UCS C-Series Servers Integrated Management Controller GUI Configuration Guide*.

Installing an OS Using the KVM Console

Because the KVM console is operated only through the GUI, you cannot install a server OS using the CLI. To install an OS using the KVM console, follow the instructions in the "Installing an OS Using the KVM Console" section of the *Cisco UCS C-Series Servers Integrated Management Controller GUI Configuration Guide*.

Note Detailed guides for installing Linux, VMware, and Windows can be found at this URL: http://www.cisco.com/en/US/products/ps10493/products_installation_and_configuration_guides_list.html.

PXE Installation Servers

A Preboot Execution Environment (PXE) installation server allows a client to boot and install an OS from a remote location. To use this method, a PXE environment must be configured and available on your VLAN, typically a dedicated provisioning VLAN. Additionally, the server must be set to boot from the network. When the server boots, it sends a PXE request across the network. The PXE installation server acknowledges the request, and starts a sequence of events that installs the OS on the server.

PXE servers can use installation disks, disk images, or scripts to install an OS. Proprietary disk images can also be used to install an OS, additional components, or applications.

Note PXE installation is an efficient method for installing an OS on a large number of servers. However, considering that this method requires setting up a PXE environment, it might be easier to use another installation method.

Installing an OS Using a PXE Installation Server

Before you begin

- Verify that the server can be reached over a VLAN.
- You must log in as a user with admin privileges to install an OS.

Procedure

Step 1 Set the boot order to **PXE** first.

Step 2 Reboot the server.

If a PXE install server is available on the VLAN, the installation process begins when the server reboots. PXE installations are typically automated and require no additional user input. Refer to the installation guide for the OS being installed to guide you through the rest of the installation process.

What to do next

After the OS installation is complete, reset the LAN boot order to its original setting. Always follow your OS vendors recommended configuration, including software interoperability and driver compatibility. For more information on driver recommendations and installation, follow the Cisco UCS Hardware Compatibility list here:

https://ucshcltool.cloudapps.cisco.com/public/

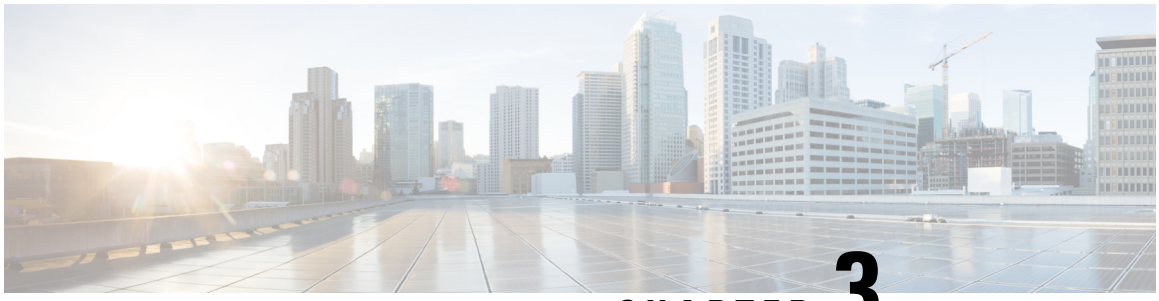
Booting an Operating System from a USB Port

All Cisco UCS C-series servers support booting an operating system from any USB port on the server. However, there are a few guidelines that you must keep in mind, prior to booting an OS from a USB port.

- To maintain the boot order configuration, it is recommended that you use an internal USB port for booting an OS.
- The USB port must be enabled prior to booting an OS from it.

  By default, the USB ports are enabled. If you have disabled a USB port, you must enable it prior to booting an OS from it. For information on enabling a disabled USB ports, see topic *Enabling or Disabling the Internal USB Port* in the server-specific installation and service guide available at the following link:

  http://www.cisco.com/en/US/products/ps10493/prod_installation_guides_list.html.
- After you boot the OS from the USB port, you must set the second-level boot order so that the server boots from that USB source every time.



CHAPTER 3

Managing the Server

This chapter includes the following sections:

Toggling the Locator LED

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **set locator-led** {**on** | **off**}	Enables or disables the chassis locator LED.

	Command or Action	Purpose
Step 3	Server /chassis # **commit**	Commits the transaction to the system configuration.

Example

This example disables the chassis locator LED and commits the transaction:

```
Server# scope chassis
Server /chassis # set locator-led off
Server /chassis *# commit

Server /chassis #
```

Toggling the Front Locator LED for the Chassis

This option is available only on some UCS C-Series servers.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **set front-locator-led** {**on** | **off**}	Enables or disables the chassis locator LED.
Step 3	Server /chassis # **commit**	Commits the transaction to the system configuration.

Example

This example disables the chassis locator LED and commits the transaction:

```
Server# scope chassis
Server /chassis # set front-locator-led off
Server /chassis *# commit

Server /chassis #
```

Toggling the Locator LED for a Hard Drive

This action is available only on some UCS C-Series servers.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server/chassis # **scope hdd**	Enters hard disk drive (HDD) command mode.
Step 3	Server /chassis/hdd # **locateHDD** *drivenum* {**1** | **2**}	Where *drivenum* is the number of the hard drive whose locator LED you want to set. A value of 1 turns the LED on while a value of 2 turns the LED off.

Example

This example turns on the locator LED on HDD 2:

```
Server# scope chassis
Server /chassis # scope hdd
Server /chassis/hdd # locateHDD 2 1
HDD Locate LED Status changed to 1
Server /chassis/hdd # show
Name                 Status               LocateLEDStatus
-------------------- -------------------- --------------------
HDD1_STATUS          present              TurnOFF
HDD2_STATUS          present              TurnON
HDD3_STATUS          absent               TurnOFF
HDD4_STATUS          absent               TurnOFF

Server /chassis/hdd #
```

Clearing Personality Configuration

Before you begin

You must log in with admin privileges to perform this task.

Procedure

Step 1 Server # **scope chassis**

Enters chassis command mode.

Step 2 Server chassis # **clear-personality**

Clears the personality configuration.

Selecting a Time Zone

Selecting a Time Zone

Selecting a time zone helps you choose a local time zone so that you can view the local time rather than the default machine time. Cisco IMC Web UI and the CLI provide you options to choose and set a time zone of your choice.

Setting the time zone to your local time will apply the time zone variable to all the services that utilize the system timing. This impacts the logging information and is utilized in the following applications of the Cisco IMC:

- Fault summary and fault history logs
- Cisco IMC log
- rsyslog

When you set a local time, the timestamp on the applications that you can view are updated with the local time that you have chosen.

Selecting a Time Zone

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope CIMC**	Enters Cisco IMC command mode.
Step 2	Server /CIMC # **timezone-select**	Displays a list of continents and oceans.
Step 3	Enter the number corresponding to your continent or ocean.	A list of all the countries or regions of the chosen continent or ocean displays.
Step 4	Enter the number corresponding to the country or region that you want to set as your time zone.	If a country or a region has more than one time zones, a list of time zones in that country or region displays.
Step 5	Enter the number corresponding to time zone.	**Is the above information OK?** message appears.
Step 6	Enter **1**.	**Continue?[y|N]**: prompt appears.
Step 7	Enter **y** if you want to set the chosen time zone.	The chosen time zone is set as the time zone for your Cisco IMC server.

Example

This example sets the time zone:

```
Server# scope CIMC
Server /CIMC # timezone-select

Please identify a location so that time zone rules can be set correctly.
Please select a continent or ocean.
1) Africa
2) Americas
3) Antarctica
4) Arctic Ocean
5) Asia
6) Atlantic Ocean
7) Australia
8) Europe
9) Indian Ocean
10) Pacific Ocean
#? 2
Please select a country whose clocks agree with yours.
1) Anguilla
2) Antigua & Barbuda
3) Argentina
4) Aruba
5) Bahamas
6) Barbados
7) Belize
8) Bolivia
9) Brazil
10) Canada
11) Caribbean Netherlands
12) Cayman Islands
13) Chile
14) Colombia
15) Costa Rica
16) Cuba
17) Curacao
18) Dominica
19) Dominican Republic
20) Ecuador
21) El Salvador
22) French Guiana
23) Greenland
24) Grenada
25) Guadeloupe
26) Guatemala
27) Guyana
28) Haiti
29) Honduras
30) Jamaica
31) Martinique
32) Mexico
33) Montserrat
34) Nicaragua
35) Panama
36) Paraguay
37) Peru
38) Puerto Rico
39) St Barthelemy
40) St Kitts & Nevis
41) St Lucia
42) St Maarten (Dutch part)
```

```
43) St Martin (French part)
44) St Pierre & Miquelon
45) St Vincent
46) Suriname
47) Trinidad & Tobago
48) Turks & Caicos Is
49) United States
50) Uruguay
51) Venezuela
52) Virgin Islands (UK)
53) Virgin Islands (US)
#? 49
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 Time - Indiana - most locations
6) Eastern Time - Indiana - Daviess, Dubois, Knox & Martin Counties
7) Eastern Time - Indiana - Pulaski County
8) Eastern Time - Indiana - Crawford County
9) Eastern Time - Indiana - Pike County
10) Eastern Time - Indiana - Switzerland County
11) Central Time
12) Central Time - Indiana - Perry County
13) Central Time - Indiana - Starke County
14) Central Time - Michigan - Dickinson, Gogebic, Iron & Menominee Counties
15) Central Time - North Dakota - Oliver County
16) Central Time - North Dakota - Morton County (except Mandan area)
17) Central Time - North Dakota - Mercer County
18) Mountain Time
19) Mountain Time - south Idaho & east Oregon
20) Mountain Standard Time - Arizona (except Navajo)
21) Pacific Time
22) Alaska Time
23) Alaska Time - Alaska panhandle
24) Alaska Time - southeast Alaska panhandle
25) Alaska Time - Alaska panhandle neck
26) Alaska Time - west Alaska
27) Aleutian Islands
28) Metlakatla Time - Annette Island
29) Hawaii
#? 8

The following information has been given:

        United States
        Eastern Time - Indiana - Crawford County

Is the above information OK?
1) Yes
2) No
#? 1

You have chosen to set timezone settings to:

        America/Indiana/Marengo

Continue?[y|N]: y
Timezone has been updated.
The local time now is: Sun Jun 1 02:21:15 2014 EST

Server /CIMC #
```

Managing the Server Boot Order

Server Boot Order

Using Cisco IMC, you can configure the order in which the server attempts to boot from available boot device types. In the legacy boot order configuration, Cisco IMC allows you to reorder the device types but not the devices within the device types. With the precision boot order configuration, you can have a linear ordering of the devices. In the web UI or CLI you can change the boot order and boot mode, add multiple devices under each device types, rearrange the boot order, set parameters for each device type.

When you change the boot order configuration, Cisco IMC sends the configured boot order to BIOS the next time that server is rebooted. To implement the new boot order, reboot the server after you make the configuration change. The new boot order takes effect on any subsequent reboot. The configured boot order remains until the configuration is changed again in Cisco IMC or in the BIOS setup.

Note The actual boot order differs from the configured boot order if either of the following conditions occur:

- BIOS encounters issues while trying to boot using the configured boot order.
- A user changes the boot order directly through BIOS.
- BIOS appends devices that are seen by the host but are not configured from the user.

Important While upgrading Cisco UCS C220 M5 or C480 M5 servers to release 4.1(1x) under the following conditions:

- if you are upgrading from any release earlier than 4.0(4x)
- if **Legacy Boot Mode** is enabled and no **Cisco IMC Boot Order** is configured
- and, if the server is booting from Cisco HWRAID adapter

then, you should perform one of the following before upgrading:

- Run XML-API scripts and UCSCFG based scripts provided here.

  OR

- Manually configure the intended boot order through Cisco IMC GUI or CLI interfaces.

Note When you create a new policy using the configure boot order feature, BIOS tries to map this new policy to the devices in the system. It displays the actual device name and the policy name to which it is mapped in the **Actual Boot Order** area. If BIOS cannot map any device to a particular policy in Cisco IMC, the actual device name is stated as **NonPolicyTarget** in the **Actual Boot Order** area.

Note During Cisco IMC 2.0(x) upgrade, the legacy boot order is migrated to the precision boot order. The previous boot order configuration is erased and all device types configured before updating to 2.0 version are converted to corresponding precision boot device types and some dummy devices are created for the same device types. you can view these devices in the **Configured Boot Order** area in the web UI. To view these devices in the CLI, enter **show boot-device** command. During this the server's actual boot order is retained and it can be viewed under actual boot order option in web UI and CLI.

When you downgrade Cisco IMC prior to 2.0(x) verison the server's last legacy boot order is retained, and the same can be viewed under **Actual Boot Order** area. For example:

- If you configured the server in a legacy boot order in 2.0(x) version, upon downgrade a legacy boot order configuration is retained.
- If you configured the server in a precision boot order in 2.0(x), upon downgrade the last configured legacy boot order is retained.

Important

- Boot order configuration prior to 2.0(x) is referred as legacy boot order. If your running version is 2.0(x), then you cannot configure legacy boot order through web UI, but you can configure through CLI and XML API. In the CLI, you can configure it by using **set boot-order HDD,PXE** command. Even though, you can configure legacy boot order through CLI or XML API, in the web UI this configured boot order is not displayed.
- Legacy and precision boot order features are mutually exclusive. You can configure either legacy or precision boot order. If you configure legacy boot order, it disables all the precision boot devices configured. If you configure precision boot order, then it erases legacy boot order configuration.

Viewing the Boot Device Detail

Note Do not change the boot order while the host is performing BIOS power-on self test (POST).

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **show boot-device** [**detail**].	Displays the detailed information of the boot device.

Example

This example displays the details of the created bootable device:

```
Server# scope bios
Server /bios # show boot-device
Boot Device          Device Type  Device State       Device Order
-------------------- ------------ ------------------ ----------------
TestUSB              USB          Enabled            1
TestPXE              PXE          Enabled            2
Server /bios # show boot-device detail
Boot Device TestUSB:
    Device Type: USB
    Device State: Enabled
    Device Order: 1
    Sub Type: HDD
Boot Device TestPXE:
    Device Type: PXE
    Device State: Enabled
    Device Order: 2
    Slot Id: L
    Port Number: 1
```

Configuring the Precision Boot Order

Note Do not change the boot order while the host is performing BIOS power-on self test (POST).

Before you begin

Beginning with release 4.1(3b), Cisco IMC supports HTTP Boot Capability. HTTP Boot is supported in UEFI Boot Mode only.

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **create-boot-device**[*device name*] [*device type*].	Creates a bootable device that BIOS chooses to boot. This can be one of the following: • **HDD**—Hard disk drive • **PXE**—PXE boot • **SAN** boot • **iSCSI** boot • **SD** Card

	Command or Action	Purpose
		Note SD card option is available only on some UCS C-Series servers. • **USB** • **Virtual Media** • **PCHStorage** • **UEFISHELL** • **HTTP**
Step 3	Server /bios # **scope boot-device** *created boot device name*.	Enters the management of the created bootable devices.
Step 4	Server /bios /boot-device # **set** *values*	Specifies the property values for particular bootable device. You can set one or more of the following: • cli— CLI options • state— Whether the device will be visible by BIOS. By default the device is disabled. **Note** If enabled, the device will overwrite the legacy boot order configuration. • slot— Slot id where the device is plugged in. • port— Port of the slot in which the device is present. • LUN— Logical unit in a slot where the device is present. • sub-type—Sub device type under a certain device type. • order—The order of the device in the available list of devices. • macaddress—MAC address of the network ethernet interface • iptype— IP type. Enter any one of the required values: IPv4 or IPv6 • ipconfig-type— Type of IP Configuration.

	Command or Action	Purpose
		Enter any one of the required values: DHCP or Static • uri— URI path where all the OS iso and EFI files are located.
Step 5	Server /bios /boot-device # **commit**	Commits the transaction to the system configuration.

Example

This example configures the boot order, creates a boot device, set the attributes of the new device and commit the transaction:

```
Server# scope bios
Server /bios #  create boot-device TestPXE PXE
Server /bios #  scope boot-device TestPXE
Server /bios /boot-device #  set state Enabled
Server /bios /boot-device #  set slot L
Server /bios /boot-device #  set port 1
Server /bios /boot-device #  set order 1
Server /bios /boot-device #  commit
Enabling boot device will overwrite Legacy Boot Order configuration
Continue?[y|N]y
Server /bios /boot-device #  y
Commiting device configuration
Server /bios/boot-device # show detail
BIOS:
    BIOS Version: "C240M3.2.0.0.15 (Build Date: 03/16/2014)"
    Boot Order: (none)
    Boot Override Priority:
    FW Update/Recovery Status: None, OK
    UEFI Secure Boot: disabled
    Configured Boot Mode: None
    Actual Boot Mode: Legacy
    Last Configured Boot Order Source: CIMC

Server /bios/boot-device # show boot-device detail
Boot Device TestPXE:
    Device Type: PXE
    Device State: Enabled
    Device Order: 1
    Slot Id: L
    Port Number: 1
```

This example configures the boot order, creates a HTTP boot device for the IP type - **DHCP**, sets the attributes of the new device and commits the transaction:

```
Server# scope server 1
Server /server # scope bios
Server /server/bios #  create boot-device HTTP-Test HTTP
Server /server/bios #  scope boot-device HTTP-Test
Server /server/bios/boot-device # set status enabled
Server /server/bios/boot-device # set port 10
Server /server/server/bios /boot-device #  set order 1
Server /server/bios /boot-device #  set slot MLOM
Server /server/bios/boot-device # set iptype IPv4
```

```
Server /server/bios/boot-device # set macaddress 00:25:B5:00:01:2b
Server /server/bios/boot-device # set ipconfig-type DHCP
Server /server/bios/boot-device # set uri http://www.cloudboot.com:80/EFI/rhel_82_dvd.iso
Server /bios /boot-device #  commit
Commiting device configuration
Server /server/bios/boot-device # show detail
BBIOS:
    BIOS Version: server-name.2.0.7c.0.071620151216
    Backup BIOS Version: server-name.2.0.7c.0.071620151216
    Boot Order: (none)
    Boot Override Priority:
    FW Update/Recovery Status: None, OK
    UEFI Secure Boot: Enabled
    Last Configured Boot Order Source: CIMC

Server /server/bios/boot-device # show boot-device detail
Boot Device HTTP-Test:
    Device Type: HTTP-Test
    Device State: Enabled
    Device Order: 1
    Slot Id: MLOM
    Port Number: 10
    MAC Address: 00:25:B5:00:01:2b
    IP Type: IPv4
    IP Config Type: DHCP
    URI: http://www.cloudboot.com:80/EFI/rhel_82_dvd.iso
```

This example configures the boot order, creates a HTTP boot device for the IP type - **Static**, sets the attributes of the new device and commits the transaction:

```
Server# scope server 1
Server /server # scope bios
Server /server/bios #  create boot-device HTTP-Test HTTP
Server /server/bios #  scope boot-device HTTP-Test
Server /server/bios/boot-device # set status enabled
Server /server/bios/boot-device # set port 10
Server /server/server/bios /boot-device #  set order 1
Server /server/bios /boot-device #  set slot MLOM
Server /server/bios/boot-device # set macaddress 00:25:B5:00:01:2b
Server /server/bios/boot-device # set ipconfig-type Static
Server /server/bios/boot-device # set iptype IPv6C240-WZP21360Z1B /bios/boot-device *# set
 ipaddress 2001:420:5446:2014::330:12
Server /server/bios/boot-device *# set netmask_or_ipv6prefix 64
Server /server/bios/boot-device *# set gateway 2001:420:5446:2014::330:1
Server /server/bios/boot-device *# set dnsserver 2001:420:c0e0:1008::118
Server /server/bios/boot-device *# commit
Server /server/bios/boot-device *# set uri http://cisco.com/a.iso
Server /server/bios/boot-device *# commit
Server /server/bios/boot-device # show detail
Boot Device http_test:
    Device Type: HTTP
    Device State: Disabled
    Device Order: 1
    Slot Id: MLOM
    Port Number: 10
    MAC Address: aa:aa:aa:aa:aa:aa
    IP Type: IPv6
    IP Config Type: Static
    URI: http://cisco.com/a.iso
    IP Address: 2001:420:5446:2014::330:12
    Netmask/IPV6 Prefix: 64
    Gateway: 2001:420:5446:2014::330:1
```

```
    DNS Server: 2001:420:c0e0:1008::118
Server /server/bios/boot-device #
```

What to do next

Reboot the server to boot with your new boot order.

Modifying the Attributes of a Boot Device

Note Do not change the boot order while the host is performing BIOS power-on self test (POST).

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **scope boot-device** *created boot device name*.	Enters the management of the created bootable devices.
Step 3	Server /bios /boot-device # **set state** {*Enabled*|*Disabled*}.	Enables or disables the device. The default state is disabled. **Note** If enabled, the device will overwrite the legacy boot order configuration.
Step 4	Server /bios /boot-device* # **set order** {*Index* | *1-50*}.	Specifies the order of booting for particular device in the device list. Enter a number between 1 and 50 based on the total number of created device. **Note** When you set the boot device order individually, it is not assured that the order appears in the way it was set. So, it is recommended that to set the order for multiple devices in a single execution, use **re-arrange-boot-device** command.
Step 5	Server /bios /boot-device* # **set port** {*value* | *1-255* }.	Specifies the port of the slot in which the device is present. Enter a number between 1 and 255.

	Command or Action	Purpose
Step 6	Server /server/bios /boot-device* # **set iptype** {*value* | *IPv4* | *IPv6*}.	Specifies the IP type for the device.
Step 7	Server /server/bios /boot-device* # **set macaddress** {*value* }.	Sets the MAC address of the network ethernet interface.
Step 8	Server /server/bios /boot-device* # **set ipconfig-type** {*value* | *DHCP* | *Static* }.	Specifies the IP configuration type for the device.
Step 9	Server /server/bios /boot-device* # **set uri** {*value* }.	Specifies the URI path where all the OS iso and EFI files are located.
Step 10	Server /bios /boot-device* # **commit**	Commits the transaction to the system configuration.

Example

This example modifies the attributes of an existing device:

```
Server# scope bios
Server /bios *# scope boot-device scu-device-hdd
Server /bios/boot-device # set status enabled
Server /bios/boot-device *# set order 2
Server /bios/boot-device *# set port 1
Server /bios/boot-device *# commit
Enabling boot device will overwrite boot order Level 1 configuration
Continue?[y|N]y
Server /bios/boot-device #
```

This example modifies the attributes of an existing HTTP boot device:

```
Server# scope server 1
Server /server # scope bios
Server /server/bios *# scope boot-device http-test
Server /server/bios/boot-device # show detail
Boot Device http-test:
    Device Type: HTTP
    Device State: Disabled
    Device Order: 3
    Slot Id: 1
    Port Number: 10
    MAC Address: 00:25:B5:00:01:2b
    IP Type: IPv4
    IP Config Type: DHCP
    URI: http://www.cloudboot.com:80/EFI/rhel_82_dvd.iso


Server /server/bios/boot-device # set iptype IPv6
Server /server/bios/boot-device *# set slot 34
Server /server/server/bios /boot-device #  set order 1
Server /server/bios/boot-device *# set macaddress 00:25:B5:00:01:2c
Server /server/bios/boot-device *# set uri http://www.cloudboot.com:80/dvd.iso
Server /server/bios/boot-device *# commit
Server /server/bios/boot-device # show detail
Boot Device http-test:
    Device Type: HTTP
    Device State: Disabled
    Device Order: 3
```

```
    Slot Id: 34
    Port Number: 10
    MAC Address: 00:25:B5:00:01:2c
    IP Type: IPv6
    IP Config Type: DHCP
    URI: http://www.cloudboot.com:80/dvd.iso

Server /server/bios/boot-device #
```

Rearranging Device Boot Order

Note Do not change the boot order while the host is performing BIOS power-on self test (POST).

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **rearrange boot-device**[*device name*]:[*position*].	Rearranges the selected boot devices in a single execution.

Example

This example rearranges the selected boot devices:

```
Server# scope bios
Server /bios # rearrange-boot-device  TestPXE:1,TestUSB:2
 Server /bios # show boot-device
Boot Device          Device Type  Device State       Device Order
-------------------- ------------ ------------------ ----------------
TestPXE              PXE          Disabled           1
TestUSB              USB          Disabled           2

Server /bios #
```

Re-Applying the Boot Order Configuration

Note Do not change the boot order while the host is performing BIOS power-on self test (POST).

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **re-apply**.	Re-applies the boot order to BIOS, if the last configured boot order source is BIOS..

Example

This example re-applies the boot order to BIOS:

```
Server# scope bios
Server /bios # re-apply
Server /bios #
```

What to do next

Reboot the host after reapplying the boot order to BIOS.

Deleting an Existing Boot Device

Note Do not change the boot order while the host is performing BIOS power-on self test (POST).

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **remove-boot-device** *device name*	Deletes the particular device from the boot order.

Example

This example deletes the selected device from the device list:

```
Server# scope bios
Server /bios # remove-boot-device scu-device-hdd
Server /bios #
```

Overview to UEFI Secure Boot

You can use Unified Extensible Firmware Interface (UEFI) secure boot to ensure that all the EFI drivers, EFI applications, option ROM or operating systems prior to loading and execution are signed and verified for authenticity and integrity, before you load and execute the operating system. You can enable this option using either web UI or CLI. When you enable UEFI secure boot mode, the boot mode is set to UEFI mode and you cannot modify the configured boot mode until the UEFI boot mode is disabled.

Note If you enable UEFI secure boot on a nonsupported OS, on the next reboot, you cannot boot from that particular OS. If you try to boot from the previous OS, an error is reported and recorded the under system software event in the web UI. You must disable the UEFI secure boot option using Cisco IMC to boot from your previous OS.

Important Also, if you use an unsupported adapter, an error log event in Cisco IMC SEL is recorded. The error messages is displayed that says:

System Software event: Post sensor, System Firmware error. EFI Load Image Security Violation. [0x5302] was asserted .

UEFI secure boot is supported on the following components:

Components	Types
Supported OS	• Windows Server 2019 • Windows Server 2016 • ESX 6.7 • ESX 6.5 • ESXi 7.0 • Linux
Broadcom PCI adapters	• 5709 dual and quad port adapters • 57712 10GBASE-T adapter • 57810 CNA • 57712 SFP port
Intel PCI adapters	• i350 quad port adapter • X520 adapter • X540 adapter • LOM

Components	Types
QLogic PCI adapters	• 8362 dual port adapter • 2672 dual port adapter
Fusion-io	
LSI	• LSI MegaRAID SAS 9240-8i • LSI MegaRAID SAS 9220-8i • LSI MegaRAID SAS 9265CV-8i • LSI MegaRAID SAS 9285CV-8e • LSI MegaRAID SAS 9285CV-8e • LSI MegaRAID SAS 9266-8i • LSI SAS2008-8i mezz • LSI Nytro card

Enabling UEFI Secure Boot Mode

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server/ BIOS # **set secure-boot enable | disable**	Enables or disables UEFI secure boot. **Note** If enabled, the boot mode is set to UEFI secure boot mode. You cannot modify configure boot mode until UEFI secure boot mode is disabled. **Note** In case of RFD (Reset Factory Default), you must re-enable UEFI Secure Boot.

Example

This example enables UEFI secure boot mode and commits the transaction

```
Server# scope bios
Server /bios # set secure-boot enable
Setting Value : enable
Commit Pending.
Server /bios *# commit
```

```
UEFI Secure boot state changed successfully. Execute 'show detail' command to check the
current status
Server /bios #
```

What to do next

Reboot the server to have your configuration boot mode settings take place.

Disabling UEFI Secure Boot

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server/ BIOS # **set secure-boot enable | disable**	Enables or disables UEFI secure boot.

Example

This example disables UEFI secure boot mode and commits the transaction

```
Server# scope bios
Server /bios # set secure-boot disable
Setting Value : enable
Commit Pending.
Server /bios *# commit
UEFI Secure boot state changed successfully. Execute 'show detail' command to check the
current status
Server /bios #
```

What to do next

Reboot the server to have your configuration boot mode settings take place.

Viewing the Actual Server Boot Order

The actual server boot order is the boot order actually used by the BIOS when the server last booted. The actual boot order can differ from the boot order configured in Cisco IMC.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters bios command mode.
Step 2	Server /bios # **show actual-boot-order** [**detail**]	Displays the boot order actually used by the BIOS when the server last booted.

Example

This example displays the actual boot order of the legacy boot order from the last boot:

```
Server# scope bios
Server /bios #  show actual-boot-order

Boot Order   Type                     Boot Device
------------ ------------------------ ---------------------------------
1            CD/DVD                   CD-ROM
2            CD/DVD                   Cisco   Virtual CD/DVD  1.18
3            Network Device (PXE)     Cisco NIC 23:0.0
4            Network Device (PXE)     MBA v5.0.5  Slot 0100
5            Network Device (PXE)     MBA v5.0.5  Slot 0101
6            Network Device (PXE)     MBA v5.0.5  Slot 0200
7            Network Device (PXE)     MBA v5.0.5  Slot 0201
8            Network Device (PXE)     Cisco NIC 22:0.0
9            Internal EFI Shell       Internal EFI Shell
10           FDD                      Cisco   Virtual HDD     1.18
11           FDD                      Cisco   Virtual Floppy  1.18

Server /bios #
```

This example displays the actual boot order of precision boot order from the last boot:

```
Server /bios # show actual-boot-order
Boot Order   Boot Device                       Device Type     Boot Policy
------------ ---------------------------------- --------------- --------------------
1            IBA GE Slot 0201 v1398             PXE             TestPXE
2            IBA GE Slot 0200 v1398             PXE             NonPolicyTarget
3            IBA GE Slot 0202 v1398             PXE             NonPolicyTarget
4            IBA GE Slot 0203 v1398             PXE             NonPolicyTarget
5            "UEFI: Built-in EFI Shell "        EFI             NonPolicyTarget
Server  /bios #
```

Resetting the Server

Important If any firmware or BIOS updates are in progress, do not reset the server until those tasks are complete.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **power hard-reset**	After a prompt to confirm, resets the server.

Example

This example resets the server:

```
Server# scope chassis
Server /chassis # power hard-reset
This operation will change the server's power state.
Continue?[y|N]
```

Shutting Down the Server

Important If any firmware or BIOS updates are in progress, do not shut down the server until those tasks are complete.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis mode.
Step 2	Server /chassis # **power shutdown**	Shuts down the server.

Example

The following example shuts down the server:

```
Server# scope chassis
Server /chassis # power shutdown
```

Managing Server Power

Powering On the Server

Note If the server was powered off other than through the Cisco IMC, the server will not become active immediately when powered on. In this case, the server will enter standby mode until the Cisco IMC completes initialization.

Important If any firmware or BIOS updates are in progress, do not change the server power until those tasks are complete.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **power on**	Turns on the server.
Step 3	At the prompt, enter **y** to confirm.	Turns on the server.

Example

This example shows how to turn on the server:

```
Server# scope chassis
Server /chassis # power on
Warning: System is already powered ON, this action is ineffective.
Do you want to continue?[y|N]y
```

Powering Off the Server

Important If any firmware or BIOS updates are in progress, do not power off the server until those tasks are complete.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **power off**	Turns off the server.

Example

This example turns off the server:

```
Server# scope chassis
Server /chassis # power off
This operation will change the server's power state.
Continue?[y|N]y

Server /chassis # show
Power Serial Number Product Name  UUID
----- ------------- ------------- ----------------------------------
off   Not Specified Not Specified 208F0100020F000000BEA80000DEAD00
```

Power Cycling the Server

Important If any firmware or BIOS updates are in progress, do not power cycle the server until those tasks are complete.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope** chassis	Enters chassis command mode.
Step 2	Server /chassis # **power cycle**	Power cycles the server.

Example

This example power cycles the server:

```
Server# scope chassis
Server /chassis # power cycle
```

Configuring Power Policies

Power Capping

Important This section is valid only for some UCS C-Series servers.

Power capping determines how server power consumption is actively managed. When you enable power capping option, the system monitors power consumption and maintains the power below the allocated power limit. If the server cannot maintain the power limit or cannot bring the platform power back to the specified

power limit within the correction time, power capping performs actions that you specify in the **Action** field under the **Power Profile** area.

Once power capping is enabled, you can configure multiple power profiles to either have standard or advanced power profiles with defined attributes. If you choose a standard power profile, you can set the power limit, correction time, corrective-action, suspend period, hard capping, and policy state (if enabled). If you choose an advanced power profile, in addition to the attributes of the standard power profile, you can also set the domain specific power limits, safe throttle level, and ambient temperature based power capping attributes.

Note The following changes are applicable for Cisco UCS C-Series release 2.0(13) and later:

- After upgrading to the 2.0(13) release, power characterization automatically runs during the first host power on. Subsequent characterization runs only if initiated as described in section **Run Power Characterization** section.
- Also, when a server is power cycled and there is a change to the CPU or DIMM configurations, power characterization automatically runs on first host boot. For any other hardware change like PCIe adapters, GPU or HDDs, power characterization does not run. The characterized power range is modified depending on the components present after the host power cycle.

The **Run Power Characterization** option in the **Power Cap Configuration** Tab of the Web UI power cycles the host and starts power characterization.

Setting Power Redundancy Policy

Before you begin

You must log in as a user with admin privileges to perform this action.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope sensor**	Enters sensor command.
Step 2	Server /sensor # **scope psu-redundancy-policy**	Enters psu redundancy policy command.
Step 3	Server /sensor/psu-redundancy-policy #**set psu-redundancy-policy***value*	Choose one of the following redundancy value that you want to set: • **non-redundant** - N, the available PSU output capacity, equals the number of PSUs installed, where PSU failure or grid failure is not supported. • **N+1** - N, the available PSU output capacity, equals the number of PSUs installed minus 1 (N-1), where the single PSU failure is supported, but grid failure is not supported.

	Command or Action	Purpose
		• **grid** - N, the available PSU output capacity, equals half the number of PSUs installed (N/2), where N PSU failure or grid failure is supported. This policy implies that the you have connected N number of PSUs to one feed and the other N number of PSUs to another feed.
Step 4	Server /sensor/psu-redundancy-policy* #**commit**	Commits the transaction to the server.
Step 5	(Optional) Server /sensor/psu-redundancy-policy #**show detail**	Displays the power redundancy status.

Example

This example shows how to set power redundancy for the server:

```
Server / #scope sensor
Server /sensor #scope psu-redundancy-policy
Server /sensor/psu-redundancy-policy # set psu-redundancy-policy grid
Server /sensor/psu-redundancy-policy* # commit
Server /sensor/psu-redundancy-policy # show detail
PSU Redundancy Policy: grid
Server /sensor/psu-redundancy-policy #
```

Enabling Power Characterization

This option is available only on some Cisco UCS C-Series servers.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope power-cap-config**	Enters power cap command mode.
Step 3	Server /chassis # **run-pow-char-at-boot**	Runs the power characterization at boot.
Step 4	Server /chassis # **commit**	Commits the transaction to the system.

Example

This example shows how to automatically invoke power characterization during a host reboot:

```
Server# scope chassis
Server /chassis# scope power-cap-config
Server /chassis /power-cap-config # run-pow-char-at-boot
Server /chassis /power-cap-config* # commit
Server /chassis/power-cap-config #
```

Configuring the Power Cap Policy

This option is available only on some Cisco UCS C-Series servers.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope power-cap-config**	Enters power cap command mode.
Step 3	Server /chassis /power-cap-config# **set pow-cap-enable** {**yes** | **no**}	Enables or disables the capping of power to the server.
Step 4	Server /chassis /power-cap-config# **commit**	Commits the transaction to the system configuration.

Example

This example shows how to enable the power capping policy:

```
Server# scope chassis
Server /chassis# scope power-cap-config
Server /chassis /power-cap-config # set pow-cap-enable yes
Server /chassis /power-cap-config* # commit
Server /chassis/power-cap-config #
```

Checking the Power Cap Range

This option is available only on some Cisco UCS C-Series servers.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Chassis power-cap-config # **show detail**	Dislpays details of the power cap range.

	Command or Action	Purpose
		Platform Min (Allow-Throttle) - This is the lower power limit for the chassis when CPU throttling is enabled. To use this as the platform minimum, set the **allow-throttle** field to **enabled** in the standard or advanced power-profile scope. **Platform Min (Efficient)** - This is the lower power limit for the chassis when the CPU throttling is disabled. **CPU Min (Allow-Throttle)** - This is the lower power limit for the CPU domain when throttling is enabled. To use this as the CPU minimum, set the **allow-throttle** field to **enabled**in the standard or advanced power-profile scope. **CPU Min (Efficient)** - This is the lower power limit for the CPU domain when throttling is disabled.

Example

```
Power Characterization Enabled: yes
    Power Capping: yes
    Power Characterization Status: Completed
    Platform Min (Allow-Throttle)(W): 164
    Platform Min (Efficient)(W): 286
    Platform Max (W): 582
    Memory Min (W): 2
    Memory Max (W): 5
    CPU Min (Allow-Throttle)(W): 64
    CPU Min (Efficient)(W): 177
    CPU Max (W): 330
```

Configuring Standard Power Profile

This option is available only on some Cisco UCS C-Series servers.

Before you begin

- Power capping must be enabled.
- You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope power-cap-config**	Enters power cap command mode.
Step 3	Server /chassis /power-cap-config# **set pow-cap-enable** {**yes** | **no**}	Enables or disables the power capping capability of the system.
Step 4	Server /chassis /power-cap-config# **scope power-profile standard**	Enters the standard command mode of a power profile
Step 5	Server /chassis /power-cap-config# **set allow-throttle yes** | **no**	Enables or disables the system to maintain the power limit by forcing the processor to use the throttling state (T-state) and memory throttle.
Step 6	Server /chassis /power-cap-config# **set corr-time** *value*	Sets the correction time in which the platform power should be brought back to the specified power limit before taking the action specified in the **Action** mode. The range is from 3 and 600 seconds. The default is 3 seconds.
Step 7	Server /chassis /power-cap-config# **set except-action alert** | **shutdown**	Specifies the action to be performed if the specified power limit is not maintained within the correction time. This can be one of the following: • **Alert**—Logs the event to the Cisco IMC SEL. • **Shutdown**—Gracefully shuts down the host. • **None**—No actions are taken.
Step 8	Server /chassis /power-cap-config# **set hard-cap yes** | **no**	Enables or disables the system to maintain the power consumption below the specified power limit.
Step 9	Server /chassis /power-cap-config# **set pow-limit** *value*	Specifies the power limit. Enter a value within the specified range.
Step 10	Server /chassis /power-cap-config# **set susp-pd** {*h:m-h:m* | |*All,Mo,Tu,We,Th,Fr,Sa,Su.*}	Specifies the time period that the power capping profile is not active.
Step 11	Server /chassis /power-cap-config# **commit**	Commits the transaction to the system.

Example

This example shows how to configure standard power profile:

```
Server# scope chassis
```

```
Server /chassis# scope power-cap-config
Server /chassis /power-cap-config # set pow-cap-enable yes
Server /chassis /power-cap-config* # commit
Server /chassis/power-cap-config # scope power-profile advance
Server /chassis/power-cap-config # set allow-throttle yes
Server /chassis/power-cap-config* # set corr-time 6
Server /chassis/power-cap-config* # set except-action alert
Server /chassis/power-cap-config* # set hard-cap yes
Server /chassis/power-cap-config* # set pow-limit 360
Server /chassis/power-cap-config* # set susp-pd 1:30-2:30|All
Server /chassis/power-cap-config* # commit
Server /chassis/power-cap-config # show detail
Power Cap Config:
    Power Characterization Enabled: yes
    Power Capping: no
    Power Characterization Status: Completed
    Platform Min (Allow-Throttle)(W): 164
    Platform Min (Efficient)(W): 290
    Platform Max (W): 581
    Memory Min (W): 2
    Memory Max (W): 5
    CPU Min (Allow-Throttle)(W): 64
    CPU Min (Efficient)(W): 177
    CPU Max (W): 330
```

Configuring Advanced Power Profile Settings

You can configure these settings only on some UCS C-Series servers.

Before you begin

- You must enable power capping.
- You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope power-cap-config**	Enters power cap command mode.
Step 3	Server /chassis /power-cap-config # **set pow-cap-enable** {**yes** | **no**}	Enables or disables the power capping capability of the server.
Step 4	Server /chassis /power-cap-config # **commit**	Commits the transaction to the system.
Step 5	Server /chassis /power-cap-config # **scope power-profile advanced**	Enters the advance command mode of a power profile.
Step 6	Server /chassis /power-cap-config/power-profile # **set allow-throttle** {**yes** | **no**}	Enables or disables the system to maintain the power limit by forcing the processor to use the throttling state (T-state) and memory throttle.

	Command or Action	Purpose
Step 7	Server /chassis /power-cap-config/power-profile # **set corr-time** *value*	Sets the maximum time to take corrective actions in order to bring the platform back to the specified power limit before taking the actions specified in the **Action** mode. The range is from 3 and 600 seconds. The default is 3 seconds.
Step 8	Server /chassis /power-cap-config/power-profile # **set cpu-power-limit** *value*	Specifies the power limit for the CPU. Enter power in watts within the range specified.
Step 9	Server /chassis /power-cap-config/power-profile # **set except-action** {**alert** | **shutdown**}	Specifies the action to be performed if the specified power limit is not maintained within the correction time. This can be one of the following: • **Alert**—Reports the event to the Cisco IMC SEL. • **Shutdown**—Gracefully shuts down the host. • **None**—No actions are taken.
Step 10	Server /chassis /power-cap-config/power-profile # **set hard-cap** {**yes** | **no**}	Enables or disables the system to maintain the power consumption below the specified power limit.
Step 11	Server /chassis /power-cap-config/power-profile # **set mem-pow-limit** *value*	Specifies the power limit for the memory. Enter power in watts within the range specified.
Step 12	Server /chassis /power-cap-config/power-profile # **set fail-safe-timeout** *value*	Specifies a safe throttle policy when the power capping functionality is impacted internal faults such as missing power readings for platforms or CPUs. The range is from 1 and 10 seconds.
Step 13	Server /chassis /power-cap-config/power-profile # **set plat-safe-Tlvl** *value*	Specifies the throttling level for the platform in percentage. The range is from 0 and 100.
Step 14	Server /chassis /power-cap-config/power-profile # **set plat-temp** *value*	Specifies the inlet temperature sensor. Enter value in Celsius.
Step 15	Server /chassis /power-cap-config/power-profile # **set pow-limit** *value*	Specifies the power limit. Enter power in watts within the range specified.

	Command or Action	Purpose
Step 16	Server /chassis /power-cap-config/power-profile # **set susp-pd** {*h:m-h:m* | |*All,Mo,Tu,We,Th,Fr,Sa,Su.*}	Specifies the time period that the power capping profile will not be active.
Step 17	Server /chassis/power-cap-config/power-profile # **set thermal-power-limit** *value*	Specifies the power limit to be maintained. Enter power in watts within the range specified.
Step 18	Server /power-cap-config/power-profile # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to configure the advance power profile setting:

```
Server# scope chassis
Server /chassis# scope power-cap-config
Server /chassis /power-cap-config # set pow-cap-enable yes
Server /chassis /power-cap-config* # commit
Server /chassis/power-cap-config # scope power-profile advanced
Server /chassis/power-cap-config/power-profile # set allow-throttle yes
Server /chassis/power-cap-config/power-profile* # set corr-time 6
Server /chassis/power-cap-config/power-profile*# set cpu-power-limit 259
Server /chassis/power-cap-config/power-profile* # set except-action alert
Server /chassis/power-cap-config/power-profile* # set hard-cap yes
Server /chassis/power-cap-config/power-profile* # set mem-pow-limit 259
Server /chassis/power-cap-config/power-profile* # set fail-safe-timeout 10
Server /chassis/power-cap-config/power-profile* # set plat-safe-Tlvl 50
Server /chassis/power-cap-config/power-profile* # set plat-temp 35
Server /chassis/power-cap-config/power-profile* # set pow-limit 360
Server /chassis/power-cap-config/power-profile* # set susp-pd 1:30-2:30|All
Server /chassis/power-cap-config/power-profile* # set thermal-power-limit 354
Server /chassis/power-cap-config/power-profile* # commit
Server /chassis/power-cap-config/power-profile #
```

Resetting the Power Profiles to Defaults

This option is available only on some Cisco UCS C-Series servers.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope power-cap-config**	Enters power cap command mode.

	Command or Action	Purpose
Step 3	Server /chassis # **reset-power-profile-to-defaults**	Resets the power profile settings to factory-default values and disables power capping.
Step 4	Server /chassis # **commit**	Commits the transaction to the system.

Example

This example shows how to reset the power profile to the default settings:

```
Server# scope chassis
Server /chassis# scope power-cap-config
Server /chassis /power-cap-config # reset-power-profile-to-defaults
Server /chassis /power-cap-config* # commit
Server /chassis/power-cap-config #
```

Viewing the Power Capping Configuration

This option is available only on some Cisco UCS C-Series servers.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope power-cap-config**	Enters power cap configuration command mode.
Step 3	Server /chassis/power-cap-config # **show detail**	Displays information about the power characterization.

Example

This example shows how to view information about the power cap configuration:

```
Server #scope chassis
Server/chassis # scope power-cap-config
Server /chassis/power-cap-config # show detail
Power Cap Config:
    Power Characterization Enabled: yes
    Power Capping: no
    Power Characterization Status: Completed
    Platform Min (Allow-Throttle)(W): 164
    Platform Min (Efficient)(W): 290
    Platform Max (W): 581
    Memory Min (W): 2
    Memory Max (W): 5
```

```
    CPU Min (Allow-Throttle)(W): 64
    CPU Min (Efficient)(W): 177
    CPU Max (W): 330
Server /chassis/power-cap-config #
```

Viewing the Power Statistics

This option is available only on some UCS C-Series servers.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show power-monitoring**	Displays the power used by the server, CPU, and memory since the last time it was rebooted.

Example

This example shows how to view the power statistics of an individual domain:

```
Server #scope chassis
Server /chassis # show power-monitoring
Domain     Current (W)  Minimum (W)  Maximum (W)  Average (W)
---------- ------------ ------------ ------------ ------------
Platform   180          160          504          180
CPU        53           33           275          53
Memory     2            2            6            2
Server /chassis #
```

Configuring the Power Restore Policy

The power restore policy determines how power is restored to the server after a chassis power loss.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **Scope CIMC**	Enters the Cisco IMC command mode.
Step 2	Server /CIMC # **Scope power-restore-policy**	Enters the power restore policy command mode.

	Command or Action	Purpose
Step 3	Server /CIMC/power-restore-policy # **set policy** {**power-off** | **power-on** | **restore-last-state**}	Specifies the action to be taken when chassis power is restored. Select one of the following: • **power-off**—Server power will remain off until manually turned on. This is the default action. • **power-on**—Server power will be turned on when chassis power is restored. • **restore-last-state**—Server power will return to the state before chassis power was lost. When the selected action is **power-on**, you can select a delay in the restoration of power to the server.
Step 4	(Optional) Server /CIMC/power-restore-policy # **set delay** {**fixed** | **random**}	Specifies whether server power will be restored after a fixed or random time. The default is **fixed**. This command is accepted only if the power restore action is **power-on**.
Step 5	(Optional) Server /CIMC/power-restore-policy # **set delay-value** *delay*	Specifies the delay time in seconds. The range is 0 to 240; the default is 0.
Step 6	Server /CIMC/power-restore-policy # **commit**	Commits the transaction to the system configuration.

Example

This example sets the power restore policy to power-on with a fixed delay of 180 seconds (3 minutes) and commits the transaction:

```
Server# scope CIMC
Server /CIMC # Scope  power-restore-policy
Server /CIMC/power-restore-policy # set policy power-on
Server /CIMC/power-restore-policy *# commit
Server /CIMC/power-restore-policy # set delay fixed
Server /CIMC/power-restore-policy *# set delay-value 180
Server /CIMC/power-restore-policy *# commit
Server /CIMC/power-restore-policy #  show detail
Power Restore Policy:
    Power Restore Policy: power-on
    Power Delay Type: fixed
    Power Delay Value(sec): 180

Server /CIMC/power-restore-policy #
```

Configuring Fan Policies

Fan Control Policies

Fan Control Policies enable you to control the fan speed to bring down server power consumption and noise levels. Prior to these fan policies, the fan speed increased automatically when the temperature of any server component exceeded the set threshold. To ensure that the fan speeds were low, the threshold temperatures of components are usually set to high values. While this behavior suited most server configurations, it did not address the following situations:

- Maximum CPU performance

  For high performance, certain CPUs must be cooled substantially below the set threshold temperature. This required very high fan speeds which resulted in higher power consumption and increased noise levels.

- Low power consumption

  To ensure the lowest power consumption, fans must run very slowly, and in some cases, stop completely on servers that support it. But slow fan speeds resulted in servers overheating. To avoid this situation, it is necessary to run fans at a speed that is moderately faster than the lowest possible speed.

With the introduction of fan policies, you can determine the right fan speed for the server, based on the components in the server. In addition, it allows you to configure the fan speed to address problems related to maximum CPU performance and low power consumption.

Following are the fan policies that you can choose from:

- **Balanced**—This setting can cool almost any server configuration, but may not be suitable for servers with PCIe cards as these cards overheat easily.
- **Low Power**—This setting is ideal for minimal configuration servers that do not contain any PCIe cards.
- **High Power**—This policy is ideal for servers that contain PCIe cards that overheat easily and have high temperatures.
- **Maximum Power**—This setting can be used for server configurations that required extremely high fan speeds. This policy is ideal for servers that contain PCIe cards that overheat easily and have very high temperatures.
- **Acoustic**—This setting can be used for configuring the fan noise level, thereby enabling noise reduction in the servers.

  Application of this policy might result in performance throttling impacting system performance. If excessive thermal or performance events are recorded in the event logs, select a standard fan control policy like **Low Power**, which is a non-disruptive change.

Note This option is available only on Cisco UCS C220 M5, C240 SD M5, C240 M5, C220 M6, C240 M6, C245 M6 , C225 M6 servers. For these servers, **Acoustic** is the default fan policy.

For other servers, default fan policy depends on the server configuration and the number of PCIe cards present in the server.

Note For Cisco UCS M5 servers, although you set a fan policy in Cisco IMC, the actual speed that the fan runs at is determined by the configuration requirements of the server. PCIe cards are tagged with minimum fan speed depending on thermal requirements. If the server is equipped with these PCIe cards, you cannot configure the fan policy, which go below the tagged requirement.

The **Configuration Status** displays the status of the configured fan policy in Cisco UCS M5 servers. This can be one of the following:

- SUCCESS —The selected fan policy matches the actual fan speed that runs on the server.
- PENDING —The configured fan policy is not in effect yet. This can be due to one of the following:
  - The server is powered off
  - The BIOS POST is not complete
- FAN POLICY OVERRIDE—Overrides the specified fan speed with the actual speed determined by the configuration requirements of the server.

Note
- For Cisco UCS C220 M7, C240 M7, C220 M6, C240 M6, UCS C220 M5,C240 M5, C240 SD M5, C125 M5,C480 M5,C480-M5ML, **Applied fan policy** depends on the PCIe cards present in the server.
- For Cisco UCS C225 M6 and C245 M6, **Applied fan policy** depends on the PCIe cards or a specific CPU type present in the server.

Configuring a Fan Policy

The fan policy determines the cooling requirements for your server. Prior to setting the fan policy, you must determine if your server includes PCIe cards that overheat easily.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope fan-policy**	Enters the fan policy command mode.
Step 3	Server /chassis/fan-policy # **set fan-policy**	Sets the fan policy for the server. It can be one of the following: • **Balanced**—This setting can cool almost any server configuration, but may not be suitable for servers with PCIe cards as these cards overheat easily. • **Low Power**—This setting is ideal for minimal configuration servers that do not contain any PCIe cards. • **High Power**—This policy is ideal for servers that contain PCIe cards that overheat easily and have high temperatures. • **Maximum Power**—This setting can be used for server configurations that required extremely high fan speeds. This policy is ideal for servers that contain PCIe cards that overheat easily and have very high temperatures. • **Acoustic**—This setting can be used for configuring the fan noise level, thereby enabling noise reduction in the servers. Application of this policy might result in performance throttling impacting system performance. If excessive thermal or performance events are recorded in the event logs, select a standard fan control policy like **Low Power**, which is a non-disruptive change.

	Command or Action	Purpose
		Note This option is available only on Cisco UCS C220 M5, C240 SD M5, C240 M5, C220 M6, C240 M6, C245 M6 , C225 M6 servers. For these servers, **Acoustic** is the default fan policy. For other servers, default fan policy depends on the server configuration and the number of PCIe cards present in the server.
Step 4	Server /chassis/fan-policy # **set aggressive-cooling***no|yes*	Use this option to enable aggressive cooling.
Step 5	Server /chassis/fan-policy # **commit**	Commits the changes to the server.

Example

This example shows how to set the fan policy to maximum power for a server:

```
server # scope chassis
server /chassis # scope fan-policy
server /chassis/fan-policy # set fan-policy maximum-power
server /chassis/fan-policy # set aggressive-cooling yes
server /chassis/fan-policy* # commit
server /chassis/fan-policy # show detail
  Fan Policy: maximum-power
  Applied Fan Policy: Max Power
  Configuration Status: SUCCESS
server /chassis/fan-policy #
```

Configuring DIMM Black Listing

DIMM Black Listing

In Cisco IMC, the state of the Dual In-line Memory Module (DIMM) is based on SEL event records. A DIMM is marked bad if the BIOS encounters a non-correctable memory error or correctable memory error with 16000 error counts during memory test execution during BIOS post. If a DIMM is marked bad, it is considered a non-functional device.

If you enable DIMM blacklisting, Cisco IMC monitors the memory test execution messages and blacklists any DIMM that encounters memory errors at any given point of time in the DIMM SPD data. This allows the host to map out those DIMMs.

DIMMs are mapped out or blacklisted only when Uncorrectable errors occur. When a DIMM gets blacklisted, other DIMMs in the same channel are ignored or disabled, which means that the DIMM is no longer considered bad.

Note DIMMs do not get mapped out or blacklisted for 16000 Correctable errors.

Enabling DIMM Black Listing

Before you begin

You must be logged in as an administrator.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope dimm-blacklisting** /	Enters the DIMM blacklisting mode.
Step 2	Server /dimm-blacklisting # **set enabled** {**yes** | **no**}	Enables or disables DIMM blacklisting.
Step 3	Server /dimm-blacklisting* # **commit**	Commits the transaction to the system configuration.

Example

The following example shows how to enable DIMM blacklisting:

```
Server# scope dimm-blacklisting
Server /dimm-blacklisting # set enabled yes
Server /dimm-blacklisting* # commit
Server /dimm-blacklisting #
Server /dimm-blacklisting # show detail

DIMM Blacklisting:
      Enabled: yes
```

Configuring BIOS Settings

Viewing BIOS Status

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.

	Command or Action	Purpose
Step 2	Server /bios # **show detail**	Displays details of the BIOS status.

The BIOS status information contains the following fields:

Name	Description
BIOS Version	The version string of the running BIOS.
Boot Order	The legacy boot order of bootable target types that the server will attempt to use.
Boot Override Priority	This can be None, or HV.
FW Update/Recovery Status	The status of any pending firmware update or recovery action.
UEFI Secure Boot	Enables or Disables UEFI secure boot.
Configured Boot Mode	The boot mode in which h BIOS will try to boot the devices.
Actual Boot Mode	The actual boot mode in which BIOS booted the devices.
Last Configured Boot Order Source	The last configured boot order source by BIOS.

Configuring BIOS Settings

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **scope** [illegible]	Enters the settings command mode. For descriptions and information about the options for each BIOS setting, see the following topic: BIOS Parameters by Server Model, on page 425 You must commit the changes between each setting type. Server /bios/ # **commit**

Example

This example configures the BIOS to enable the USB legacy support and commits the transaction:

```
Server# scope bios
Server /bios # scope input-output
Server /bios/input-output # set UsbLegacySupport enabled
Server /bios/input-output *# commit
Changes to BIOS set-up parameters will require a reboot.
Do you want to reboot the system?[y|N] n
Changes will be applied on next reboot.
Server /bios/input-output #
```

Restoring BIOS Defaults

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **bios-setup-default**	Restores BIOS default settings. This command initiates a reboot.

Example

This example restores BIOS default settings:

```
Server# scope bios
Server /bios # bios-setup-default
This operation will reset the BIOS set-up tokens to factory defaults.
All your configuration will be lost.
Changes to BIOS set-up parameters will initiate a reboot.
Continue?[y|N]y
```

Entering BIOS Setup

Before you begin

- The server must be powered on.
- You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **enter-bios-setup**	Enters BIOS setup on reboot.

Example

This example enables you to enter BIOS setup:

```
Server# scope bios
Server /bios # enter-bios-setup
This operation will enable Enter BIOS Setup option.
Host must be rebooted for this option to be enabled.
Continue?[y|N]y
```

Restoring BIOS Manufacturing Custom Defaults

In instances where the components of the BIOS no longer function as desired, you can restore the BIOS set up tokens to the manufacturing default values.

Note This action is only available for some C-Series servers.

Before you begin

- You must log in with admin privileges to perform this task.
- The server must be powered off.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **restore-mfg-defaults**	Restores the set up tokens to the manufacturing default values.

Example

This example shows how to restore the BIOS set up tokens to the manufacturing default values:

```
Server # scope bios
Server /bios # restore-mfg-defaults
This operation will reset the BIOS set-up tokens to manufacturing defaults.
The system will be powered on.
Continue? [y|n] N
Server /bios #
```

Secure Boot Certificate Management

Beginning with 4.2(2a) release, Cisco IMC allows you to upload up to ten certificates for configured secure HTTP Boot device. You can also delete and upload a new certificate for the specific boot device configured. Cisco IMC allows you to upload up to ten root CA Certificates.

Viewing Secure Boot Certificate

Before you begin

You must log in with admin privileges to perform this task. log in as admin

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server / bios # **scope secure-boot-certificate** *certificate_ID*	where, *certificate_ID* is the ID assigned by Cisco IMC.
Step 3	Server / bios / secure-boot-certificate # **show detail**	Certificate detail is displayed.

Example

This examples shows how to view secure boot certificate detail:

```
server # scope bios
server / bios # scope secure-boot-certificate 3
server /bios/secure-boot-certificate # show detail
Secure Boot CA Certificate:
    Certificate ID: 3
    Serial Number: 04
    Subject Country Code (CC): XX
    Subject State (S): XX
    Subject Locality (L): XX
    Subject Organization (O): XX
    Subject Organizational Unit (OU): XX
    Subject Common Name (CN): *.XX
    Issuer Country Code (CC): XX
    Issuer State (S): XX
    Issuer Locality (L): XX
    Issuer Organization (O): XX
    Issuer Organizational Unit (OU): XX
    Issuer Common Name (CN): .XX
    Valid From: Month Date Time_Stamp 20xx GMT
    Valid To: Month Date Time_Stamp 20xx GMT
```

Uploading Secure Boot Certificate Using Paste Option

Before you begin

You must log in with admin privileges to perform this task. log in as admin

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server / bios # **scope secure-boot-certificate** *certificate_ID*	where, *certificate_ID* is the ID assigned by Cisco IMC. If a certificate is already uploaded to this ID, then you can only view the details of the certificate. To verify the status, you may use **`show detail`** command.
Step 3	Server / bios / secure-boot-certificate # **upload-paste-secure-boot-certificate**	You are prompted to paste the certificate. `Please paste your certificate here, when finished, press CTRL+D`

Once the certificate is successfully uploaded, following message is displayed:

```
Secure Boot Certificate pasted successfully.
```

Example

This examples shows how to upload a secure boot certificate using paste option:

```
server # scope bios
server / bios # scope secure-boot-certificate 3
server /bios/secure-boot-certificate # upload-paste-secure-boot-certificate
Please paste your certificate here, when finished, press CTRL+D.
-----BEGIN CERTIFICATE-----
MIIDzzCCAregAwIBAgIBBDANBgkqhkiG9w0BAQsFADCBnTELMAkGA1UEBhMCVVMx
EzARBgNVBAgMCkNhbGlmb3JuaWExEDAOBgNVBAcMB05ld3lvcmsxETAPBgNVBAoM
CERpZ2ljZXJ0MRAwDgYDVQQLDAdTU0xERVBUMR8wHQYDVQQDDBYqLmNhLnRlc3Rp
bmcuY28uYmxyLmluMSEwHwYJKoZIhvcNAQkBFhJhbm1pY2hhZUBjaXNjby5jb20w
HhcNMjAwNDI4MDQyNTM2WhcNMjIwNDI4MDQyNTM2WjCBoDELMAkGA1UEBhMCSU4x
EjAQBgNVBAgMCUJlbmdhbHVydTESMBAGA1UEBwwJa2FybmF0YWthMQ8wDQYDVQQK
DAZPUkdDU1IxEzARBgNVBAsMCk9SR1VOSVRDU1IxIDAeBgNVBAMMFyouY3NyLnRl
c3RpbmcuYmxyLmNvLmluMSEwHwYJKoZIhvcNAQkBFhJhbm1pY2hhZUBjaXNjby5j
b20wggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQC4oBCGcFnw/wcHkitn
TshWScl5+yI2aCmiCcVCUfRCX96erdE+4QKW1UqClZ9lpL8CqnhKkKTWVl54mcw2
RcZto+SpDrCJLJNgcuvmaUu1sIoafNmc3DTLCDJvrlxE0ooJP8SgXdEngAm44DXz
Uw3/8nu3I7WLXu//tOxd0edHHv4V2ktFx5mLaU/QlRRBEyRuXtGyiRSE5h5YWWd0
TAZ0R2NZFHn7ymYg2GGMjEFKfDSK0mfspbfQI5SMNLVIeA3SqI98Y95o6y9UUbg0
2DQH4O9Z/F9w0NuNJz5vhtxSl3ScNFQwRMLho/lJErV0SvV9vtuio+j3btQ+1CsF
VM9lAgMBAAGjFTATMBEGCWCGSAGG+EIBAQQEAwIGQDANBgkqhkiG9w0BAQsFAAOC
AQEAUzW7p3YhiEZfgBvR8D4iNsuv4J18BdzZmhDqA852tLprnh4HoWgMRt1YBO5B
7D5wJ7mgQn/TCqIlIlrNX8KUbDs+UYYDQBTxCuRZcM2QNaFogOJiQqHFugtjJZ4H
kUX06s9JJmTNs68dySQVJhHrY0b3sQdvWhzL8ryxDyg5EUu/m+O/FnxqU9CTEWEf
7E8ATB4dH82NlecRCbh2su4bC1PnMMi5g/w6pIMahMKHPVVvRQBW/0PsB0rlRw2j
```

```
J6o61URlJ6L7bc8ij5ExX+UjYc1mR555jflNG+1Sty5H8oJtzDLoxNgOPzyb4U6C
ljPN+QPSVZOcLUjIMZYjB8qSDw==
-----END CERTIFICATE-----
Secure Boot Certificate pasted successfully.
```

What to do next

You may verify the certificate details using the **show detail** command.

Uploading Secure Boot Certificate From Remote Location

Before you begin

- You must log in with admin privileges to perform this task. log in as admin
- Ensure that the generated certificate is of type server.
- The following certificate formats are supported:
  - .crt
  - .cer
  - .pem

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server / bios # **scope secure-boot-certificate** *certificate_ID*	where, *certificate_ID* is the ID assigned by Cisco IMC. If a certificate is already uploaded to this ID, then you can only view the details of the certificate. To verify the status, you may use **show detail** command.
Step 3	Server / bios / secure-boot-certificate # **upload-remote-secure-boot-certificate tftp | ftp | sftp | scp | http** *IP_address|Hostname Remote_server_path_filename*	where, • **tftp, ftp, sftp, scp, http** are protocols for the file transfer • **Server IP Address or Hostname**—The IP address or hostname of the server on which the certificate file should be stored. • **Path and Filename**—The path and filename Cisco IMC should use when uploading the file to the remote server.

	Command or Action	Purpose
		Depending on the file transfer protocol, you may be prompted to enter username and password

Once the certificate is successfully uploaded, following message is displayed:

```
Secure Boot Certificate uploaded successfully
```

Example

This examples shows how to upload a secure boot certificate using remote location option (with scp file transfer protocol):

```
server # scope bios
server / bios # scope secure-boot-certificate 3
server /bios/secure-boot-certificate # upload-remote-secure-boot-certificate scp 10.10.10.10

/home/username/certificate.pem
Server (RSA) key fingerprint is xx:xx:8b:36:5a:53:14:d3:85:d0:xx:xx:e0:xx:24:51
Do you wish to continue? [y/N]y
Username: username
Password: password
Secure Boot Certificate uploaded successfully
```

What to do next

You may verify the certificate details using the **show detail** command.

Deleting a Secure Boot Certificate

Before you begin

You must log in with admin privileges to perform this task. log in as admin

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server / bios # **scope secure-boot-certificate** *certificate_ID*	where, *certificate_ID* is the ID assigned by Cisco IMC.
Step 3	Server / bios / secure-boot-certificate # **delete-secure-boot-certificate**	Type **y** and press **Enter** to confirm.

Following message is displayed:

```
Secure Boot Certificate - ID is deleted
```

Example

This examples shows how to delete a secure boot certificate:

```
server # scope bios
server / bios # scope secure-boot-certificate 3
Server /bios/secure-boot-certificate # delete-secure-boot-certificate
Do you want to delete the existing secure boot certificate? [y|N]y
Secure Boot Certificate - 3 is deleted
```

Updating Firmware on Server Components

Important If any firmware or BIOS updates are in progress, do not reset the server until those tasks are complete.

Before you begin

You must log in with user or admin privileges to perform this task.

Server must be powered off.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope firmware**	Enters firmware command mode.
Step 3	Server /chassis/firmware # **show detail**	Displays the firmware update required on some components message.
Step 4	Server /chassis/firmware # **update-all**	Updates the firmware on the server components.

Example

This example resets the server:

```
Server# scope chassis
Server /chassis # scope firmware
Server /chassis / firmware # show detail

Firmware update required on some components,
please run update-all (under chassis/firmware scope).

Server /chassis / firmware # update-all
```

Viewing Product ID (PID) Catalog Details

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show cpu-pid**	Displays the CPU PID details.
Step 3	Server /chassis # **show dimm-pid**	Displays the memory PID details.
Step 4	Server /chassis # **show pciadapter-pid**	Displays the PCI adapters PID details.
Step 5	Server /chassis # **show hdd-pid**	Displays the HDD PID details.

Example

This example shows how to create view PID details

```
Server # scope chassis
Viewing CPU PID details
Server /chassis # show cpu-pid
Socket Product ID           Model
------ -------------------- ----------------------------------------
CPU1   UCS-CPU-E52660B      Intel(R) Xeon(R) CPU E5-2660 v2 @ 2.2...
CPU2   UCS-CPU-E52660B      Intel(R) Xeon(R) CPU E5-2660 v2 @ 2.2...
Viewing memory PID details
Server /chassis # show dimm-pid
Name              Product ID           Vendor ID  Capacity  Speed
----------------- -------------------- ---------- --------- ------
DIMM_A1           UNKNOWN              NA         Failed    NA
DIMM_A2           UNKNOWN              NA         Ignore... NA
DIMM_B1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_B2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_C1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_C2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_D1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_D2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_E1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_E2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_F1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_F2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_G1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_G2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_H1           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
DIMM_H2           UCS-MR-1X162RZ-A     0xCE00     16384 MB  1866
Viewing PCI adapters PID details
Server /chassis # show pciadapter-pid
Slot   Product ID           Vendor ID  Device ID   SubVendor ID  SubDevice ID
------ -------------------- ---------- ----------- ------------- -------------
1      UCSC-MLOM-CSC-02     0x1137     0x0042      0x1137        0x012e
Viewing HDD PID details
Server /chassis # show hdd-pid
Disk Controller  Product ID           Vendor     Model
---- ----------- -------------------- ---------- ------------
1    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
```

```
2    SLOT-MEZZ   UCS-C3X60-HD4TB      SEAGATE    ST4000NM0023
3    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
4    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
5    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
6    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
7    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
8    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
9    SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
10   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
11   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
12   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
13   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
14   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
15   SLOT-MEZZ   UCS-C3X60-HD4TB      SEAGATE    ST4000NM0023
16   SLOT-MEZZ   UCS-C3X60-HD4TB      SEAGATE    ST4000NM0023
19   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
28   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
54   SLOT-MEZZ   UCSC-C3X60-HD6TB     SEAGATE    ST6000NM0014
55   SLOT-MEZZ   UCSC-C3X60-HD6TB     SEAGATE    ST6000NM0014
56   SLOT-MEZZ   UCSC-C3X60-HD4TB     TOSHIBA    MG03SCA400
57   SLOT-MEZZ   UCS-HD4T7KS3-E       WD         WD4001FYY...
58   SLOT-MEZZ   UCS-HD4T7KS3-E       WD         WD4001FYY...
59   SLOT-MEZZ   UCS-HD4T7KS3-E       WD         WD4001FYY...
60   SLOT-MEZZ   UCS-HD4T7KS3-E       WD         WD4001FYY...

Server /chassis #
```

Uploading and Activating a PID Catalog

Caution BMC reboots automatically once a PID catalog is activated.

You must reboot the server after activating a PID catalog.

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server# /chassis **scope pid-catalog**	Enters the PID catalog command mode.
Step 3	Server /chassis/pid-catalog # **upload-pid-catalog** *remote-protocol IP Address PID Catalog file*	Specifies the protocol to connect to the remote server. It can be one of the following types: • TFTP • FTP • SFTP • SCP

	Command or Action	Purpose
		• HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 4	(Optional) Server# /chassis/pid-catalog **show detail**	Displays the status of the upload.
Step 5	Server# /chassis/pid-catalog **activate**	Activates the uploaded PID catalog.
Step 6	Server# /chassis/pid-catalog **show detail**	Displays the status of the activation.

Example

This example uploads and activates the PID catalog:

```
Server # scope chassis
Server /chassis # scope pid-catalog
Uploading PID Catalog
Server /chassis/pid-catalog # upload-pid-catalog tftp 10.10.10.10 pid-ctlg-2_0_12_78_01.tar.gz
upload-pid-catalog initialized.
Please check the status using "show detail".
Server /chassis/pid-catalog #
Server /chassis/pid-catalog # show detail
    Upload Status: Upload Successful
    Activation Status: Please Activate Catalog
    Current Activated Version: N/A
Activating the uploaded PID catalog
Server /chassis/pid-catalog # activate
Successfully activated PID catalog
Server /chassis/pid-catalog # show detail
    Upload Status:
    Activation Status: Activation Successful
    Current Activated Version: 2.0(12.78).01
```

```
Server /chassis/pid-catalog #
```

Deleting a PID Catalog

Caution BMC reboots automatically once a PID catalog is deleted.

You must reboot the server after deleting a PID catalog.

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server# /chassis **scopepid-catalog**	Enters the PID catalog command mode.
Step 3	Server /chassis/pid-catalog # **delete**	Enter **y** at the confirmation prompt to delete the PID catalog. **Note** You can delete a PID catalog only if it has been previously updated and activated.
Step 4	(Optional) Server# /chassis/pid-catalog **show detail**	Displays the status of the PID catalog.

Example

This example uploads and activates the PID catalog:

```
Server # scope chassis
Server /chassis # scope pid-catalog
Server /chassis/pid-catalog # delete
CIMC will be automatically rebooted after successful deletion of the uploaded catalog file.
Once this is complete, a host reboot will be required for the catalog changes to be reflected
 in
the BIOS and host Operating System Continue?[y|N]y
Server /chassis/pid-catalog # show detail
PID Catalog:
    Upload Status: N/A
    Activation Status: N/A
    Current Activated Version: 4.1(0.41)
Server /chassis/pid-catalog #
```

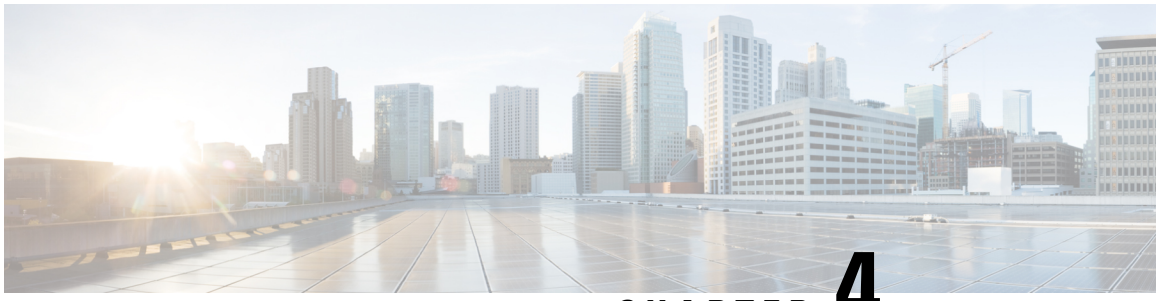
Persistent Memory Module

Persistent Memory Modules

Cisco UCS C-Series Release 4.0(4) introduces support for the Intel® Optane™ Data Center persistent memory modules on the UCS M5 servers that are based on the Second Generation Intel® Xeon® Scalable processors. These persistent memory modules can be used only with the Second Generation Intel® Xeon® Scalable processors.

Persistent memory modules are non-volatile memory modules that bring together the low latency of memory and the persistence of storage. Data stored in persistent memory modules can be accessed quickly compared to other storage devices, and is retained across power cycles.

For detailed information about configuring persistent memory modules, see the Cisco UCS: Configuring and Managing Intel® Optane™ Data Center Persistent Memory Modules Guide.



CHAPTER 4

Viewing Server Properties

This chapter includes the following sections:

Viewing Server Properties

Procedure

	Command or Action	Purpose
Step 1	Server# **show chassis** [**detail**]	Displays server properties.

Example

This example displays server properties:

```
Server# show chassis detail
Chassis:
    Power: on
    Serial Number: QCI140205ZG
    Product Name: UCS C210 M2
    PID : R210-2121605W
    UUID: FFFFFFFF-FFFF-FFFF-FFFF-FFFFFFFFFFFF
    Locator LED: off
    Description: This shows the chassis details.
```

```
Server#
```

This example displays server properties for C3160 servers:

```
Server# show chassis detail
Chassis:
    Power: on
    Serial Number: FCH1821JAVL
    Product Name: UCS C3160
    PID : UCSC-C3X60-SVRNB
    UUID: 84312F76-75F0-4BD1-9167-28B74EBB444C
    Locator LED: off
    Front Panel Locator LED: off
    Description: This shows the chassis details
Server#
```

Viewing System Information

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show sku-details**	Displays the system information.

Example

This example shows how to view system details:

```
Server# scope chassis
Server /chassis # show sku-details
    SAS Expander: Not-Present
    HDD: 10-SFF_drive_back_plane
    Riser1: (1 Slot x16)
    Riser2: (1 Slot x16)
    M.2 SATA/NVMe: Not-Present
    M.2 SD Card Controller: Not-Present
    CPU1 PKG-ID: Non-MCP
    CPU2 PKG-ID: Non-MCP
    Intrusion Sensor: Not-Equipped
Server /chassis #
```

Viewing a Server Utilization

You can view a server utilization only on some UCS C-Series servers.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **show cups-utilization**	Displays the server utilization value on all the available CPUs. **Note** These utilization values are reported as a percentage of the total hardware bandwidth. These values may not match with the values being displayed by the host based resource monitoring software.

Example

This example shows how to view the server utilization value:

```
Server# scope chassis
Server /chassis # show cups-utilization

CPU Utilization (%)  Memory Utilization (%)  I/O Utilization (%)  Overall Utilization (%)
-------------------- ----------------------- -------------------- -----------------------
100                  69                      0                    86

Server /chassis #
```

Viewing Cisco IMC Properties

Note Cisco IMC gets the current date and time from the server BIOS. To change this information, reboot the server and press **F2** when prompted to access the BIOS configuration menu. Then change the date or time using the options on the main BIOS configuration tab.

Procedure

	Command or Action	Purpose
Step 1	Server# **show cimc** [**detail**]	Displays Cisco IMC properties.

Example

This example displays Cisco IMC properties:

```
Server# show cimc detail
Cisco IMC:
    Firmware Version: 2.0(8.122)
    Current Time: Wed Dec  9 23:14:28 2015
    Boot-loader Version: 2.0(8.122).36
    Local Time: Wed Dec  9 23:14:28 2015 UTC +0000
    Timezone: UTC
```

```
    Reset Reason: graceful-reboot (This provides the last Cisco IMC reboot reason.)

Server#
```

Viewing CPU Properties

Before you begin

The server must be powered on, or the properties will not display.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show cpu** [**detail**]	Displays CPU properties.

Example

This example displays CPU properties:

```
Server# scope chassis
Server /chassis # show cpu
Name         Cores    Version
------------ -------- --------------------------------------------------
CPU1         4        Intel(R) Xeon(R) CPU           E5520  @ 2.27GHz
CPU2         4        Intel(R) Xeon(R) CPU           E5520  @ 2.27GHz

Server /chassis #
```

Viewing Memory Properties

Before you begin

The server must be powered on, or the properties will not display.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show dimm** [**detail**]	Displays memory properties.
Step 3	Server /chassis # **show dimm-summary**	Displays DIMM summary information.

Example

This example displays memory properties:

```
Server# scope chassis
Server /chassis # show dimm
Name                 Capacity        Channel Speed (MHz) Channel Type
-------------------- --------------- ------------------- ---------------
DIMM_A1              2048 MB         1067                Other
DIMM_A2              2048 MB         1067                Other
DIMM_B1              2048 MB         1067                Other
DIMM_B2              2048 MB         1067                Other
DIMM_C1              Not Installed   Unknown             Other
DIMM_C2              Not Installed   Unknown             Other
DIMM_D1              2048 MB         1067                Other
DIMM_D2              2048 MB         1067                Other
DIMM_E1              2048 MB         1067                Other
DIMM_E2              2048 MB         1067                Other
DIMM_F1              Not Installed   Unknown             Other
DIMM_F2              Not Installed   Unknown             Other

Server /chassis #
```

This example displays detailed information about memory properties:

```
Server# scope chassis
Server /chassis # show dimm detail
Name DIMM_A1:
    Capacity: 2048 MB
    Channel Speed (MHz): 1067
    Channel Type: Other
    Memory Type Detail: Synchronous
    Bank Locator: NODE 0 CHANNEL 0 DIMM 0
    Visibility: Yes
    Operability: Operable
    Manufacturer: 0x802C
    Part Number: 18JSF25672PY-1G1D1
    Serial Number: 0xDA415F3F
    Asset Tag: Unknown
    Data Width: 64 bits
Name DIMM_A2:
    Capacity: 2048 MB
--More--

Server /chassis #
```

This example displays DIMM summary information:

```
Server# scope chassis
Server /chassis # show dimm-summary
DIMM Summary:
    Memory Speed: 1067 MHz
    Total Memory: 16384 MB
    Effective Memory: 16384 MB
    Redundant Memory: 0 MB
    Failed Memory: 0 MB
    Ignored Memory: 0 MB
    Number of Ignored Dimms: 0
    Number of Failed Dimms: 0
    Memory RAS possible: Memory configuration can support mirroring
    Memory Configuration: Maximum Performance

Server /chassis #
```

Viewing Power Supply Properties

Before you begin

The server must be powered on, or the properties will not display.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show psu** [**detail**]	Displays power supply properties.

Example

This example displays power supply properties:

```
Server# scope chassis
Server /chassis # show psu
Name       In. Power (Watts)    Out. Power (Watts)   Firmware  Status
---------- -------------------- -------------------- -------- ----------
PSU1       74                   650                  R0E      Present
PSU2       83                   650                  R0E      Present

Server /chassis #
```

Note **Input Power** and **Maximum Output Power** options are available only for some C-Series servers.

Viewing Storage Properties

Viewing Storage Adapter Properties

Before you begin

The server must be powered on, or the properties will not display.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter** [*slot*] [**detail**]	Displays installed storage cards.

	Command or Action	Purpose
		Note This command displays all MegaRAID controllers on the server that can be managed through Cisco IMC. If an installed controller or storage device is not displayed, then it cannot be managed through Cisco IMC.
Step 3	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **show bbu** [**detail**]	Displays battery backup unit information for the storage card.
Step 5	Server /chassis/storageadapter # **show capabilites** [**detail**]	Displays RAID levels supported by the storage card.
Step 6	Server /chassis/storageadapter # **show error-counters** [**detail**]	Displays number of errors seen by the storage card.
Step 7	Server /chassis/storageadapter # **show firmware-versions** [**detail**]	Displays firmware version information for the storage card.
Step 8	Server /chassis/storageadapter # **show hw-config** [**detail**]	Displays hardware information for the storage card.
Step 9	Server /chassis/storageadapter # **show mfg-data** [**detail**]	Displays manufacturer data for the storage card.
Step 10	Server /chassis/storageadapter # **show pci-info** [**detail**]	Displays adapter PCI information for the storage card.
Step 11	Server /chassis/storageadapter # **show running-firmware-images** [**detail**]	Displays running firmware information for the storage card.
Step 12	Server /chassis/storageadapter # **show settings** [**detail**]	Displays adapter firmware settings for the storage card.
Step 13	Server /chassis/storageadapter # **show startup-firmware-images** [**detail**]	Displays firmware images to be activated on startup for the storage card.

Example

This example displays storage properties:

```
Server# scope chassis
Server /chassis # show storageadapter
PCI Slot Product Name                       Serial Number  Firmware Package Build
-------- ---------------------------------- -------------- -------------------------
SAS      LSI MegaRAID SAS 9260-8i           SV93404392     12.12.0-0038
```

```
        Product ID     Battery Status Cache Memory Size
    ---- -------------- -------------- --------------
        LSI Logic      fully charged  0 MB

Server /chassis #
```

This example displays battery backup unit information for the storage card named SAS:

```
Server# scope chassis
Server /chassis # scope storageadapter SAS
Server /chassis/storageadapter # show bbu
Controller Battery Type Battery Present Voltage    Current    Charge Charging State
---------- ------------ --------------- ---------- ---------- ------ --------------
SAS        iBBU         true            4.051 V    0.000 A    100%   fully charged

Server /chassis/storageadapter #
```

Viewing the Flexible Flash Controller Properties

Before you begin

- Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **show flexflash** [**detail**]	(Optional) Displays the available Cisco Flexible Flash controllers.
Step 3	Required: Server /chassis # **scope flexflash** *index*	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible *index* value is **FlexFlash-0**.
Step 4	Server /chassis/flexflash # **show operational-profile** [**detail**]	Displays the operational profile properties.

Example

This example displays the properties of the flash controller:

```
Server# scope chassis
Server /chassis # show flexflash
Controller   Product Name     Has Error  Firmware Version  Vendor   Internal State
------------ ---------------- ---------- ----------------- -------- ---------------
FlexFlash-0  Cisco FlexFlash  No         1.2 build 247     Cypress  Connected

Server /chassis # scope flexflash FlexFlash-0
Server /chassis # show operational-profile
Primary Member Slot  I/O Error Threshold  Host Accessible VDs
-------------------- -------------------- --------------------
slot1                100                   SCU Drivers
```

```
Server /chassis/flexflash #
```

Viewing Physical Drive Properties

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **show physical-drive** [*drive-number*] [**detail**]	Displays physical drive information for the storage card.
Step 4	Server /chassis/storageadapter # **show physical-drive-count** [**detail**]	Displays the number of physical drives on the storage card.
Step 5	Server /chassis/storageadapter # **scope physical-drive** *drive-number*	Enters command mode for the specified physical drive.
Step 6	Server /chassis/storageadapter/physical-drive # **show general** [**detail**]	Displays general information about the specified physical drive.
Step 7	Server /chassis/storageadapter/physical-drive # **show inquiry-data** [**detail**]	Displays inquiry data about the specified physical drive.
Step 8	Server /chassis/storageadapter/physical-drive # **show status** [**detail**]	Displays status information about the specified physical drive.

Example

This example displays general information about physical drive number 1 on the storage card named SAS:

```
Server# scope chassis
Server /chassis # scope storageadapter SAS
Server /chassis/storageadapter # scope physical-drive 1
Server /chassis/storageadapter/physical-drive # show general
Slot Number 1:
    Controller: SAS
    Enclosure Device ID: 27
    Device ID: 34
    Sequence Number: 2
    Media Error Count: 0
    Other Error Count: 0
    Predictive Failure Count: 0
    Link Speed: 6.0 Gb/s
    Interface Type: SAS
    Media Type: HDD
    Block Size: 512
    Block Count: 585937500
    Raw Size: 286102 MB
```

```
    Non Coerced Size: 285590 MB
    Coerced Size: 285568 MB
    SAS Address 0: 500000e112693fa2
    SAS Address 1:
    Connected Port 0:
    Connected Port 1:
    Connected Port 2:
    Connected Port 3:
    Connected Port 4:
    Connected Port 5:
    Connected Port 6:
    Connected Port 7:
    Power State: powersave

Server /chassis/storageadapter/physical-drive #
```

This example displays inquiry data about physical drive number 1 on the storage card named SAS:

```
Server# scope chassis
Server /chassis # scope storageadapter SAS
Server /chassis/storageadapter # scope physical-drive 1
Server /chassis/storageadapter/physical-drive # show inquiry-data
Slot Number 1:
    Controller: SAS
    Product ID: MBD2300RC
    Drive Firmware: 5701
    Drive Serial Number: D010P9A0016D

Server /chassis/storageadapter/physical-drive #
```

This example displays status information about physical drive number 1 on the storage card named SAS:

```
Server# scope chassis
Server /chassis # scope storageadapter SAS
Server /chassis/storageadapter # scope physical-drive 1
Server /chassis/storageadapter/physical-drive # show inquiry-data
Slot Number 1:
    Controller: SAS
    State: online
    Online: true
    Fault: false

Server /chassis/storageadapter/physical-drive #
```

Viewing Virtual Drive Properties

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **show virtual-drive** [*drive-number*] [**detail**]	Displays virtual drive information for the storage card.

	Command or Action	Purpose
Step 4	Server /chassis/storageadapter # **show virtual-drive-count** [**detail**]	Displays the number of virtual drives configured on the storage card.
Step 5	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 6	Server /chassis/storageadapter/virtual-drive # **show physical-drive** [**detail**]	Displays physical drive information about the specified virtual drive.

Example

This example displays information about virtual drives on the storage card named SAS:

```
Server# scope chassis
Server /chassis # scope storageadapter SAS
Server /chassis/storageadapter # show virtual-drive
Virtual Drive  Status          Name                      Size       RAID Level
-------------- --------------- ------------------------ ---------- ----------
0              Optimal         SLES1SP1beta5             30720 MB   RAID 0
1              Optimal         RHEL5.5                   30720 MB   RAID 0
2              Optimal         W2K8R2_DC                 30720 MB   RAID 0
3              Optimal         VD_3                      30720 MB   RAID 0
4              Optimal         ESX4.0u2                  30720 MB   RAID 0
5              Optimal         VMs                       285568 MB  RAID 0
6              Optimal         RHEL6-35GB                35840 MB   RAID 0
7              Optimal         OS_Ins_Test_DR            158720 MB  RAID 0
8              Optimal                                   285568 MB  RAID 1

Server /chassis/storageadapter #
```

This example displays physical drive information about virtual drive number 1 on the storage card named SAS:

```
Server# scope chassis
Server /chassis # scope storageadapter SAS
Server /chassis/storageadapter # scope virtual-drive 1
Server /chassis/storageadapter/virtual-drive # show physical-drive
Span  Physical Drive Status     Starting Block Number Of Blocks
----- -------------- ---------- -------------- ----------------
0     12             online     62914560       62914560

Server /chassis/storageadapter/virtual-drive #
```

Viewing Nvidia GPU Card Information

These commands are not available on all UCS C-series servers.

Before you begin

The server must be powered on to view information on the Nvidia GPU cards.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show gpu**	Displays the available Nvidia GPU cards on the system.
Step 3	Server /chassis # **scope gpu** *slot-number*	Enters the GPU card command mode. Specify the slot number of the GPU card.
Step 4	Server /chassis/gpu # **show gpu-list**	Displays temperature information on the GPU cards.

Example

This example shows how to view the temperature information of the available GPU cards on the system:

```
Server # scope chassis
Server /chassis # show gpu

Slot       Product Name         Num of GPUs
----       ------------         -----------
5          Nvidia GRID K2 @ BD     2

Server /chassis # scope gpu 5
Server /chassis/gpu # show gpu-list

GPU ID       Temperature
------       -----------
0             32
1             33

Server /chassis/gpu #
```

Viewing PCI Adapter Properties

Before you begin

The server must be powered on, or the properties will not display.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show pci-adapter** [**detail**]	Displays PCI adapter properties.

Example

This example displays PCI adapter properties:

```
Server# scope chassis
Server /chassis # show pci-adapter
Slot Vendor ID Device ID  SubVendor ID SubDevice ID  Firmware Version Product Name
---- --------- ---------- ------------ ------------- ---------------- ------------------
L    0x8086    0x1521     0x1137       0x008b        0x80000AA5... Intel(R) I350 1 Gbps N...
1    0x19a2    0x0710     0x10df       0xe702        4.6.142.10    Emulex OCe11102-FX 2 p...
3    0x10de    0x118f     0x10de       0x097f        N/A           Nvidia TESLA K10 P2055...
4    0x14e4    0x1639     0x14e4       0x1639        N/A           Broadcom 5709 1 Gbps 2...
5    0x10de    0x0ff2     0x10de       0x1012        N/A           Nvidia GRID K1 P2401-502
M    0x1000    0x0073     0x1137       0x00b1        N/A           Cisco UCSC RAID SAS 20…

Option ROM Status
----------
Loaded
Not-Loaded
Not-Loaded
Loaded

Server /chassis #
```

Note **Option ROM Status** is applicable only for legacy boot mode and not for UEFI boot mode.

Viewing Network Related Properties

Viewing LOM Properties

You can view the MAC addresses of the LAN On Motherboard (LOM) Ethernet ports.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope network-adapter** *slot ID*	Enters the specific network adapter command mode.
Step 3	Server /chassis/network-adapter # **show mac-list** [**detail**]	Displays the MAC addresses of the LOM ports.

Example

This example shows how to display the MAC addresses of the LOM ports:

```
Server# scope chassis
Server /chassis # scope network-adapter L
Server /chassis/network-adapter # show mac-list
Interface ID       MAC Address
```

```
-------------  --------------------
eth0            010000002000
eth1            010000002000

Server /chassis/network-adapter #
```

Viewing TPM Properties

Before you begin

The server must be powered on, or the properties will not display.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show tpm-inventory**	Displays the TPM properties.

Example

This example displays the TPM properties:

```
Server# scope chassis
Server /chassis # show tpm-inventory

Version Presence  Enabled-Status  Active-Status  Ownership  Revision     Model
Vendor      Serial
------- --------  --------------  -------------- ---------- ---------  -------------
--------   -----------
 A      equipped    disabled       deactivated    unowned      1       UCSX-TPMX-00X   ABC
 Inc    FCHXXXXXXXX

Server /chassis #
```

Enabling Dual Enclosure in Storage Controllers

This feature is supported only on the server nodes having UCS S3260 12G Dual Pass-Through Controller (UCS-S3260-DHBA). Using this feature, you can select a SAS expander in the Dynamic Storage tab and enable dual enclosure support on the SAS expander, based on your requirements.

Before you begin

- Ensure that the server is powered off.

Procedure

Step 1 Server# **scope chassis**

Enters the chassis command mode.

Step 2 Server /chassis # **dynamic-storage**

Enters the dynamic storage command mode.

Step 3 Server /chassis/dynamic-storage # **show expander-hw-detail**

Displays the list of SAS expander hardware details:

- Expander ID
- Hardware revision
- SAS Address
- Enclosure ID of the SAS Expander

Step 4 Server /chassis/dynamic-storage # **set-dual-enclosure**

Enable dual enclosure support. And select `yes` to set different enclosure ID for each SAS expander.

Step 5 Server /chassis/dynamic-storage # **show expander-hw-detail**

Displays the list of SAS expander hardware details. Note the enclosure IDs for each SAS expander after enabling dual enclosure support.

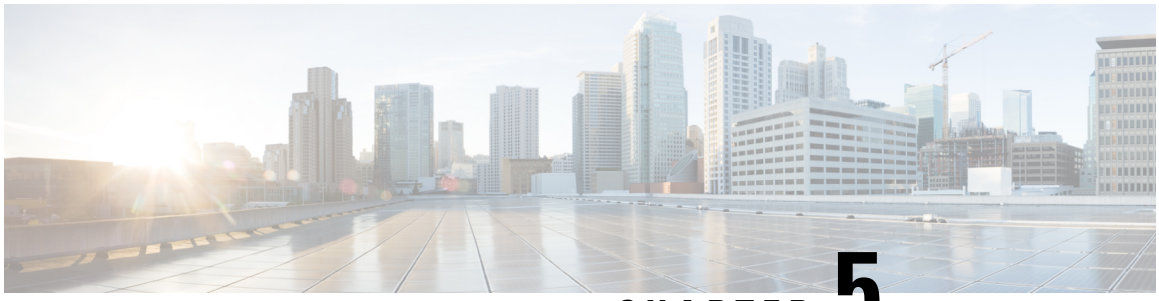
Example

This example sets dual enclosure support in the SAS expanders:

```
Server # scope chassis
Server /chassis # scope dynamic-storage
Server /chassis # show expander-hw-detail
Name       Id    ExpanderHwRev   SasAddress           EnclosureId
---------- ----- --------------- -------------------- -------------------------
SASEXP1    1     2               52cd02db305cba00     52cd02db305cb000
Name       Id    ExpanderHwRev   SasAddress           EnclosureId
---------- ----- --------------- -------------------- -------------------------
SASEXP2    2     2               52cd02db305ccb00     52cd02db305cb000

Server /chassis/dynamic-storage # set-dual-enclosure
Do you want to set different enclosure id to SAS Expanders?
Enter 'yes' --> to set different enclosure id
Enter 'no' --> to set same enclosure id
Enter your option 'yes/no' to continue-->yes
This dual enclosure feature should be applied only when the server nodes has UCS-S3260-DHBA
 adaptor and single path is zoned for each drives.
make sure both server blades are powered off.
Do you want to continue? Enter 'yes' to continue-->yes
set-dual-enclosure operation success

Server /chassis # show expander-hw-detail
Name       Id    ExpanderHwRev   SasAddress           EnclosureId
---------- ----- --------------- -------------------- -------------------------
SASEXP1    1     2               52cd02db305cba00     52cd02db305cb000
Name       Id    ExpanderHwRev   SasAddress           EnclosureId
---------- ----- --------------- -------------------- -------------------------
SASEXP2    2     2               52cd02db305ccb00     52cd02db305cb100
```



CHAPTER 5

Viewing Sensors

This chapter includes the following sections:

Viewing Power Supply Sensors

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sensor**	Enters sensor command mode.
Step 2	Server /sensor # **show psu**	Displays power supply sensor statistics for the server.
Step 3	Server /sensor # **show psu-redundancy**	Displays power supply redundancy sensor status for the server.

Example

This example displays power supply sensor statistics:

```
Server# scope sensor
Server /sensor # show psu
Name           Sensor Status  Reading  Units  Min. Warning Max. Warning  Min. Failure  Max.
 Failure
------------  -------------- -------- ------ ------------ ------------  -------------
-------------
SU1_PIN        Normal         102      Watts      N/A         882             N/A
 1098
PSU2_PIN        Normal         96       Watts      N/A        882             N/A
 1098
```

```
PSU3_PIN        Normal        102       Watts       N/A       882             N/A
 1098
PSU4_PIN        Normal        96        Watts       N/A       882             N/A
 1098
PSU1_POUT       Normal        78        Watts       N/A       798             N/A
 996
PSU2_POUT       Normal        78        Watts       N/A       798             N/A
 996
PSU3_POUT       Normal        84        Watts       N/A       798             N/A
 996
PSU4_POUT       Normal        84        Watts       N/A       798             N/A
 996
POWER_USAGE     Normal        406       Watts       N/A       N/A             N/A
 2674
PSU1_DC_OK      Normal        good

PSU2_DC_OK      Normal        good

PSU3_DC_OK      Normal        good

PSU4_DC_OK      Normal        good

PSU1_AC_OK      Normal        good

PSU2_AC_OK      Normal        good

PSU3_AC_OK      Normal        good

PSU4_AC_OK      Normal        good

PSU1_STATUS     Normal        present

PSU2_STATUS     Normal        present

PSU3_STATUS     Normal        present

PSU4_STATUS     Normal        present

Server /sensor # show psu-redundancy
Name                 Reading          Sensor Status
-------------------- ---------------- --------------------
PS_RDNDNT_MODE       full             Normal

Server /sensor #
```

Viewing Fan Sensors

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sensor**	Enters sensor command mode.
Step 2	Server /sensor # **show fan** [**detail**]	Displays fan sensor statistics for the server.

Example

This example displays fan sensor statistics:

```
Server# scope sensor
Server /sensor # show fan
Name            Sensor Status  Reading    Units  Min. Warning  Max. Warning Min. Failure
Max. Failure
--------------- -------------  ---------- ------ ------------- ------------ -------------
------------
PSU1_FAN_SPEED   Normal         5160       RPM    1118            N/A             946
  N/A
PSU2_FAN_SPEED   Normal         6106       RPM    1118            N/A             946
  N/A
PSU3_FAN_SPEED   Normal         5762       RPM    1118            N/A             946
  N/A
PSU4_FAN_SPEED   Normal         4988       RPM    1118            N/A             946
  N/A
FAN1_SPEED       Normal         6600       RPM    2040            N/A             1800
  N/A
FAN2_SPEED       Normal         6660       RPM    2040            N/A             1800
  N/A
FAN3_SPEED       Normal         6600       RPM    2040            N/A             1800
  N/A
FAN4_SPEED       Normal         6660       RPM    2040            N/A             1800
  N/A
FAN5_SPEED       Normal         6660       RPM    2040            N/A             1800
  N/A
FAN6_SPEED       Normal         6660       RPM    2040            N/A             1800
  N/A
FAN7_SPEED       Normal         6660       RPM    2040            N/A             1800
  N/A
FAN8_SPEED       Normal         6660       RPM    2040            N/A             1800
  N/A
Server /sensor #
```

Viewing Temperature Sensors

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sensor**	Enters sensor command mode.
Step 2	Server /sensor # **show temperature** [**detail**]	Displays temperature sensor statistics for the server.

Example

This example displays temperature sensor statistics:

```
Server# scope sensor
Server /sensor # show temperature
Name                     Sensor Status  Reading    Units      Min. Warning Max. Warning
Min. Failure Max. Failure
------------------------ -------------- ---------- ---------- ------------ ------------
```

```
------------ ------------
IOH_TEMP_SENS             Normal          32.0       C          N/A           80.0
N/A           85.0
P2_TEMP_SENS              Normal          31.0       C          N/A           80.0
N/A           81.0
P1_TEMP_SENS              Normal          34.0       C          N/A           80.0
N/A           81.0
DDR3_P2_D1_TMP            Normal          20.0       C          N/A           90.0
N/A           95.0
DDR3_P1_A1_TMP            Normal          21.0       C          N/A           90.0
N/A           95.0
FP_AMBIENT_TEMP           Normal          28.0       C          N/A           40.0
N/A           45.0

Server /sensor #
```

Viewing Voltage Sensors

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sensor**	Enters sensor command mode.
Step 2	Server /sensor # **show voltage** [**detail**]	Displays voltage sensor statistics for the server.

Example

This example displays voltage sensor statistics:

```
Server# scope sensor
Server /sensor # show voltage
Name                      Sensor Status  Reading    Units      Min. Warning Max. Warning
Min. Failure Max. Failure
------------------------- -------------- ---------- ---------- ------------ ------------
------------ ------------
P3V_BAT_SCALED            Normal         3.022      V          N/A          N/A
2.798        3.088
P12V_SCALED               Normal         12.154     V          N/A          N/A
11.623       12.331
P5V_SCALED                Normal         5.036      V          N/A          N/A
4.844        5.157
P3V3_SCALED               Normal         3.318      V          N/A          N/A
3.191        3.381
P5V_STBY_SCALED           Normal         5.109      V          N/A          N/A
4.844        5.157
PV_VCCP_CPU1              Normal         0.950      V          N/A          N/A
0.725        1.391
PV_VCCP_CPU2              Normal         0.891      V          N/A          N/A
0.725        1.391
P1V5_DDR3_CPU1            Normal         1.499      V          N/A          N/A
1.450        1.548
P1V5_DDR3_CPU2            Normal         1.499      V          N/A          N/A
1.450        1.548
P1V1_IOH                  Normal         1.087      V          N/A          N/A
1.068        1.136
P1V8_AUX                  Normal         1.773      V          N/A          N/A
```

```
1.744        1.852

Server /sensor #
```

Viewing Current Sensors

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sensor**	Enters sensor command mode.
Step 2	Server /sensor # **show current** [**detail**]	Displays current sensor statistics for the server.

Example

This example displays current sensor statistics:

```
Server# scope sensor
Server /sensor # show current
Name                      Sensor Status  Reading    Units      Min. Warning Max. Warning
Min. Failure Max. Failure
------------------------- -------------- ---------- ---------- ------------ ------------
------------ ------------
VR_P2_IMON                Normal         16.00      AMP        N/A          147.20
N/A          164.80
VR_P1_IMON                Normal         27.20      AMP        N/A          147.20
N/A          164.80

Server /sensor #
```

Viewing Storage Sensors

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show hdd** [**detail**]	Displays storage sensor information.

The displayed fields are described in the following table:

Name	Description
Name column	The name of the storage device.
Status column	A brief description of the storage device status.

Name	Description
LED Status column	The current LED color, if any. To make the physical LED on the storage device blink, select **Turn On** from the drop-down list. To let the storage device control whether the LED blinks, select **Turn Off**. **Note** This information is only available for some C-Series servers.

Example

This example displays storage sensor information:

```
Server# scope chassis
Server /chassis # show hdd
Name                 Status
-------------------- --------------------
HDD_01_STATUS        present
HDD_02_STATUS        present
HDD_03_STATUS        present
HDD_04_STATUS        present

Server /chassis #
```

Setting Dynamic Front Panel Temperature Threshold

Before you begin

Log in as a user with admin privileges.

Procedure

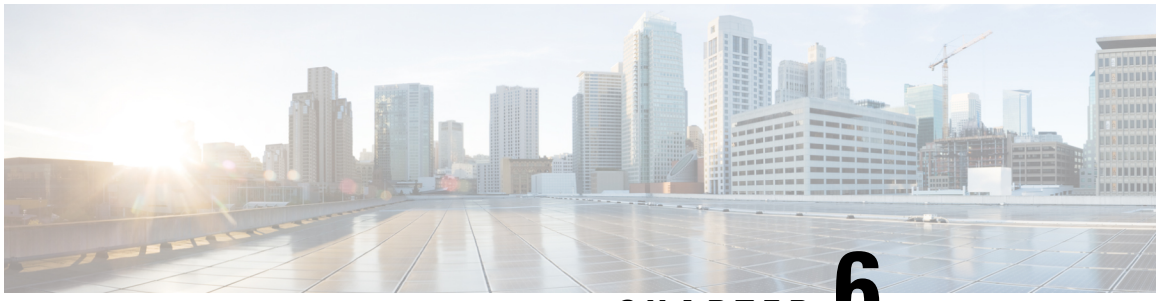
	Command or Action	Purpose
Step 1	server # **scope sensor**	Enters sensor command mode
Step 2	server /sensor # **set fp-critical-temp** *upper critical temperature threshold value*	Sets the upper critical temperature threshold. The valid range is between 8 and 50.
Step 3	server /sensor * # **commit**	Commits the change in temperature threshold value.

Example

This example shows how to set the dynamic front panel temperature threshold:

```
Server # scope sensor
Valid value for "fp-critical-temp" is from 8 to 50
Server /sensor # set fp-critical-temp 44
```

```
Server /sensor *# commit
Server /sensor # show temperature
Name                     Sensor Status  Reading    Units   Critical Min  Critical Max
Non-Recoverable Min   Non-Recoverable Max
-------------------      -------------  -------   ------   ------------  ------------
--------------------  --------------------
VIC_SLOT1_TEMP           Normal         58.0       C          N/A          90.0
N/A                   95.0
TEMP_SENS_FRONT          Normal         27.0       C          N/A          40.0
N/A                   50.0
DDR4_P1_A1_TMP           Normal         29.0       C          N/A          85.0
N/A                   90.0
DDR4_P2_G1_TMP           Normal         28.0       C          N/A          85.0
N/A                   90.0
P1_TEMP_SENS             Normal         39.5       C          N/A          103.0
N/A                   113.0
P2_TEMP_SENS             Normal         39.5       C          N/A          103.0
N/A                   113.0
PSU1_TEMP                Normal         27.0       C          N/A          65.0
N/A                   70.0
PSU2_TEMP                Normal         26.0       C          N/A          65.0
N/A                   70.0
PCH_TEMP_SENS            Normal         36.0       C          N/A          85.0
N/A                   90.0
RISER2_INLET_TMP         Normal         37.0       C          N/A          70.0
N/A                   80.0
RISER1_INLET_TMP         Normal         36.0       C          N/A          70.0
N/A                   80.0
```



CHAPTER 6

Managing Remote Presence

This chapter includes the following sections:

Managing the Virtual KVM

Virtual KVM Console

The vKVM console is an interface accessible from Cisco IMC that emulates a direct keyboard, video, and mouse (vKVM) connection to the server. The vKVM console allows you to connect to the server from a remote location.

Here are a few major advantages of using Cisco KVM Console:

- The Cisco KVM console provides connection to KVM, SOL, and vMedia whereas the Avocent KVM provides connection only to KVM and vMedia.
- In the KVM Console, the vMedia connection is established at the KVM Launch Manager and is available for all users.
- The KVM console offers you an advanced character replacement options for the unsupported characters while pasting text from the guest to the host.
- The KVM console provides you an ability to store the vMedia mappings on CIMC.

Instead of using CD/DVD or floppy drives physically connected to the server, the vKVM console uses virtual media, which are actual disk drives or disk image files that are mapped to virtual CD/DVD or floppy drives. You can map any of the following to a virtual drive:

- CD/DVD or floppy drive on your computer
- Disk image files (ISO or IMG files) on your computer
- USB flash drive on your computer
- CD/DVD or floppy drive on the network

- Disk image files (ISO or IMG files) on the network
- USB flash drive on the network

You can use the vKVM console to install an OS on the server.

Note The vKVM Console is operated only through the GUI. To launch the vKVM Console, see the instructions in the *Cisco UCS C-Series Servers Integrated Management Controller GUI Configuration Guide*.

Enabling the Virtual KVM

Before you begin

You must log in as a user with admin privileges to enable the virtual KVM.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kvm**	Enters KVM command mode.
Step 2	Server /kvm # **set enabled yes**	Enables the virtual KVM.
Step 3	Server /kvm # **commit**	Commits the transaction to the system configuration.
Step 4	Server /kvm # **show** [**detail**]	(Optional) Displays the virtual KVM configuration.

Example

This example enables the virtual KVM:

```
Server# scope kvm
Server /kvm # set enabled yes
Server /kvm *# commit
Server /kvm # show
Encryption Enabled Local Video      Active Sessions Enabled KVM Port
------------------ ---------------- --------------- ------- --------
no                 yes              0               yes     2068

Server /kvm #
```

Disabling the Virtual KVM

Before you begin

You must log in as a user with admin privileges to disable the virtual KVM.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kvm**	Enters KVM command mode.
Step 2	Server /kvm # **set enabled no**	Disables the virtual KVM. **Note** Disabling the virtual KVM disables access to the virtual media feature, but does not detach the virtual media devices if virtual media is enabled.
Step 3	Server /kvm # **commit**	Commits the transaction to the system configuration.
Step 4	Server /kvm # **show** [**detail**]	(Optional) Displays the virtual KVM configuration.

Example

This example disables the virtual KVM:

```
Server# scope kvm
Server /kvm # set enabled no
Server /kvm *# commit
Server /kvm # show
Encryption Enabled Local Video      Active Sessions Enabled KVM Port
------------------ ---------------- --------------- ------- --------
no                 yes              0               no      2068

Server /kvm #
```

Configuring the Virtual KVM

Before you begin

You must log in as a user with admin privileges to configure the virtual KVM.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kvm**	Enters KVM command mode.
Step 2	Server /kvm # **set enabled** {**yes** | **no**}	Enables or disables the virtual KVM.
Step 3	Server /kvm # **set encrypted** {**yes** | **no**}	If encryption is enabled, the server encrypts all video information sent through the KVM.
Step 4	Server /kvm # **set kvm-port** *port*	Specifies the port used for KVM communication.

	Command or Action	Purpose
Step 5	Server /kvm # **set local-video** {**yes** | **no**}	If local video is **yes**, the KVM session is also displayed on any monitor attached to the server.
Step 6	Server /kvm # **set max-sessions** *sessions*	Specifies the maximum number of concurrent KVM sessions allowed. The *sessions* argument is an integer between 1 and 4.
Step 7	Server /kvm # **commit**	Commits the transaction to the system configuration.
Step 8	Server /kvm # **show** [**detail**]	(Optional) Displays the virtual KVM configuration.

Example

This example configures the virtual KVM and displays the configuration:

```
Server# scope kvm
Server /kvm # set enabled yes
Server /kvm *# set encrypted no
Server /kvm *# set kvm-port 2068
Server /kvm *# set max-sessions 4
Server /kvm *# set local-video yes
Server /kvm *# commit
Server /kvm # show detail
KVM Settings:
    Encryption Enabled: no
    Max Sessions: 4
    Local Video: yes
    Active Sessions: 0
    Enabled: yes
    KVM Port: 2068

Server /kvm #
```

What to do next

Launch the virtual KVM from the GUI.

Configuring Virtual Media

Before you begin

You must log in as a user with admin privileges to configure virtual media.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope vmedia**	Enters virtual media command mode.

	Command or Action	Purpose
Step 2	Server /vmedia # **set enabled** {**yes** | **no**}	Enables or disables virtual media. By default, virtual media is disabled. **Note** Disabling virtual media detaches the virtual CD, virtual floppy, and virtual HDD devices from the host.
Step 3	Server /vmedia # **set encryption** {**yes** | **no**}	Enables or disables virtual media encryption.
Step 4	Server /vmedia # **set low-power-usb-enabled** {**yes** | **no**}	Enables or disables low power USB. **Note** While mapping an ISO to a server which has a UCS VIC P81E card and the NIC is in Cisco Card mode: • If the low power USB is enabled, after mapping the ISO and rebooting the host the card resets and ISO mapping is lost. The virtual drives are not visible on the boot selection menu. • If the low power USB is disabled, after mapping the ISO, and rebooting the host and the Cisco IMC, the virtual drivers appear on the boot selection menu as expected.
Step 5	Server /vmedia # **commit**	Commits the transaction to the system configuration.
Step 6	Server /vmedia # **show** [**detail**]	(Optional) Displays the virtual media configuration.

Example

This example configures virtual media encryption:

```
Server# scope vmedia
Server /vmedia # set enabled yes
Server /vmedia *# set encryption yes
Server /vmedia *# set low-power-use-enabled no
Server /vmedia *# commit
Server /vmedia # show detail
vMedia Settings:
    Encryption Enabled: yes
    Enabled: yes
```

```
    Max Sessions: 1
    Active Sessions: 0
    Low Power USB Enabled: no

Server /vmedia #
```

What to do next

Use the KVM to attach virtual media devices to a host.

Configuring a Cisco IMC-Mapped vMedia Volume

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope vmedia**	Enters the virtual media command mode.
Step 2	Server /vmedia # **map-cifs** {**volume-name** | **remote-share** | **remote-file-path** [*mount options*]	Maps a CIFS file for vMedia. You must specify the following: • Name of the volume to create • Remote share including IP address and the exported directory • Path of the remote file corresponding to the exported directory. • (Optional) Mapping options • Username and password to connect to the server
Step 3	Server /vmedia # **map-nfs** {**volume-name** | **remote-share** | **remote-file-path**} [*mount options*]	Maps an NFS file for vMedia. You must specify the following: • Name of the volume to create • Remote share including IP address and the exported directory • Path of the remote file corresponding to the exported directory. • (Optional) Mapping options
Step 4	Server /vmedia # **map-www** {**volume-name** | **remote-share** | **remote-file-path** [*mount options*]	Maps an HTTPS file for vMedia. You must specify the following: • Name of the volume to create

	Command or Action	Purpose
		• Remote share including IP address and the exported directory • Path of the remote file corresponding to the exported directory. • (Optional) Mapping options • Username and password to connect to the server

Example

This example shows how to create a CIFS Cisco IMC-mapped vmedia settings:

```
Server # scope vmedia
Server /vmedia # map-cifs sample-volume //10.10.10.10/project /test/sample
Server username:
Server password: ****
Confirm password: ****

Server /vmedia #
```

Viewing Cisco IMC-Mapped vMedia Volume Properties

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope vmedia**	Enters the virtual media command mode.
Step 2	Server /vmedia # **show mappings** *detail*	Displays information on all the vmedia mapping that are configured.

Example

This example shows how to view the properties of all the configured vmedia mapping:

```
Server # scope vmedia
Server /vmedia # show mappings

Volume  Map-status   Drive-type     remote-share        remote-file               mount-type
------  ----------  ------------  --------------------- --------------------      -----------

Huu     OK           removable    http://10.104.236.99/ rhel-server-6.1-x86_6.iso      www
Rhel    OK           CD           http://10.104.236.99/ rhel-server-6.1-x86_6.iso      www
```

Managing Serial over LAN

Serial Over LAN

Serial over LAN (SoL) is a mechanism that enables the input and output of the serial port of a managed system to be redirected via an SSH session over IP. SoL provides a means of reaching the host console via Cisco IMC.

Guidelines and Restrictions for Serial Over LAN

For redirection to SoL, the server console must have the following configuration:

- console redirection to serial port A
- no flow control
- baud rate the same as configured for SoL
- VT-100 terminal type
- legacy OS redirection disabled

The SoL session will display line-oriented information such as boot messages, and character-oriented screen menus such as BIOS setup menus. If the server boots an operating system or application with a bitmap-oriented display, such as Windows, the SoL session will no longer display. If the server boots a command-line-oriented operating system (OS), such as Linux, you may need to perform additional configuration of the OS in order to properly display in an SoL session.

In the SoL session, your keystrokes are transmitted to the console except for the function key F2. To send an F2 to the console, press the Escape key, then press 2.

Configuring Serial Over LAN

Before you begin

You must log in as a user with admin privileges to configure serial over LAN (SoL).

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sol**	Enters SoL command mode.
Step 2	Server /sol # **set enabled** {**yes** | **no**}	Enables or disables SoL on this server.
Step 3	Server /sol # **set baud-rate** {**9600** | **19200** | **38400** | **57600** | **115200**}	Sets the serial baud rate the system uses for SoL communication. **Note** The baud rate must match the baud rate configured in the server serial console.

	Command or Action	Purpose
Step 4	(Optional) Server /sol # **set comport** {**com0** | **com1**	Sets the serial port through which the system routes SoL communications. **Note** This option is only available on some C-Series servers. If it is not available, the server always uses COM port 0 for SoL communication. You can specify: • **com0**—SoL communication is routed through COM port 0, an externally accessible serial port that supports either a physical RJ45 connection to an external device or a virtual SoL connection to a network device. If you select this option, the system enables SoL and disables the RJ45 connection, which means that the server can no longer support an external serial device. • **com1**—SoL communication is routed through COM port 1, an internal port accessible only through SoL. If you select this option, you can use SoL on COM port 1 and the physical RJ45 connection on COM port 0. **Note** Changing the comport setting disconnects any existing SoL sessions.
Step 5	Server /sol # **commit**	Commits the transaction to the system configuration.
Step 6	Server /sol # **show** [**detail**]	(Optional) Displays the SoL settings.

Example

This example configures SoL:

```
Server# scope sol
Server /sol # set enabled yes
Server /sol *# set baud-rate 115200
Server /sol *# commit
Server /sol # show
Enabled Baud Rate(bps)  Com Port
------- --------------- --------
yes     115200          com2
```

```
Server /sol # show detail
Serial Over LAN:
    Enabled: yes
    Baud Rate(bps): 115200
    Com Port: com2
Server /sol #
```

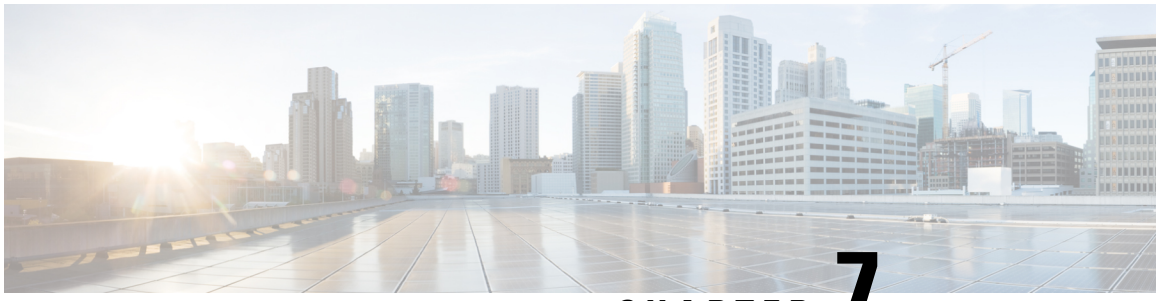
Launching Serial Over LAN

Procedure

	Command or Action	Purpose
Step 1	Server# **connect host**	Opens a serial over LAN (SoL) connection to the redirected server console port. You can enter this command in any command mode.

What to do next

To end the SoL session, you must close the CLI session. For example, to end an SoL session over an SSH connection, disconnect the SSH connection.



CHAPTER 7

Managing User Accounts

This chapter includes the following sections:

Configuring Local Users

Before you begin

You must log in as a user with admin privileges to configure or modify local user accounts.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope user** *usernumber*	Enters user command mode for user number *usernumber*.
Step 2	Server /user # **set enabled** {**yes** | **no**}	Enables or disables the user account on the Cisco IMC.
Step 3	Server /user # **set name** *username*	Specifies the username for the user.

	Command or Action	Purpose
Step 4	Server /user # **set password**	You are prompted to enter the password twice. **Note** When strong password is enabled, you must follow these guidelines while setting a password: • The password must have a minimum of 8 and a maximum of 14 characters. • The password must not contain the User's Name. • The password must contain characters from three of the following four categories: • English uppercase characters (A through Z) • English lowercase characters (a through z) • Base 10 digits (0 through 9) • Non-alphabetic characters (!, @, #, $, %, ^, &, *, -, _, +, =) when strong password is disabled, you can set a password using characters of your choice (alphanumeric, special characters, or integers) within the range 1-20.
Step 5	Server /user # **set role** {**readonly** | **user** | **admin**}	Specifies the role assigned to the user. The roles are as follows: • readonly—This user can view information but cannot make any changes. • user—This user can do the following: • View all information • Manage the power control options such as power on, power cycle, and power off • Launch the KVM console and virtual media • Clear all logs

	Command or Action	Purpose
		• Toggle the locator LED • Set the time zone • Ping an IP address • admin—This user can perform all actions available through the GUI, CLI, and IPMI.
Step 6	Server /user # **commit**	Commits the transaction to the system configuration.

Example

This example configures user 5 as an admin:

```
Server# scope user 5
Server /user # set enabled yes
Server /user *# set name john
Server /user *# set password
Warning:
Strong Password Policy is enabled!

For CIMC protection your password must meet the following requirements:
        The password must have a minimum of 8 and a maximum of 14 characters.
        The password must not contain the User's Name.
        The password must contain characters from three of the following four categories.
            English uppercase characters (A through Z)
            English lowercase characters (a through z)
            Base 10 digits (0 through 9)
Please enter password:
Please confirm password:
Server /user *# set role readonly
Server /user *# commit
Server /user #  show
User   Name             Role     Enabled
------ ---------------- -------- --------
5      john             readonly yes
```

Managing SSH Keys for User Accounts

Configuring SSH Keys

In the release 4.1.2, Cisco IMC provides SSH RSA key-based authentication in addition to password authentication. SSH keys are a set of public and private RSA key pair, which you can use for authentication. Public key-based authentication provides enhanced security over password-based authentication.

You must log in as a user with admin privileges to configure the SSH keys for all the users. If you are a non-admin user, you can configure the SSH keys to authenticate and login only to your account. You can

configure only one SSH RSA key pair, public and private, for your account. The SSH keys must be in .pem or .pub format.

The Cisco IMC sessions authenticated using public keys will be active even if the password has expired. You can also start new sessions using the public SSH key even after the password has expired. **Account lockout** option, available on some C-series servers, does not apply to the accounts that use public key authentication.

Adding SSH Keys

Before you begin

- You must log in as a user with admin privileges to add the SSH keys for all the users.
- If you are a non-admin user, you can add the public key only for your account.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope user** *user-number*	Enters the user command mode for a user.
Step 2	Server /user # **show-detail**	Displays the details of the user account. You can view the number of SSH keys configured for a user in the `SSH Key Count` field.
Step 3	Server /user # **scope ssh-keys**	Enters the SSH keys command mode.
Step 4	Server /user/ssh-keys # **add-key 1 remote**	Use this option to add the SSH key from a remote server. Enter the following details: **a.** Specify the protocol to connect to the remote server. It can be of the following types: • TFTP FTP SFTP SCP HTTP **Note** If you choose FTP, SCP or SFTP, you will be prompted to enter your username and password. **b.** Specify the remote server address. **c.** Specify the remote file path. **d.** Specify your username and password.

	Command or Action	Purpose
Step 5	(Optional) Server /user/ssh-keys # **add-key 2 paste**	Use this option to add the SSH key by paste method. Launches a dialog for entering the public SSH key. Copy the SSH key text, paste it into the console when prompted, and type CTRL+D.
Step 6	(Optional) Server /user/ssh-keys # **show-detail**	Displays the public SSH key that you have added to the account.

Example

1. This example adds the SSH key from a remote server.

```
Server# scope user 1
Server /user # scope ssh-keys
Server /user/ssh-keys # add-key 1 remote
Enter the remote Protocol [tftp | ftp | sftp | scp | http]: scp
Enter the remote Server: 10.10.10.10
Enter the remote file Path: /home/xyz/publickey.pem
Server (RSA) key fingerprint is dd:b5:2b:07:ad:c0:30:b2:d5:6a:6a:78:80:85:93:b0
Do you wish to continue? [y/N]y
Username: xyz
Password:
SSH Public key added successfully
Server /user/ssh-keys #
```

2. This example adds the SSH key by paste method.

```
Server# scope user 1
Server /user # scope ssh-keys
Server /user/ssh-keys # add-key 2 paste
Please paste your ssh key here, when finished, press CTRL+D.
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDFOK17ZYbMMfGcxGrfxlupMqFyl1ZNIJohPxAStu41
OkItF9VrrhrfF1ZKOpogJinx3s0OcPfGLMSWEQkUq1zGlL8rAESZbi6z36WGFeZ93amJ3nfxDU7JWD9K
HmINixpX5XbbZeKQJvfSTptanmkjTQ8sq2iSMK0HL+G35i8BXmwIBLuEM+SWIEYjLaDAZ6aLKPxxddTr
FxWTP9QpzJAfQGlXXZSYauYb6OMNUxjgqFtB2XCiROZTzcj4n1XQRbzU+56HvHmowcOPhO81Btbun+xv
ksTeXbV3e9DVymjQK1qD2yY5h/EJdC0+9wGPyVmaT2bAOu4HbTsz8u4HFkTf
SSH Public key added successfully
Server /user/ssh-keys #
```

What to do next

Modify or delete the SSH key.

Modifying SSH Keys

Before you begin

- You must log in as a user with admin privileges to modify the SSH keys for all the users.
- If you are a non-admin user, you can modify the public key only for your account.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope user** *user-number*	Enters the user command mode for a user.
Step 2	Server /user # **show-detail**	Displays the details of the user account. You can view the number of SSH keys configured for a user in the `SSH Key Count` field.
Step 3	Server /user # **scope ssh-keys**	Enters the SSH keys command mode.
Step 4	Server /user/ssh-keys # **modify-key 1 remote**	Use this option to add the modified key from a remote server. Enter the following details: **a.** Specify the protocol to connect to the remote server. It can be of the following types: • TFTP FTP SFTP SCP HTTP **Note** If you choose FTP, SCP or SFTP, you will be prompted to enter your username and password. **b.** Specify the remote server address. **c.** Specify the remote file path. **d.** Specify your username and password.
Step 5	(Optional) Server /user/ssh-keys # **modify-key 2 paste**	Use this option to add the modified SSH key by paste method. Launches a dialog for entering the updated public SSH key. Copy the SSH key text, paste it into the console when prompted, and type CTRL+D.
Step 6	(Optional) Server /user/ssh-keys # **show-detail**	Displays the updated public SSH key that you modified in the account.

Example

1. This example adds the modified SSH key from a remote server.

```
Server# scope user 1
Server /user # scope ssh-keys
Server /user/ssh-keys # modify-key 1 remote
Enter the remote Protocol [tftp | ftp | sftp | scp | http]: scp
Enter the remote Server: 10.10.10.10
Enter the remote file Path: /home/xyz/publickey.pem
Server (RSA) key fingerprint is dd:b5:2b:07:ad:c0:30:b2:d5:6a:6a:78:80:85:93:b0
Do you wish to continue? [y/N]y
Username: xyz
Password:
SSH Public key modified successfully
Server /user/ssh-keys #
```

2. This example adds the modified SSH key by paste method.

```
Server# scope user 1
Server /user # scope ssh-keys
Server /user/ssh-keys # modify-key 2 paste
Please paste your ssh key here, when finished, press CTRL+D.
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDFOK17ZYbMMfGcxGrfxlupMqFyl1ZNIJohPxAStu41
OkItF9VrrhrfF1ZKOpogJinx3s0OcPfGLMSWEQkUq1zGlL8rAESZbi6z36WGFeZ93amJ3nfxDU7JWD9K
HmINixpX5XbbZeKQJvfSTptanmkjTQ8sq2iSMK0HL+G35i8BXmwIBLuEM+SWIEYjLaDAZ6aLKPxxddTr
FxWTP9QpzJAfQGlXXZSYauYb6OMNUxjgqFtB2XCiROZTzcj4n1XQRbzU+56HvHmowcOPhO81Btbun+xv
ksTeXbV3e9DVymjQK1qD2yY5h/EJdC0+9wGPyVmaT2bAOu4HbTsz8u4HFkTf
SSH Public key modified successfully
Server /user/ssh-keys #
```

What to do next

Delete the SSH key.

Deleting SSH Keys

Before you begin

- You must log in as a user with admin privileges to delete the SSH keys for all the users.
- If you are a non-admin user, you can delete the public key only for your account.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope user** *user-number*	Enters the user command mode for a user.
Step 2	Server /user # **show-detail**	Displays the details of the user account. The field `SSH Key Count`displays the number of SSH keys that are configured for the user.
Step 3	Server /user # **scope ssh-keys**	Enters the SSH keys command mode.
Step 4	Server /user/ssh-keys # **delete-key 1**	A prompt with the message `Do you wish to continue? [y/N]` is displayed.
Step 5	Enter `y` to confirm the deletion.	

	Command or Action	Purpose
Step 6	(Optional) Server /user/ssh-keys # **show-detail**	Displays the updated user details and SSH key count.

Example

This example deletes the SSH key.

```
Server# scope user 1
Server /user # scope ssh-keys
Server /user/ssh-keys # delete-key 1
This operation will delete the SSH key -
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDFOK17ZYbMMfGcxGrfxlupMqFyl1ZNIJohPxAStu41
OkItF9VrrhrfF1ZKOpogJinx3s0OcPfGLMSWEQkUq1zGlL8rAESZbi6z36WGFeZ93amJ3nfxDU7JWD9K
HmINixpX5XbbZeKQJvfSTptanmkjTQ8sq2iSMK0HL+G35i8BXmwIBLuEM+SWIEYjLaDAZ6aLKPxxddTr
FxWTP9QpzJAfQGlXXZSYauYb6OMNUxjgqFtB2XCiROZTzcj4n1XQRbzU+56HvHmowcOPhO81Btbun+xv
ksTeXbV3e9DVymjQK1qD2yY5h/EJdC0+9wGPyVmaT2bAOu4HbTsz8u4HFkTf
Do you wish to continue? [y/N]y
SSH Public key deleted successfully
Server /user/ssh-keys #
```

Non-IPMI User Mode

Release 4.1 introduces a new user configuration option called **User Mode** that allows you to switch between IPMI and non-IPMI user modes. Introduction of the non-IPMI user mode provides enhanced password security for users and security enhancements to the BMC database that were restricted in earlier releases due to the constraints posed by the IPMI 2.0 standards. Non-IPMI user mode allows you to use 127 characters to set user passwords whereas users in IPMI mode are restricted to a password length of 20 characters. Non-IPMI user mode enables you to set stronger passwords for users configured in this mode.

You must consider the following configuration changes that occur while switching between user modes, when you:

- Switch to the non-IPMI mode, IPMI over LAN will not be supported.
- Switch from the non-IPMI to IPMI mode, deletes all the local users and reverts user credentials to default username and password. On subsequent login, you will be prompted to change the password.

  User data is not affected when you switch from IPMI to non-IPMI mode.
- Downgrade the firmware to a versions lower than 4.1 and if the user mode is non-IPMI, deletes all the local users and reverts user credentials to default username and password. On subsequent login, you will be prompted to change the default password.

Note When you reset to factory defaults, the user mode reverts to IPMI mode.

Switching User Mode from IPMI to Non-IPMI

Before you begin

You must log in as a user with admin privileges to perform this action.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope user-policy**	Enters user policy command mode.
Step 2	Server /user-policy # **scope user-mode**	Enters user mode command mode.
Step 3	Server /user-policy/user-mode # **set user-mode non-ipmi**	Enter y at the confirmation prompt to switch to Non-IPMI user mode.
Step 4	Server /user-policy/user-mode * # **commit**	Commits the transaction to the system configuration.
Step 5	Server /user-policy/user-mode # **show detail**	Displays the user mode.

Example

This example shows how to disable strong password:

```
Server# scope user-policy
Server /user-policy # scope user-mode
Server /user-policy/user-mode # set user-mode non-ipmi
Server /user-policy/user-mode *# commit
Warning: This will enable NON-IPMI based user mode.
         Converting to Non-IPMI User Mode disables IPMI Services and removes IPMI user
support.
         SSH, KVM, Webserver, XMAPI and Redfish sessions will be disconnected.
Do you wish to continue? [y/N] y
Connection to 10.10.10.10 closed by remote host.
Connection to 10.10.10.10 closed.
Server /user-policy/user-mode # show detail
User Mode:
    User mode for IPMI accessibility: non-ipmi
Server /user-policy/user-mode #
```

Switching User Mode from Non-IPMI to IPMI

Before you begin

You must log in as a user with admin privileges to perform this action.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope user-policy**	Enters user policy command mode.

	Command or Action	Purpose
Step 2	Server /user-policy # **scope user-mode**	Enters user mode command mode.
Step 3	Server /user-policy/user-mode # **set user-mode ipmi**	Enter y at the confirmation prompt to switch to IPMI user mode. **Note** Switching to IPMI user mode deletes all the UCS users and reverts to default username and password.
Step 4	Server /user-policy/user-mode * # **commit**	Commits the transaction to the system configuration.
Step 5	Server /user-policy/user-mode # **show detail**	Displays the user mode.

Example

This example shows how to disable strong password:

```
Server# scope user-policy
Server /user-policy # scope user-mode
Server /user-policy/user-mode # set user-mode ipmi
Server /user-policy/user-mode *# commit
Warning: This will enable IPMI based user mode.
         Converting to IPMI User Mode deletes all UCS users and reverts to default
userid/password.
         SSH, KVM, Webserver, XMAPI and Redfish sessions will be disconnected.
Do you wish to continue? [y/N] y
Connection to 10.10.10.10 closed by remote host.
Connection to 10.10.10.10 closed.
Server /user-policy/user-mode # show detail
User Mode:
    User mode for IPMI accessibility: ipmi
Server /user-policy/user-mode #
```

Disabling Strong Password

The Cisco IMC now implements a strong password policy wherein you are required to follow guidelines and set a strong password when you first log on to the server for the first time. The Cisco IMC CLI provides you option which allows you to disable the strong password policy and set a password of your choice by ignoring the guidelines. Once you disable the strong password, an Enable Strong Password button is displayed. By default, the strong password policy is enabled.

Before you begin

You must log in as a user with admin privileges to perform this action.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope user-policy**	Enters user policy command mode.
Step 2	Server /user-policy # **set password-policy** {**enabled** | **disabled**}	At the confirmation prompt, enter **y** to complete the action or **n** to cancel the action. Enables or disables the strong password.
Step 3	Server /user-policy # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to disable strong password:

```
Server# scope user-policy
Server /user-policy # set password-policy disabled
Warning: Strong password policy is being disabled.
Do you wish to continue? [y/N] y
Server /user-policy *# commit
Server /user-policy #
```

Configuring User Authentication Precedence

Procedure

	Command or Action	Purpose
Step 1	Server # **scope user-policy**	Enters the TACACS+ command mode.
Step 2	Server/user-policy # **set authentication-precedence** *User Database name*	Enter comma delimited list of user database.
Step 3	Server/user-policy # **commit**	

Example

```
Server # scope user-policy
Server /user-policy # set authentication-precedence DB1,DB2
Server /user-policy* # commit
```

Resetting the User Password

You can use the change password option to change your password.

Note

- This option is not available when you login as an admin, you can only change the password of the configured users with read-only user privileges.
- When you change your password you will be logged out of Cisco IMC.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope user** *user ID*	Enters the chosen user command mode.
Step 2	Server /chassis/user # **set password**	Read the password requirements instructions and enter the current password, new password and confirm the password at the respective prompts.
Step 3	Server /chassis/user * # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to change the password of a configured user:

```
Server # scope user 2
Server /chassis/user # set password
Warning:
Strong Password Policy is enabled!
For CIMC protection your password must meet the following requirements:
      The password must have a minimum of 8 and a maximum of 20 characters.
       The password must not contain the User's Name.
        The password must contain characters from three of the following four categories.
            English uppercase characters (A through Z)
            English lowercase characters (a through z)
            Base 10 digits (0 through 9)
            Non-alphabetic characters (!, @, #, $, %, ^, &, *, -, _, +, =)
Please enter current password:Testabcd1
Please enter password: Testabcd2
Please confirm password: Testabcd2
Server /chassis/user * # commit
Server /chassis/user #
```

LDAP Servers

Cisco IMC supports directory services that organize information in a directory, and manage access to this information. Cisco IMC supports Lightweight Directory Access Protocol (LDAP), which stores and maintains directory information in a network. In addition, Cisco IMC supports Microsoft Active Directory (AD). Active Directory is a technology that provides a variety of network services including LDAP-like directory services, Kerberos-based authentication, and DNS-based naming. The Cisco IMC utilizes the Kerberos-based authentication service of LDAP.

When LDAP is enabled in the Cisco IMC, user authentication and role authorization is performed by the LDAP server for user accounts not found in the local user database. The LDAP user authentication format is username@domain.com.

By enabling encryption in the configuration of Active Directory on the server, you can require the server to encrypt data sent to the LDAP server.

Configuring the LDAP Server

The Cisco IMC can be configured to use LDAP for user authentication and authorization. To use LDAP, configure users with an attribute that holds the user role and locale information for the Cisco IMC. You can use an existing LDAP attribute that is mapped to the Cisco IMC user roles and locales or you can modify the LDAP schema to add a new custom attribute, such as the CiscoAVPair attribute, which has an attribute ID of 1.3.6.1.4.1.9.287247.1.

Important For more information about altering the schema, see the article at http://technet.microsoft.com/en-us/library/bb727064.aspx.

Note This example creates a custom attribute named CiscoAVPair, but you can also use an existing LDAP attribute that is mapped to the Cisco IMC user roles and locales.

If you are using Group Authorization on the Cisco IMC LDAP configuration, then you can skip Steps 1-4 and perform the steps listed in the *Configuring LDAP Settings and Group Authorization in Cisco IMC* section.

The following steps must be performed on the LDAP server.

Procedure

Step 1 Ensure that the LDAP schema snap-in is installed.

Step 2 Using the schema snap-in, add a new attribute with the following properties:

Properties	Value
Common Name	`CiscoAVPair`
LDAP Display Name	`CiscoAVPair`
Unique X500 Object ID	`1.3.6.1.4.1.9.287247.1`
Description	`CiscoAVPair`
Syntax	`Case Sensitive String`

Step 3 Add the CiscoAVPair attribute to the user class using the snap-in:

a) Expand the **Classes** node in the left pane and type `U` to select the user class.

b) Click the **Attributes** tab and click **Add**.

c) Type **C** to select the CiscoAVPair attribute.
d) Click **OK**.

Step 4 Add the following user role values to the CiscoAVPair attribute, for the users that you want to have access to Cisco IMC:

Role	CiscoAVPair Attribute Value
admin	`shell:roles="admin"`
user	`shell:roles="user"`
read-only	`shell:roles="read-only"`

Note For more information about adding values to attributes, see the article at http://technet.microsoft.com/en-us/library/bb727064.aspx.

What to do next

Use the Cisco IMC to configure the LDAP server.

Configuring LDAP in Cisco IMC

Configure LDAP in Cisco IMC when you want to use an LDAP server for local user authentication and authorization.

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ldap**	Enters the LDAP command mode.
Step 2	Server /ldap # **set enabled** {**yes** | **no**}	Enables or disables LDAP security. When enabled, user authentication and role authorization is performed by LDAP for user accounts not found in the local user database.
Step 3	Server /ldap # **set domain***LDAP domain name*	Specifies an LDAP domain name.
Step 4	Server /ldap # **set timeout** *seconds*	Specifies the number of seconds the Cisco IMC waits until the LDAP search operation times out. The value must be between 0 and 1800 seconds.
Step 5	Server /ldap # **set base-dn** *domain-name*	Specifies the Base DN that is searched on the LDAP server.

	Command or Action	Purpose
Step 6	Server /ldap # **set attribute** *name*	Specify an LDAP attribute that contains the role and locale information for the user. This property is always a name-value pair. The system queries the user record for the value that matches this attribute name. You can use an existing LDAP attribute that is mapped to the Cisco IMC user roles and locales or you can create a custom attribute, such as the CiscoAVPair attribute, which has the following attribute ID: `1.3.6.1.4.1.9.287247.1` **Note** If you do not specify this property, user access is denied.
Step 7	Server /ldap # **set filter-attribute**	Specifies the account name attribute. If Active Directory is used, then specify **sAMAccountName** for this field.
Step 8	Server /ldap # **scope secure**	Enters the secure LDAP mode.
Step 9	Enable secure LDAP and either download the certificate remotely or paste the certificate.	Perform one of the following: **a.** Server /ldap # **secure-ldap** *disabled|enabled paste tftp | ftp | sftp | scp | http* Prompts you to paste the certificate content. **b.** Paste the certificate content and press **CTRL+D**. Confirmation prompt appears. **c.** At the confirmation prompt, enter **y**. This begins the download of the LDAP CA certificate. **OR** **a.** Server /ldap # **secure-ldap** *disabled|enabled remote tftp | ftp | sftp | scp | http IP Address LDAP CA Certificate file*

	Command or Action	Purpose
		Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. **b.** At the confirmation prompt, enter **y**. This begins the download of the LDAP CA certificate.
Step 10	Server /ldap # **commit**	Commits the transaction to the system configuration.
Step 11	Server /ldap # **show** [**detail**]	(Optional) Displays the LDAP configuration.

Example

This example configures LDAP using remote download option:

```
Server# scope ldap
Server /ldap # set enabled yes
Server /ldap *# set domain sample-domain
Server /ldap *# set timeout 60
Server /ldap *# set base-dn example.com
Server /ldap *# set attribute CiscoAVPair
Server /ldap *# set filter-attribute sAMAccountName
Server /ldap *# scope secure
Server /ldap/secure *# secure-ldap enabled remote ftp xx.xx.xx.xx filename
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
```

```
100  1282  100  1282    0     0   1247      0  0:00:01  0:00:01 --:--:--  1635
100  1282  100  1282    0     0   1239      0  0:00:01  0:00:01 --:--:--  1239
  You are going to overwrite the LDAP CA Certificate.
  Are you sure you want to proceed and overwrite the LDAP CA Certificate? [y|N]y
LDAP CA Certificate is downloaded successfully
Server /ldap/secure *# commit
Server /ldap # exit
Server /ldap # show detail
LDAP Settings:
    Enabled: yes
    Domain: sample-domain
    BaseDN: example.com
    Timeout: 60
    Filter-Attribute: sAMAccountName
Server /ldap #
```

This example configures secure LDAP using paste certificate option:

```
Server# scope ldap
Server /ldap # set enabled yes
Server /ldap *# set domain sample-domain
Server /ldap *# set timeout 60
Server /ldap *# set base-dn example.com
Server /ldap *# set attribute CiscoAVPair
Server /ldap *# set filter-attribute sAMAccountName
Server /ldap *# scope secure
Server /ldap/secure *# secure-ldap enabled ftp paste

 Please paste your certificate here, when finished, press CTRL+D.
-----BEGIN CERTIFICATE-----
MIIDdzCCAl+gAwIBAgIQV06yJcJPAYNO8Cp+FYQttjANBgkqhkiG9w0BAQsFADBO
MRIwEAYKCZImiZPyLGQBGRYCaW4xGzAZBgoJkiaJk/IsZAEZFgs0T0JKUkEySkhC
UTEbMBkGA1UEAxMSV0lOLTRPQkpSQTJKSEJRLUNBMB4XDTE2MDIyNTE3MDczNloX
DTIxMDIyNTE3MTczM1owTjESMBAGCgmSJomT8ixkARkWAmluMRswGQYKCZImiZPy
LGQBGRYLNE9CSlJBMkpIQlExGzAZBgNVBAMTEldJTi00T0JKUkEySkhCUS1DQTCC
ASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAMM2cdgmrPTkZe4K2zI+EbeZ
mfQnjfiUz8OIY97w8lC/2S4qK46T+fnX13rXe8vvVHAO5wgPDVQTGS4nlF46A6Ba
FK+krKcIgFrQB1gnF74qs/ln1YtKHNBjrvg5KyeWFrA7So6Mi2XEw8w/zMPL0d8T
b+LM1YnhnuXA9G8gVCJ/iUhXfMpB20L8sv30Mek7bw8x2cxJYTuJAviVIrjSwU5j
fO3WKttRuyFpeOIi00weklpF0+8D3Z9mBinoTbL2pl0U32am6wTI+8WmtJ+8W68v
jH4Y8YBY/kzMHdpwjpdZkC5pE9BcM0rL9xKoIu6X0kSNEssoGnepFyNaH3t8vnMC
AwEAAaNRME8wCwYDVR0PBAQDAgGGMA8GA1UdEwEB/wQFMAMBAf8wHQYDVR0OBBYE
FBAUulHTAWBT1OBz8IgAEzXsfcCsMBAGCSsGAQQBgjcVAQQDAgEAMA0GCSqGSIb3
DQEBCwUAA4IBAQAzUMZr+0r1dWkVfFNBd7lu8tQbAEJf/A7PIKnJGNoUq8moAGs4
pMndoxdpNGZhYCWDWX3GWdeF1HqZHhb38gGQ9ylu0pIK7tgQufZmeCBH6T7Tzq/w
Dq+TMFGIjXF84xW3N665y4ePgUcUI7e/6aBGcGkGeUYodBPtExe28tQyeuYwD4Zj
nLuZKkT+I4PAYygVCqxDGsvfRHDpGneb3R+GeonOf4ED/0tn5PLSL9khb9qkHu/V
dO3/HmKVzUhloTDBuAMq/wES2WZAWhGr3hBc4nWQNjZWEMOKDpYZVK/GhBmNF+xi
eRcFqgh64oEmH9qAp0caGS1e7UyYaN+LtPRe
-----END CERTIFICATE-----
CTRL+D
  You are going to overwrite the LDAP CA Certificate.
  Are you sure you want to proceed and overwrite the LDAP CA Certificate? [y|N]
y

Server /ldap/secure *# commit
Server /ldap # exit
Server /ldap # show detail
LDAP Settings:
    Enabled: yes
    Domain: sample-domain
    BaseDN: example.com
    Timeout: 60
```

```
    Filter-Attribute: sAMAccountName
Server /ldap #
```

What to do next

If you want to use LDAP groups for group authorization, see *Configuring LDAP Groups in Cisco IMC*.

Configuring LDAP Groups in Cisco IMC

Note When Active Directory (AD) group authorization is enabled and configured, user authentication is also done on the group level for users that are not found in the local user database or who are not individually authorized to use Cisco IMC in the Active Directory.

Before you begin

- You must log in as a user with admin privileges to perform this task.
- Active Directory (or LDAP) must be enabled and configured.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ldap**	Enters the LDAP command mode for AD configuration.
Step 2	Server /ldap# **scope ldap-group-rule**	Enters the LDAP group rules command mode for AD configuration.
Step 3	Server /ldap/ldap-group-rule # **set group-auth** {**yes** | **no**}	Enables or disables LDAP group authorization.
Step 4	Server /ldap # **scope role-group** *index*	Selects one of the available group profiles for configuration, where *index* is a number between 1 and 28.
Step 5	Server /ldap/role-group # **set name** *group-name*	Specifies the name of the group in the AD database that is authorized to access the server.
Step 6	Server /ldap/role-group # **set domain** *domain-name*	Specifies the AD domain the group must reside in.
Step 7	Server /ldap/role-group # **set role** {**admin** | **user** | **readonly**}	Specifies the permission level (role) assigned to all users in this AD group. This can be one of the following: • **admin**—The user can perform all actions available.

	Command or Action	Purpose
		• **user**—The user can perform the following tasks: • View all information • Manage the power control options such as power on, power cycle, and power off • Launch the KVM console and virtual media • Clear all logs • Toggle the locator LED • **readonly**—The user can view information but cannot make any changes.
Step 8	Server /ldap/role-group # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to configure LDAP group authorization:

```
Server# scope ldap
Server /ldap # scope ldap-group-rule
Server /ldap/ldap-group-rule # set group-auth yes
Server /ldap *# scope role-group 5
Server /ldap/role-group # set name Training
Server /ldap/role-group* # set domain example.com
Server /ldap/role-group* # set role readonly
Server /ldap/role-group* # commit
ucs-c250-M2 /ldap # show role-group
Group  Group Name       Domain Name      Assigned Role
------ -----------     --------------   --------------
1      (n/a)            (n/a)            admin
2      (n/a)            (n/a)            user
3      (n/a)            (n/a)            readonly
4      (n/a)            (n/a)            (n/a)
5      Training         example.com      readonly

Server /ldap/role-group #
```

Configuring Nested Group Search Depth in LDAP Groups

You can search for an LDAP group nested within another defined group in an LDAP group map.

- You must log in as a user with admin privileges to perform this task.
- Active Directory (or LDAP) must be enabled and configured.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ldap**	Enters the LDAP command mode for AD configuration.
Step 2	Server /ldap# **scope ldap-group-rule**	Enters the LDAP group rules command mode for AD configuration.
Step 3	Server /ldap/ldap-group-rule # **set group-search-depth** *value*	Enables search for a nested LDAP group.
Step 4	Server /ldap/role-group-rule # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to search for run a search for an LDAP group nested within another defined group.

```
Server# scope ldap
Server /ldap # scope ldap-group-rule
Server /ldap/ldap-group-rule # set group-search-depth 10
Server /ldap/role-group-rule* # commit
Server /ldap/role-group-rule # show detail
Group rules for LDAP:
    Group search attribute: memberOf
    Enable Group Authorization: yes
    Nested group search depth: 10
Server/ldap/ldap-group-rule #
```

TACACS+ Authentication

Beginning with 4.1(3b) release, Cisco IMC supports Terminal Access Controller Access-Control System Plus (TACACS+) user authentication. Cisco IMC supports up to six TACACS+ remote servers. Once a user is successfully authenticated, the username is appended with **(TACACS+)**. This is also displayed in the Cisco IMC interfaces.

Refer Enabling TACACS+ Authentication, on page 123 to enable TACACS+ Authentication. Cisco IMC also supports user authentication precedence in case TACACS+ remote servers are inaccessible. User authentication precedence can be configured using Configuring User Authentication Precedence, on page 113.

TACACS+ Server Configuration

Privilege level of a user is calculated based on the **cisco-av-pair** value configured for that user. A **cisco-av-pair** should be created on the TACACS+ server. Users cannot use any existing TACACS+ attributes.

Following three syntax are supported for the **cisco-av-pair** attribute:

- For **admin** privilege: **cisco-av-pair=shell:roles="admin"**
- For **user** privilege: **cisco-av-pair=shell:roles="user"**

- For **`read-only`** privilege: **cisco-av-pair=shell:roles="read-only"**

More roles, if required, can be added by using **comma** as a separator.

Note If **cisco-av-pair** is not configured on the TACACS+ server, then a user with that server has **read-only** privilege.

Enabling TACACS+ Authentication

Before you begin

Before configuring Terminal Access Controller Access-Control System (TACACS+) based user authentication, ensure that privilege level of a user is configured on TACACS+ server based on the **cisco-av-pair** value.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope tacacs+**	Enters the TACACS+ command mode.
Step 2	Server/tacacs+ # **set enabled** *yes*|*no*	
Step 3	Server/tacacs+ # **set fallback-only-on-no-connectivity** *yes*|*no*	If you are enabling **`fallback-only-on-no-connectivity`**, enter **`Y`** to confirm.
Step 4	Server/tacacs+ # **set timeout** *timeout duration in seconds*	Enter a value between 5 to 30.
Step 5	Server/tacacs+ # **restore**	If you wish to restore TACACS+ configuration to default in case of time out, enter **`yes`** to confirm.
Step 6	Server/tacacs+ # **commit**	Saves the changes in the system.

Example

```
Server # scope tacacs+
Server /tacacs+ # set enabled yes
Server /tacacs+ # set fallback-only-on-no-connectivity yes

Warning: If TACACS+ and fallback option is enabled, then the fallback to the next
         precedence database happens only when CIMC is not able to connect to any
         of the configured TACACS+ servers.
Do you wish to continue? [y/N] y
Server /tacacs+ # set timeout 5
Server /tacacs+ # restore
Are you sure you want to restore TACACS+ configuration to defaults?
Please enter 'yes' to confirm: yes
Restored TACSCS+ default configuration.

Server /tacacs+ # commit
```

Configuring TACACS+ Remote Server Settings

Procedure

	Command or Action	Purpose
Step 1	Server# **scope tacacs+**	Enters the TACACS+ command mode.
Step 2	Server# **scope tacacs-server***Server Number*	Enters the TACACS server command mode.
Step 3	Server/tacacs+/tacacs-server # **set tacacs-port** *Port Number*	Enter a value between 1 and 65535.
Step 4	Server/tacacs+/tacacs-server # **set tacacs-key** *Server Key*	Enter the same key configured on the remote TACACS+ server.
Step 5	Server/tacacs+/tacacs-server # **set tacacs-server** *Server IP Address*	Enter remote TACACS+ server IP address.
Step 6	Server/tacacs+/tacacs-server # **restore**	If you wish to restore TACACS+ configuration to default in case of time out, enter **yes** to confirm.

Example

```
Server # scope tacacs+
Server # scope tacacs-server 1
Server /tacacs+/tacacs-server # set tacacs-port 6
Server /tacacs+/tacacs-server # set tacacs-key xxx
Server /tacacs+/tacacs-server # set tacacs-server xx.xx.xx.xx
Server /tacacs+/tacacs-server # restore
Are you sure you want to restore TACACS+ configuration to defaults?
Please enter 'yes' to confirm: yes
Restored TACSCS+ default configuration.

Server /tacacs+/tacacs-server # commit
```

LDAP Certificates Overview

Cisco C-series servers allow an LDAP client to validate a directory server certificate against an installed CA certificate or chained CA certificate during an LDAP binding step. This feature is introduced in the event where anyone can duplicate a directory server for user authentication and cause a security breach due to the inability to enter a trusted point or chained certificate into the Cisco IMC for remote user authentication.

An LDAP client needs a new configuration option to validate the directory server certificate during the encrypted TLS/SSL communication.

Exporting LDAP CA Certificate

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ldap**	Enters the LDAP command mode.
Step 2	Server# /ldap **scope binding-certificate**	Enters the LDAP CA certificate binding command mode.
Step 3	Server /ldap/binding-certificate # **export-ca-certificate** *remote-protocol IP Adderss LDAP CA Certificate file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. Initiates the export of the certificate.

Example

This example exports the LDAP certificate:

```
Server # scope ldap
Server /ldap # scope binding-certificate
Server /ldap/binding-certificate #  export-ca-certificate tftp 172.22.141.66 test.csv
 Initiating Export
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  1262    0     0  100  1262      0   1244  0:00:01  0:00:01 --:--:--  1653
100  1262    0     0  100  1262      0   1237  0:00:01  0:00:01 --:--:--  1237
LDAP CA Certificate is exported successfully
Server /ldap/binding-certificate #
```

Testing LDAP Binding

Before you begin

You must log in as a user with admin privileges to perform this task.

Note If you checked the **Enable Encryption** and the **Enable Binding CA Certificate** check boxes, enter the fully qualified domain name (FQDN) of the LDAP server in the LDAP Server field. To resolve the FQDN of the LDAP server, configure the preferred DNS of Cisco IMC network with the appropriate DNS IP address.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ldap**	Enters the LDAP command mode.
Step 2	Server# /ldap **scope binding-certificate**	Enters the LDAP CA certificate binding command mode.
Step 3	Server /ldap/binding-certificate # **test-ldap-binding** *username*	Password prompt appears.
Step 4	Enter the corresponding password.	Authenticates the user.

Example

This example tests the LDAP user binding:

```
Server # scope ldap
Server /ldap # scope binding-certificate
Server /ldap/binding-certificate # test-ldap-binding user
Password:
diagldapbinding: Authenticated by LDAP
User user authenticated successfully.
Server /ldap/binding-certificate #
```

Deleting LDAP CA Certificate

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ldap**	Enters the LDAP command mode.
Step 2	Server# /ldap **scope binding-certificate**	Enters the LDAP CA certificate binding command mode.
Step 3	Server /ldap/binding-certificate # **delete-ca-certificate**	Confirmation prompt appears.
Step 4	At the confirmation prompt, enter **y**.	This deletes the LDAP CA certificate.

Example

This example deletes the LDAP certificate:

```
Server # scope ldap
Server /ldap # scope binding-certificate
Server /ldap/binding-certificate # delete-ca-certificate
You are going to delete the LDAP CA Certificate.
 Are you sure you want to proceed and delete the LDAP CA Certificate? [y|N]y
LDAP CA Certificate is deleted successfully
Server /ldap/binding-certificate #
```

Viewing User Sessions

Procedure

	Command or Action	Purpose
Step 1	Server# **show user-session**	Displays information about current user sessions.

The command output displays the following information about current user sessions:

Name	Description
Session ID column	The unique identifier for the session.
BMC Session ID	The identifier for the BMC session.
User Name column	The username for the user.

Name	Description
IP Address column	The IP address from which the user accessed the server. If this is a serial connection, it displays **N/A**.
Session Type column	The type of session the user chose to access the server. This can be one of the following: • **webgui**— indicates the user is connected to the server using the web UI. • **CLI**— indicates the user is connected to the server using CLI. • **serial**— indicates the user is connected to the server using the serial port. • **XML API**— indicates the user is connected to the server using XML API. • **Redfish**— indicates the user is connected to the server using Redfish API.
Action column	This column displays **N/A** when the SOL is enabled and **Terminate** when the SOL is disabled. You can terminate a session by clicking **Terminate** on the web UI.

Example

This example displays information about current user sessions:

```
Server# show user-session
ID     Name             IP Address        Type         Killable
------ ---------------- ----------------- ------------ --------
15     admin            10.20.30.138      CLI          yes

Server /user #
```

Terminating a User Session

Before you begin

You must log in as a user with admin privileges to terminate a user session.

Procedure

	Command or Action	Purpose
Step 1	Server# **show user-session**	Displays information about current user sessions. The user session to be terminated must be eligible to be terminated (killable) and must not be your own session.

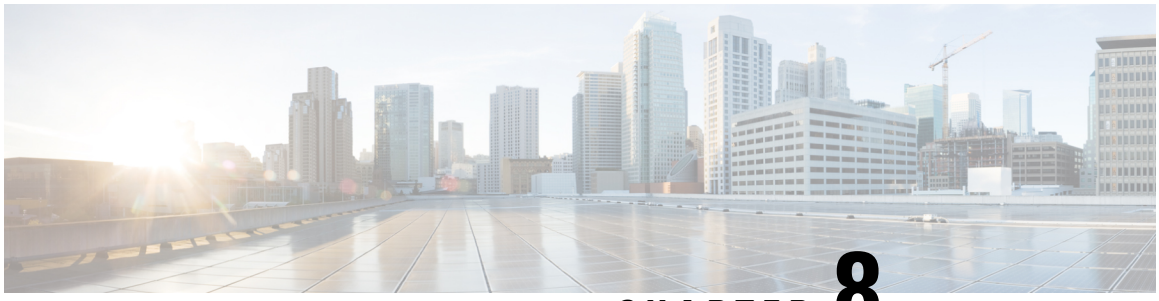
	Command or Action	Purpose
Step 2	Server /user-session # **scope user-session** *session-number*	Enters user session command mode for the numbered user session that you want to terminate.
Step 3	Server /user-session # **terminate**	Terminates the user session.

Example

This example shows how the admin at user session 10 terminates user session 15:

```
Server# show user-session
ID     Name             IP Address        Type         Killable
------ ---------------- ----------------- ------------ --------
10     admin            10.20.41.234      CLI          yes
15     admin            10.20.30.138      CLI          yes
Server# scope user-session 15
Server /user-session # terminate
User session 15 terminated.

Server /user-session #
```



CHAPTER 8

Configuring Network-Related Settings

This chapter includes the following sections:

Server NIC Configuration

Server NICs

NIC Mode

The NIC mode setting determines which ports can reach the Cisco IMC. The following network mode options are available, depending on your platform:

- **Dedicated**—The management port that is used to access the Cisco IMC.
- **Cisco Card**—Any port on the adapter card that can be used to access the Cisco IMC. The Cisco adapter card has to be installed in a slot with Network the Communications Services Interface protocol support (NCSI).
- **Shared LOM**—Any LOM (LAN on Motherboard) port that can be used to access Cisco IMC.
- **Shared LOM Extended**—Any LOM port or adapter card port that can be used to access Cisco IMC. The Cisco adapter card has to be installed in a slot with NCSI support.

Note **Shared LOM** and **Shared LOM Extended** ports are available only on some C-series servers.

Note For other UCS C-Series M4, M5, C220 M6, and C240 M6 servers, the NIC mode is set to **Shared LOM Extended** by default.

- **Shared OCP**—The OCP adapter card LOM ports are used to access Cisco IMC. You must select either the Active-Active or Active-standby NIC redundancy setting in the following step.
- **Shared OCP Extended**—In this NIC mode, DHCP replies are returned to both the OCP adapter card LOM ports and the Cisco virtual interface card (VIC) ports. If the system determines that the Cisco VIC connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco VIC are disabled.

Note **Shared OCP** and **Shared OCP Extended** ports are available only on Cisco UCS C225 M6 and C245 M6 servers.

Default NIC Mode Setting:

- For UCS C-Series C125 M5 servers and S3260 servers, the **NIC Mode** is set to **Cisco Card** by default.

For Cisco UCS C225 M6 and C245 M6 servers:

- if the server has a Cisco VIC card with OCP card, then the default NIC mode is **Shared OCP Extended** and **NIC Redundancy** is set to **active-active**.
- if the server has VIC card populated in NCSI supported slots and no OCP card, then the default NIC mode is **Cisco Card**.
- if the server does not have any VIC card and OCP card, the default NIC mode is **Dedicated** and **NIC Redundancy** is set to **None**.

NIC Redundancy

The following NIC redundancy options are available, depending on the selected NIC mode and your platform:

- **active-active**—If supported, all ports that are associated with the configured NIC mode operate simultaneously. This feature increases throughput and provides multiple paths to the Cisco IMC.
- **active-standby**—If a port that is associated with the configured NIC mode fails, traffic fails over to one of the other ports associated with the NIC mode.

Note If you choose this option, make sure that all ports associated with the configured NIC mode are connected to the same subnet to ensure that traffic is secure regardless of which port is used.

- **None**—In *Dedicated* mode, NIC redundancy is set to *None*.

The available redundancy modes vary depending on the selected network mode and your platform. For the available modes, see the *Hardware Installation Guide* (HIG) for the type of server you are using. The C-Series HIGs are available at the following URL:
http://www.cisco.com/en/US/products/ps10493/prod_installation_guides_list.html

VIC Slots

The VIC slot that can be used for management functions in Cisco card mode.

For C240 M6 and C245 M6, VIC slot options are as follows:

- **Riser 1**—Slot 1 and Slot 2
- **Riser 2**—Slot 4 and Slot 5
- **mLOM**

Note For C240 M6 and C245 M6, after resetting to factory default settings, the slot precedence is as follows:

1. mLOM
2. Riser 1 - Slot 2; and Riser 2 - Slot 5
3. Riser 1 - Slot 1; and Riser 2- Slot 4

For C220 M6 and C225 M6, VIC slot options are as follows:

- **Riser 1**—Slot 1 is selected.
- **Riser 3** —Slot 3 is selected.
- **mLOM**

Note For C220 M6 and C225 M6, after resetting to factory default settings, the slot precedence is as follows:

1. mLOM
2. Riser 1 - Slot 1
3. Riser 3 - Slot 3

For C125 M5, VIC slot option is **Riser 2**.

For C220 M4, C220 M5 and C240 M5 servers, VIC slot options are as follows:

- **Riser 1**—Slot 1 is selected.
- **Riser 2**—Slot 2 is selected.
- **FLEX LOM**—Slot 3 (MLOM) is selected.

For C240 M4 servers, VIC slot options are as follows:

- **Riser 1**—Slot 2 is the primary slot, but you can also use slot 1.
- **Riser 2**—Slot 5 is the primary slot, but you can also use slot 4.
- **FLEX LOM**—Slot 7 (MLOM) is selected.

For C480 M5 ML servers, Cisco card mode slot is Slot 11 and Slot 12.

The following options are available only on some UCS C-Series servers:

- **4**
- **5**
- **9**
- **10**

Note This option is available only on some UCS C-Series servers.

Configuring Server NICs

Configure a server NIC when you want to set the NIC mode and NIC redundancy.

Before you begin

You must log in as a user with admin privileges to configure the NIC.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.
Step 3	Server /cimc/network # **set mode** {**dedicated** | **shared_lom** | **shared_lom_10g** | **shipping** | **cisco_card** | **share_lom_ext** | **shared_ocp** | **shared_ocp_ext**}	Sets the NIC mode to one of the following: • **Dedicated**—The management port that is used to access the Cisco IMC. • **Cisco Card**—Any port on the adapter card that can be used to access Cisco IMC. The Cisco adapter card has to be installed in a slot with Network the Communications Services Interface protocol support (NCSI). • **Shared LOM**—Any LOM (LAN on Motherboard) port that can be used to access Cisco IMC.

	Command or Action	Purpose
		• **Shared LOM Extended**—Any LOM port or adapter card port that can be used to access Cisco IMC. The Cisco adapter card has to be installed in a slot with NCSI support. **Note** **Shared LOM** and **Shared LOM Extended** ports are available only on some C-series servers. **Note** For other UCS C-Series M4, M5, C220 M6, and C240 M6 servers, the NIC mode is set to **Shared LOM Extended** by default. • **Shared OCP**—The OCP adapter card LOM ports are used to access Cisco IMC. You must select either the Active-Active or Active-standby NIC redundancy setting in the following step. • **Shared OCP Extended**—In this NIC mode, DHCP replies are returned to both the OCP adapter card LOM ports and the Cisco virtual interface card (VIC) ports. If the system determines that the Cisco VIC connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco VIC are disabled. **Note** **Shared OCP** and **Shared OCP Extended** ports are available only on Cisco UCS C225 M6 and C245 M6 servers. **Default NIC Mode Setting**: • For UCS C-Series C125 M5 servers and S3260 servers, the **NIC Mode** is set to **Cisco Card** by default. • For Cisco UCS C225 M6 and C245 M6 servers: • if the server has a Cisco VIC card with OCP card, then the default NIC mode is **Shared OCP Extended** and

	Command or Action	Purpose
		NIC Redundancy is set to **active-active**. • if the server has VIC card populated in NCSI supported slots and no OCP card, then the default NIC mode is **Cisco Card**. • if the server does not have any VIC card and OCP card, the default NIC mode is **Dedicated** and **NIC Redundancy** is set to **None**.
Step 4	Server /cimc/network # **set vic-slot** {**none** | **riser1** | **riser2** | **mlom**}	VIC slot can be set to Cisco cards available in MLOM or supported Risers. For C240 M6 and C245 M6, VIC slot options are as follows: • **Riser 1**—Slot 1 and Slot 2 • **Riser 2**—Slot 4 and Slot 5 • **mLOM** **Note** For C240 M6 and C245 M6, after resetting to factory default settings, the slot precedence is as follows: **a.** mLOM **b.** Riser 1 - Slot 2; and Riser 2 - Slot 5 **c.** Riser 1 - Slot 1; and Riser 2- Slot 4 For C220 M6 and C225 M6, VIC slot options are as follows: • **Riser 1**—Slot 1 is selected. • **Riser 3** —Slot 3 is selected. • **mLOM**

	Command or Action	Purpose
		Note For C220 M6 and C225 M6, after resetting to factory default settings, the slot precedence is as follows: **a.** mLOM **b.** Riser 1 - Slot 1 **c.** Riser 3 - Slot 3 For C125 M5, VIC slot option is **Riser 2**. For C220 M4, C220 M5 and C240 M5 servers, VIC slot options are as follows: • **Riser 1**—Slot 1 is selected. • **Riser 2**—Slot 2 is selected. • **FLEX LOM**—Slot 3 (MLOM) is selected. For C240 SD M5 servers, VIC slot options are as follows: • For servers with PCIe Riser 1 and 2B combination: • If you select Riser1, you must install the VIC in slot 2. • If you select Riser2, you must install the VIC in slot 5. • For servers with PCIe Riser 1C and 2E combination: • If you select Riser1, you must install the VIC in slot 1. • If you select Riser2, you must install the VIC in slot 2. • If you select Flex-LOM, you must install an mLOM-style VIC in the mLOM slot. For C480 M5 ML servers, Cisco card mode slot is Slot 11 and Slot 12. The following options are available only on some UCS C-Series servers: • **4** • **5**

	Command or Action	Purpose
		• **9** • **10** For C240 M4 servers, VIC slot options are as follows: • **Riser 1**—Slot 2 is the primary slot, but you can also use slot 1. • **Riser 2**—Slot 5 is the primary slot, but you can also use slot 4. • **FLEX LOM**—Slot 7 (MLOM) is selected. **Important** VIC slot is applicable for Cisco cards and on some UCS C-Series servers only.
Step 5	Server /cimc/network # **set redundancy** {**none** | **active-active** | **active-standby**}	Sets the NIC redundancy mode when the NIC mode is Shared LOM. The redundancy mode can be one of the following: • **none**—The LOM Ethernet ports operate independently and do not fail over if there is a problem. • **active-active**—If supported, all LOM Ethernet ports are utilized. • **active-standby**—If one LOM Ethernet port fails, traffic fails over to another LOM port.
Step 6	Server /cimc/network # **commit**	Commits the transaction to the system configuration. **Note** The available NIC mode and NIC redundancy mode options may vary depending on your platform. If you select a mode not supported by your server, an error message displays when you save your changes.
Step 7	At the prompt, enter **y** to confirm.	Configures the server NIC.

Example

This example configures the Cisco IMC network interface:

```
scope cimc
Server /cimc # scope network
Server /cimc/network # set mode cisco_card
Server /cimc/network # set vic-slot <mlom>
Server /cimc/network *# set redundancy <active-active>
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network #
```

Cisco VIC mLOM and OCP Card Replacement Considerations

In Cisco UCS C225 M6 and C245 M6 servers, Cisco IMC network connection may be lost in the following situations, while replacing Cisco VIC mLOM and OCP cards:

- If OCP card is replaced by Cisco VIC card in MLOM Slot and the NIC mode is set to **Shared OCP** or **Shared OCP Extended**.
- If Cisco VIC Card in MLOM Slot is replaced by OCP Card and NIC mode is set to **Cisco-card MLOM**.

Follow these recommendations while replacing Cisco VIC mLOM or OCP cards in Cisco UCS C225 M6 or C245 M6 servers to avoid loss of connectivity:

- Before replacing the card, configure any of the NIC modes that has network connected, other than **Cisco card MLOM**, **Shared OCP**, or **Shared OCP Extended**. After replacing the card, configure the appropriate NIC mode.

  To set the NIC mode, refer *Server NIC Configuration* section in Configuration Guides for your Cisco IMC release.

- Or, after replacing the card, configure the appropriate NIC mode using Cisco IMC Configuration Utility/F8.

  Refer *Connecting to the Server Locally For Setup* section in Install and Upgrade Guides for your server.

- Or, after replacing the card, perform factory default settings using Cisco IMC Configuration Utility/F8 then perform the following steps:

  1. Once the server is rebooted, boot the system to Cisco IMC Configuration Utility/F8 then change the default password.
  2. Configure the appropriate NIC mode settings.

Table 2: Factory Default Settings

VIC in mLOM slot	Intel OCP 3.0 NIC in mLOM Slot	VIC in Riser Slot	Dedicated Management Port	NIC Mode for CIMC Access
Yes	No	No	Yes	**Cisco Card** mode with the card in mLOM Slot
No	Yes	No	Yes	**Shared OCP Extended**

VIC in mLOM slot	Intel OCP 3.0 NIC in mLOM Slot	VIC in Riser Slot	Dedicated Management Port	NIC Mode for CIMC Access
No	Yes	Yes	Yes	**Shared OCP Extended**
No	No	Yes	Yes	**Cisco Card** with VIC SLOT based on precedence: **For C225 M6:** **1.** Riser 1 - Slot 1 **2.** Riser 3 - Slot 3 **For C245 M6:** **1.** Riser 1 - Slot 2 **2.** Riser 2 - Slot 5 **3.** Riser 1 - Slot 1 **4.** Riser 2 - Slot 4
No	No	No	Yes	**Dedicated**

Common Properties Configuration

Overview to Common Properties Configuration

Hostname

The Dynamic Host Configuration Protocol (DHCP) enhancement is available with the addition of the hostname to the DHCP packet, which can either be interpreted or displayed at the DHCP server side. The hostname, which is now added to the options field of the DHCP packet, sent in the DHCP DISCOVER packet that was initially sent to the DHCP server.

The default hostname of the server is changed from ucs-c2XX to CXXX-YYYYYY, where XXX is the model number and YYYYYY is the serial number of the server. This unique string acts as a client identifier, allows you to track and map the IP addresses that are leased out to Cisco IMC from the DHCP server. The default serial number is provided by the manufacturer as a sticker or label on the server to help you identify the server.

Dynamic DNS

Dynamic DNS (DDNS) is used to add or update the resource records on the DNS server from Cisco IMC. You can enable Dynamic DNS by using either the web UI or CLI. When you enable the DDNS option, the DDNS service records the current hostname, domain name, and the management IP address and updates the resource records in the DNS server from Cisco IMC.

Note The DDNS server deletes the prior resource records (if any) and adds the new resource records to the DNS server if any one of the following DNS configuration is changed:

- Hostname
- Domain name in the LDAP settings
- When DDNS and DHCP are enabled, if the DHCP gets a new IP address or DNS IP or domain name due to a change in a network or a subnet.
- When DHCP is disabled and if you set the static IP address by using CLI or web UI.
- When you enter the **dns-use-dhcp** command.

Dynamic DNS Update Domain— You can specify the domain. The domain could be either main domain or any sub-domain. This domain name is appended to the hostname of the Cisco IMC for the DDNS update.

Configuring Common Properties

Use common properties to describe your server.

Before you begin

You must log in as a user with admin privileges to configure common properties.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters Cisco IMC network command mode.
Step 3	Server /cimc/network # **set hostname** *host-name*	Specifies the name of the host. When you modify the hostname, you are prompted to confirm whether you want to create a new self-signed certificate with Common Name (CN) as the new hostname. If you enter **y** at the prompt, a new self-signed certificate is created with CN as the new hostname. If you enter **n** at the prompt, only the hostname is changed and no certificate will be generated.
Step 4	(Optional) Server /cimc/network # **set ddns-enabled**	Enables the DDNS service for Cisco IMC
Step 5	(Optional) Server /cimc/network # **set ddns-update-domain** *value*	Updates the selected domain or its subdomain.

	Command or Action	Purpose
Step 6	Server /cimc/network # **commit**	Commits the transaction to the system configuration.
Step 7	At the prompt, enter **y** to confirm.	Configures common properties.

Example

This example shows how to configure the common properties:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set hostname Server
Create new certificate with CN as new hostname? [y|N]
y
New certificate will be generated on committing changes.
All HTTPS and SSH sessions will be disconnected.
Server /cimc/network # set ddns-enabled
Server /cimc/network # set ddns-update-domain 1.2.3.4
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network #
```

What to do next

Changes to the network are applied immediately. You might lose connectivity to Cisco IMC and have to log in again. Because of the new SSH session created, you may be prompted to confirm the host key.

Configuring IPv4

Before you begin

You must log in as a user with admin privileges to configure IPv4 network settings.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.

	Command or Action	Purpose
Step 3	Server /cimc/network # **set dhcp-enabled** {**yes** | **no**}	Selects whether the Cisco IMC uses DHCP. **Note** If DHCP is enabled, we recommend that the DHCP server be configured to reserve a single IP address for the Cisco IMC. If the Cisco IMC is reachable through multiple ports on the server, the single IP address must be reserved for the full range of MAC addresses of those ports.
Step 4	Server /cimc/network # **set v4-addr** *ipv4-address*	Specifies the IP address for the Cisco IMC.
Step 5	Server /cimc/network # **set v4-netmask** *ipv4-netmask*	Specifies the subnet mask for the IP address.
Step 6	Server /cimc/network # **set v4-gateway** *gateway-ipv4-address*	Specifies the gateway for the IP address.
Step 7	Server /cimc/network # **set dns-use-dhcp** {**yes** | **no**}	Selects whether the Cisco IMC retrieves the DNS server addresses from DHCP.
Step 8	Server /cimc/network # **set preferred-dns-server** *dns1-ipv4-address*	Specifies the IP address of the primary DNS server.
Step 9	Server /cimc/network # **set alternate-dns-server** *dns2-ipv4-address*	Specifies the IP address of the secondary DNS server.
Step 10	Server /cimc/network # **commit**	Commits the transaction to the system configuration.
Step 11	At the prompt, enter **y** to confirm.	Configures IPv4.
Step 12	Server /cimc/network # **show** [**detail**]	(Optional) Displays the IPv4 network settings.

Example

This example configures and displays the IPv4 network settings:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set dhcp-enabled yes
Server /cimc/network *# set v4-addr 10.20.30.11
Server /cimc/network *# set v4-netmask 255.255.248.0
Server /cimc/network *# set v4-gateway 10.20.30.1
Server /cimc/network *# set dns-use-dhcp-enabled no
Server /cimc/network *# set preferred-dns-server 192.168.30.31
Server /cimc/network *# set alternate-dns-server 192.168.30.32
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
```

```
Do you wish to continue? [y/N] y
Server /cimc/network # show detail
Network Setting:
    IPv4 Address: 10.20.30.11
    IPv4 Netmask: 255.255.248.0
    IPv4 Gateway: 10.20.30.1
    DHCP Enabled: yes
    Obtain DNS Server by DHCP: no
    Preferred DNS: 192.168.30.31
    Alternate DNS: 192.168.30.32
    IPv6 Enabled: no
    IPv6 Address: ::
    IPv6 Prefix: 64
    IPv6 Gateway: ::
    IPv6 Link Local: ::
    IPv6 SLAAC Address: ::
    IPV6 DHCP Enabled: no
    IPV6 Obtain DNS Server by DHCP: no
    IPV6 Preferred DNS: ::
    IPV6 Alternate DNS: ::
    VLAN Enabled: no
    VLAN ID: 1
    VLAN Priority: 0
    Port Profile:
    Hostname: C240-FCH1938V17L
    MAC Address: E4:AA:5D:AD:19:81
    NIC Mode: shared_lom_ext
    NIC Redundancy: active-active
    VIC Slot: riser1
    Auto Negotiate: no
    Admin Network Speed: NA
    Admin Duplex: NA
    Operational Network Speed: NA
    Operational Duplex: NA

Server /cimc/network #
```

Configuring IPv6

Before you begin

You must log in as a user with admin privileges to configure IPv6 network settings.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.
Step 3	Server /cimc/network # **set v6-enabled** {**yes** | **no**}	Enables IPv6.

	Command or Action	Purpose
Step 4	Server /cimc/network # **set v6-dhcp-enabled** {**yes** | **no**}	Selects whether the Cisco IMC uses DHCP. **Note** If DHCP is enabled, we recommend that the DHCP server be configured to reserve a single IPv6 address for the Cisco IMC. If the Cisco IMC is reachable through multiple ports on the server, the single IPv6 address must be reserved for the full range of MAC addresses of those ports.
Step 5	Server /cimc/network # **set v6-addr** *ipv6-address*	Specifies the IP address for the Cisco IMC.
Step 6	Server /cimc/network # **set v6-prefix** *ipv6-prefix-length*	Specifies the prefix length for the IP address.
Step 7	Server /cimc/network # **set v6-gateway** *gateway-ipv6-address*	Specifies the gateway for the IP address.
Step 8	Server /cimc/network # **set v6-dns-use-dhcp** {**yes** | **no**}	Selects whether the Cisco IMC retrieves the DNS server addresses from DHCP. **Note** You can use this option only when DHCP enabled.
Step 9	Server /cimc/network # **set v6-preferred-dns-server** *dns1-ipv6-address*	Specifies the IP address of the primary DNS server.
Step 10	Server /cimc/network # **set v6-alternate-dns-server** *dns2-ipv6-address*	Specifies the IP address of the secondary DNS server.
Step 11	Server /cimc/network # **commit**	Commits the transaction to the system configuration.
Step 12	At the prompt, enter **y** to confirm.	Configures IPv6.
Step 13	Server /cimc/network # **show** [**detail**]	(Optional) Displays the IPv6 network settings.

Example

This example enables static IPv6 and displays the IPv6 network settings:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set v6-enabled yes
Server /cimc/network *# set v6-addr 2010:201::279
Server /cimc/network *# set v6-gateway 2010:201::1
Server /cimc/network *# set v6-prefix 64
Server /cimc/network *# set v6-dns-use-dhcp no
Server  /cimc/network *# set v6-preferred-dns-server 2010:201::100
```

```
Server  /cimc/network *# set v6-alternate-dns-server 2010:201::101
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network # show detail
Network Setting:
    IPv4 Enabled: yes
    IPv4 Address: 10.106.145.76
    IPv4 Netmask: 255.255.255.0
    IPv4 Gateway: 10.106.145.1
    DHCP Enabled: yes
    DDNS Enabled: yes
    DDNS Update Domain: example.com
    Obtain DNS Server by DHCP: no
    Preferred DNS: 171.70.168.183
    Alternate DNS: 0.0.0.0
    IPv6 Enabled: yes
    IPv6 Address: 2010:201::279
    IPv6 Prefix: 64
    IPv6 Gateway: 2010:201::1
    IPv6 Link Local: fe80::523d:e5ff:fe9d:395d
    IPv6 SLAAC Address: 2010:201::523d:e5ff:fe9d:395d
    IPV6 DHCP Enabled: no
    IPV6 Obtain DNS Server by DHCP: no
    IPV6 Preferred DNS: 2010:201::100
    IPV6 Alternate DNS: 2010:201::101
    VLAN Enabled: no
    VLAN ID: 1
    VLAN Priority: 0
    Port Profile:
    Hostname: CIMC_C220
    MAC Address: 50:3D:E5:9D:39:5C
    NIC Mode: dedicated
    NIC Redundancy: none
    Network Speed: 100Mbps
    Duplex: full
    Auto Negotiate: no
   Admin Network Speed: NA
    Admin Duplex: NA
    Operational Network Speed: NA
    Operational Duplex: NA

Server /cimc/network #
```

This example enables DHCP for IPv6 and displays the IPv6 network settings:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set v6-enabled yes
Server /cimc/network *# set v6-dhcp-enabled yes
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network # show detail
Network Setting:
    IPv4 Enabled: yes
    IPv4 Address: 10.106.145.76
    IPv4 Netmask: 255.255.255.0
```

```
    IPv4 Gateway: 10.106.145.1
    DHCP Enabled: yes
    DDNS Enabled: yes
    DDNS Update Domain: example.com
    Obtain DNS Server by DHCP: no
    Preferred DNS: 171.70.168.183
    Alternate DNS: 0.0.0.0
    IPv6 Enabled: yes
    IPv6 Address: 2010:201::253
    IPv6 Prefix: 64
    IPv6 Gateway: fe80::222:dff:fec2:8000
    IPv6 Link Local: fe80::523d:e5ff:fe9d:395d
    IPv6 SLAAC Address: 2010:201::523d:e5ff:fe9d:395d
    IPV6 DHCP Enabled: yes
    IPV6 Obtain DNS Server by DHCP: no
    IPV6 Preferred DNS: ::
    IPV6 Alternate DNS: ::
    VLAN Enabled: no
    VLAN ID: 1
    VLAN Priority: 0
    Port Profile:
    Hostname: CIMC_C220
    MAC Address: 50:3D:E5:9D:39:5C
    NIC Mode: dedicated
    NIC Redundancy: none
    Network Speed: 100Mbps
    Duplex: full
    Auto Negotiate: no
    Admin Network Speed: NA
    Admin Duplex: NA
    Operational Network Speed: NA
    Operational Duplex: NA

Server /cimc/network #
```

Configuring ICMP

In the release 4.1(3b), Cisco IMC allows you to enable or disable processing of incoming ICMP redirect and destination unreachable packets on BMC.

Note This option is available only on some Cisco UCS M5 servers.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.
Step 3	Server /cimc/network # **scope icmp-configuration**	Enters the ICMP configuration mode.
Step 4	Server /cimc/network/icmp-configuration # **show-detail**	Displays the ICMP configuration settings.

	Command or Action	Purpose
Step 5	Server /cimc/network/icmp-configuration # **set destination-unreachable-enabled yes**	Enables the **Destination Unreachable** configuration setting in ICMP.
Step 6	Server /cimc/network/icmp-configuration # **set redirect-enabled yes**	Enables the **redirect** configuration setting in ICMP.
Step 7	Server /cimc/network/icmp-configuration # **commit**	Commits the transaction to the system configuration.
Step 8	Server /cimc/network/icmp-configuration # **show-detail**	Displays the updated ICMP configuration settings.

Example

This example shows how to configure the ICMP configuration settings:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # scope icmp-configuration
Server /network/icmp-configuration # show detail
ICMP Settings:
    Destination Unreachable Enabled: no
    Redirect Enabled: no
Server /cimc/network/icmp-configuration # set destination-unreachable-enabled yes
Server /cimc/network/icmp-configuration # set redirect yes
Server /cimc/network/icmp-configuration # commit
Server /cimc/network/icmp-configuration # show detail
ICMP Settings:
    Destination Unreachable Enabled: yes
    Redirect Enabled: yes
Server /cimc/network/icmp-configuration #
```

Configuring the Server VLAN

Before you begin

You must be logged in as admin to configure the server VLAN.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.
Step 3	Server /cimc/network # **set vlan-enabled** {**yes** | **no**}	Selects whether the Cisco IMC is connected to a VLAN.
Step 4	Server /cimc/network # **set vlan-id** *id*	Specifies the VLAN number.

	Command or Action	Purpose
Step 5	Server /cimc/network # **set vlan-priority** *priority*	Specifies the priority of this system on the VLAN.
Step 6	Server /cimc/network # **commit**	Commits the transaction to the system configuration.
Step 7	At the prompt, enter **y** to confirm.	Configures the server LAN.
Step 8	Server /cimc/network # **show** [**detail**]	(Optional) Displays the network settings.

Example

This example configures the server VLAN:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set vlan-enabled yes
Server /cimc/network *# set vlan-id 10
Server /cimc/network *# set vlan-priority 32
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network # show detail
Network Setting:
    IPv4 Address: 10.20.30.11
    IPv4 Netmask: 255.255.248.0
    IPv4 Gateway: 10.20.30.1
    DHCP Enabled: yes
    Obtain DNS Server by DHCP: no
    Preferred DNS: 192.168.30.31
    Alternate DNS: 192.168.30.32
    IPv6 Enabled: no
    IPv6 Address: ::
    IPv6 Prefix: 64
    IPv6 Gateway: ::
    IPv6 Link Local: ::
    IPv6 SLAAC Address: ::
    IPV6 DHCP Enabled: no
    IPV6 Obtain DNS Server by DHCP: no
    IPV6 Preferred DNS: ::
    IPV6 Alternate DNS: ::
    VLAN Enabled: yes
    VLAN ID: 10
    VLAN Priority: 32
    Port Profile:
    Hostname: C240-FCH1938V17L
    MAC Address: E4:AA:5D:AD:19:81
    NIC Mode: shared_lom_ext
    NIC Redundancy: active-active
    VIC Slot: riser1
    Auto Negotiate: no
    Admin Network Speed: NA
    Admin Duplex: NA
    Operational Network Speed: NA
    Operational Duplex: NA

Server /cimc/network #
```

Connecting to a Port Profile

Note You can configure a port profile or a VLAN, but you cannot use both. If you want to use a port profile, make sure the **set vlan-enabled** command is set to **no**.

Before you begin

You must be logged in as admin to connect to a port profile.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.
Step 3	Server /cimc/network # **set port-profile** *port_profile_name*	Specifies the port profile Cisco IMC should use to configure the management interface, the virtual Ethernet, and the VIF on supported adapter cards such as the Cisco UCS VIC 1225 Virtual Interface Card. Enter up to 80 alphanumeric characters. You cannot use spaces or other special characters except for - (hyphen) and _ (underscore). In addition, the port profile name cannot begin with a hyphen. **Note** The port profile must be defined on the switch to which this server is connected.
Step 4	Server /cimc/network # **commit**	Commits the transaction to the system configuration.
Step 5	At the prompt, enter **y** to confirm.	Connects to a port profile.
Step 6	(Optional) Server /cimc/network # **show** [**detail**]	Displays the network settings.

Example

This example connects to port profile abcde12345:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set port-profile abcde12345
Server /cimc/network *# commit
```

```
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network # show detail
Network Setting:
    IPv4 Address: 10.193.66.174
    IPv4 Netmask: 255.255.248.0
    IPv4 Gateway: 10.193.64.1
    DHCP Enabled: no
    Obtain DNS Server by DHCP: no
    Preferred DNS: 0.0.0.0
    Alternate DNS: 0.0.0.0
    IPv6 Enabled: no
    IPv6 Address: ::
    IPv6 Prefix: 64
    IPv6 Gateway: ::
    IPv6 Link Local: ::
    IPv6 SLAAC Address: ::
    IPV6 DHCP Enabled: no
    IPV6 Obtain DNS Server by DHCP: no
    IPV6 Preferred DNS: ::
    IPV6 Alternate DNS: ::
    VLAN Enabled: no
    VLAN ID: 1
    VLAN Priority: 0
    Port Profile: abcde12345
    Hostname: C240-FCH1938V17L
    MAC Address: E4:AA:5D:AD:19:81
    NIC Mode: shared_lom_ext
    NIC Redundancy: active-active
    VIC Slot: riser1
    Auto Negotiate: no
    Admin Network Speed: NA
    Admin Duplex: NA
    Operational Network Speed: NA
    Operational Duplex: NA

Server /cimc/network #
```

Network Interface Configuration

Overview to Network Interface Configuration

This support is added to configure network speed and duplex mode for the Cisco IMC management port. Auto Negotiation mode can be set for dedicated mode only. When auto negotiation is enabled the network port speed and duplex settings are ignored by the system and Cisco IMC retains the speed at which the switch is configured. When auto negotiation is disabled, you can configure the network port speed (10 Mbps, 100 Mbps, or 1 Gbps) and set the duplex value at either full or half.

Port Properties can be managed in the following two modes:

- **Admin Mode**—You can configure the network speed and duplex values by disabling the **Auto Negotiation** option. The default value of the network speed in the admin mode is 100 Mbps and the duplex mode is set to Full. Before changing the network speed ensure that the switch you connected to has the same port speed.

- **Operation Mode**—Displays the operation network port speed and duplex values. If you enabled auto negotiation mode, the network port speed and duplex details of the switch are displayed. If unchecked, the network port speed and duplex values that you set at the **Admin Mode** are displayed.

When you reset Cisco IMC 1.5(x), 2.0(1), and 2.0(3) versions to factory defaults, **Shared LOM** mode is configured by default.

Configuring Interface Properties

The settings on the switch must match with the Cisco IMC settings to avoid any speed or duplex mismatch.

Important This action is available only on some UCS C-Series servers.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server/cimc # **scope network**	Enters the network command mode.
Step 3	Server/cimc/network* # **set mode dedicated**	Enters dedicated command mode.
Step 4	Server/cimc/network # **set auto-negotiate** {**yes** | **no**}	Enables or disables auto negotiation command mode. • If you enter **yes**, the network port speed and duplex settings are ignored by the system and Cisco IMC retains the speed at which the switch is configured. • If you enter **no**, you can configure the network port speed and duplex values.
Step 5	Server/cimc/network # **set net-speed** {**10 Mbps** | **100 Mbps** | **1 Gbps**}	Sets specified network port speed. **Note** This option is available only if **auto-negotiate** is set to **no**. Before changing the port speed, ensure that the switch you connected to has the same port speed. When **auto-negotiate** is set to **yes**, by default the network port speed is set to 100 Mbps.
Step 6	Server/cimc/network* # **set duplex** {**full** | **half**}	Sets specified duplex mode type. By default, the duplex mode is set to **Full**. **Note** For network speed of 1 Gbps, only full duplex mode is allowed.

	Command or Action	Purpose
Step 7	Server/cimc/network* # commit	Commits the transaction to the system.

Example

This example shows how to configure the interface properties and commit the transaction:

```
Server # scope cimc
Server/cimc # scope network
Server/cimc/network* # set mode dedicated
Server/cimc/network # set auto-negotiate no
Warning: You have chosen to set auto-negotiate to no
 Please set speed and duplex
 If not set then a default speed of 100Mbps and duplex full will be applied
Server/cimc/network* # commit
Server/cimc/network* # set net-speed 100 Mbps
Server/cimc/network # set duplex full
Server/cimc/network* # commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server/cimc/network #
```

Network Security Configuration

Network Security

The Cisco IMC uses IP blocking as network security. IP blocking prevents the connection between a server or website and certain IP addresses or ranges of addresses. IP blocking effectively bans undesired connections from those computers to a website, mail server, or other Internet servers.

IP banning is commonly used to protect against denial of service (DoS) attacks. Cisco IMC bans IP addresses by setting up an IP blocking fail count.

Configuring Network Security

Configure network security if you want to set up an IP blocking fail count.

Before you begin

You must log in as a user with admin privileges to configure network security.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters the Cisco IMC network command mode.

	Command or Action	Purpose
Step 3	Server /cimc/network # **scope ipblocking**	Enters the IP blocking command mode.
Step 4	Server /cimc/network/ipblocking # **set enabled** {**yes** | **no**}	Enables or disables IP blocking.
Step 5	Server /cimc/network/ipblocking # **set fail-count** *fail-count*	Sets the number of times a user can attempt to log in unsuccessfully before the system locks that user out for a specified length of time. The number of unsuccessful login attempts must occur within the time frame specified in the IP Blocking Fail Window field. Enter an integer between 3 and 10.
Step 6	Server /cimc/network/ipblocking # **set fail-window** *fail-seconds*	Sets the length of time, in seconds, in which the unsuccessful login attempts must occur in order for the user to be locked out. Enter an integer between 60 and 120.
Step 7	Server /cimc/network/ipblocking # **set penalty-time** *penalty-seconds*	Sets the number of seconds the user remains locked out if they exceed the maximum number of login attempts within the specified time window. Enter an integer between 300 and 900.
Step 8	Server /cimc/network/ipblocking # **commit**	Commits the transaction to the system configuration.
Step 9	Server /cimc/network/ipblocking # **exit**	Exits the IP blocking to the network command mode.
Step 10	Server /cimc/network # **scope ipfiltering**	Enters the IP filtering command mode.
Step 11	Server /cimc/network/ipfiltering # **set enabled** {**yes** | **no**}	Enables or disables IP filtering. At the prompt enter **y** to enable IP filtering.
Step 12	Server /cimc/network/ipfiltering # **set filter-1** *IPv4 or IPv6 address or a range of IP addresses*	You can set four IP filters. You can assign an IPv4 or IPv6 IP address or a range of IP addresses.
Step 13	Server /cimc/network/ipfiltering # **commit**	Commits the transaction to the system configuration.

Example

This example configures network security:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # scope ipblocking
Server /cimc/network/ipblocking # set enabled yes
```

```
Server /cimc/network/ipblocking *# set fail-count 5
Server /cimc/network/ipblocking *# set fail-window 90
Server /cimc/network/ipblocking *# set penalty-time 600
Server /cimc/network/ipblocking *# commit
Server /cimc/network/ipblocking #  exit
Server /cimc/network # scope ipfiltering
Server /cimc/network/ipfiltering # set enabled yes
This will enable IP Filtering
Do you wish to continue? [y/N] y
Server /cimc/network/ipfiltering *# set filter-1 1.1.1.1-255.255.255.255
                                    set filter-2 10.10.10.10
                                    set filter-3 2001:xxx::-2xxx:xx8::0001
                                    set filter-4
2001:xxx::-2xxx:xx8::0001-2001:xxx::-2xxx:xx8::0020
Server /cimc/network/ipfiltering *# commit
Changes to the ipfiltering will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] Y
```

Network Time Protocol Configuration

Configuring Network Time Protocol Settings

By default, when Cisco IMC is reset, it synchronizes the time with the host. With the introduction of the NTP service, you can configure Cisco IMC to synchronize the time with an NTP server. The NTP server does not run in Cisco IMC by default. You must enable and configure the NTP service by specifying the IP/DNS address of at least one server or a maximum of four servers that function as NTP servers or time source servers. When you enable the NTP service, Cisco IMC synchronizes the time with the configured NTP server. The NTP service can be modified only through Cisco IMC.

Note To enable the NTP service, it is preferable to specify the IP address of a server rather than the DNS address.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope network**	Enters network command mode.
Step 3	Server /cimc/network # **scope ntp**	Enters NTP service command mode.
Step 4	Server /cimc/network/ntp # **set enabled yes**	Enables the NTP service on the server.
Step 5	Server /cimc/network/ntp* # **commit**	Commits the transaction.

	Command or Action	Purpose
Step 6	Server /cimc/network/ntp # **set server-1 10.120.33.44**	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
Step 7	Server /cimc/network/ntp # **set server-2 10.120.34.45**	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
Step 8	Server /cimc/network/ntp # **set server-3 10.120.35.46**	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
Step 9	Server /cimc/network/ntp # **set server-4 10.120.36.48**	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
Step 10	Server /cimc/network/ntp # **commit**	Commits the transaction.

Example

This example shows how to configure the NTP service:

```
Server # scope cimc
Server /cimc # scope network
Server /cimc/network # scope ntp
Server /cimc/network/ntp # set enabled yes
Warning: IPMI Set SEL Time Command will be
disabled if NTP is enabled.
Do you wish to continue? [y|N]
y
Server /cimc/network/ntp* # commit
Server /cimc/network/ntp # set server-1 10.120.33.44
Server /cimc/network/ntp* # set server-2 10.120.34.45
Server /cimc/network/ntp* # set server-3 10.120.35.46
Server /cimc/network/ntp* # set server-4 10.120.36.48
Server /cimc/network/ntp* # commit
Server /cimc/network/ntp #
```

Pinging an IP address

Ping an IP address when you want to validate network connectivity with the IP address in the Cisco IMC.

Before you begin

You must log in as a user with administration privileges to ping an IP address.

Procedure

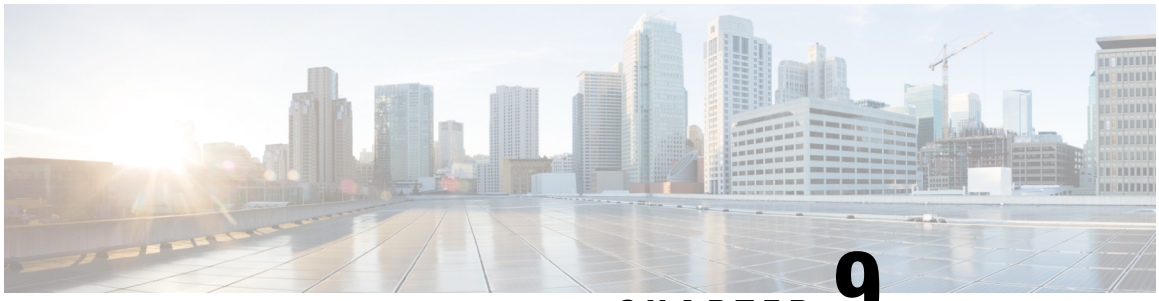
	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.

	Command or Action	Purpose
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.
Step 3	Server /cimc /network# **ping** *IP address* | **retries***number* | **timeout***seconds*	Pings the IP address or host name for a specified number of times until timeout. • **IP address/hostname** - The IP address or the host name of the server. • **Number of retries** - The number of times the system tries to connect to the server. Default value is 3. Valid range is from 1 to 10. • **Timeout** - The number of seconds the system waits before it stops pinging. Default maximum value is 20 seconds. Valid range is from 1 to 20 seconds.
Step 4	Server /cimc/network # **commit**	Commits the transaction to the system configuration.
Step 5	At the prompt, enter **y** to confirm.	Pings the IP address.

Example

This example pings an IP address:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # ping 10.10.10.10
Server /cimc/network *# commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Server /cimc/network #
```



CHAPTER 9

Managing Network Adapters

This chapter includes the following sections:

Overview of the Cisco UCS C-Series Network Adapters

Note The procedures in this chapter are available only when a Cisco UCS C-Series network adapter is installed in the chassis.

A Cisco UCS C-Series network adapter can be installed to provide options for I/O consolidation and virtualization support. The following adapters are available:

- Cisco UCS VIC 15238 Virtual Interface Card
- Cisco UCS VIC 15428 Virtual Interface Card
- Cisco UCS VIC 1497 Virtual Interface Card
- Cisco UCS VIC 1495 Virtual Interface Card
- Cisco UCS VIC 1477 Virtual Interface Card
- Cisco UCS VIC 1467 Virtual Interface Card
- Cisco UCS VIC 1457 Virtual Interface Card
- Cisco UCS VIC 1455 Virtual Interface Card
- Cisco UCS VIC 1387 Virtual Interface Card

- Cisco UCS VIC 1385 Virtual Interface Card
- Cisco UCS VIC 1227T Virtual Interface Card
- Cisco UCS VIC 1225 Virtual Interface Card

Note You must have same generation VIC cards on a server. For example, you cannot have a combination of 3rd generation and 4th generation VIC cards on a single server.

The interactive *UCS Hardware and Software Interoperability Utility* lets you view the supported components and configurations for a selected server model and software release. The utility is available at the following URL: http://www.cisco.com/web/techdoc/ucs/interoperability/matrix/matrix.html

Cisco UCS VIC 15428 Virtual Interface Card

The Cisco VIC 15428 is a quad-port Small Form-Factor Pluggable (SFP+/SFP28/SFP56) mLOM card designed for the M6 generation of Cisco UCS C-Series Rack servers. The card supports 10/25/50-Gbps Ethernet or FCoE. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as either NICs or HBAs.

Cisco UCS VIC 1497 Virtual Interface Card

The Cisco VIC 1497 is a dual-port Small Form-Factor (QSFP28) mLOM card designed for the M5 generation of Cisco UCS C-Series Rack Servers. The card supports 40/100-Gbps Ethernet and FCoE. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as NICs and HBAs.

Cisco UCS VIC 1495 Virtual Interface Card

The Cisco UCS VIC 1495 is a dual-port Small Form-Factor (QSFP28) PCIe card designed for the M5 generation of Cisco UCS C-Series Rack Servers. The card supports 40/100-Gbps Ethernet and FCoE. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as NICs and HBAs.

Cisco UCS VIC 1477 Virtual Interface Card

The Cisco VIC 1477 is a dual-port Quad Small Form-Factor (QSFP28) mLOM card designed for the M6 generation of Cisco UCS C-Series Rack Servers. The card supports 40/100-Gbps Ethernet or FCoE. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as NICs or HBAs.

Cisco UCS VIC 1467 Virtual Interface Card

The Cisco UCS VIC 1467 is a quad-port Small Form-Factor Pluggable (SFP28) mLOM card designed for the M6 generation of Cisco UCS C-Series Rack Servers. The card supports 10/25-Gbps Ethernet or FCoE. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as either NICs or HBA.

Cisco UCS VIC 1457 Virtual Interface Card

The Cisco UCS VIC 1457 is a quad-port Small Form-Factor Pluggable (SFP28) mLOM card designed for M5 generation of Cisco UCS C-Series rack servers. The card supports 10/25-Gbps Ethernet or FCoE. It incorporates Cisco's next-generation CNA technology and offers a comprehensive feature set, providing

investment protection for future feature software releases. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as NICs and HBAs.

Cisco UCS VIC 1455 Virtual Interface Card

The Cisco UCS VIC 1455 is a quad-port Small Form-Factor Pluggable (SFP28) half-height PCIe card designed for M5 generation of Cisco UCS C-Series rack servers. The card supports 10/25-Gbps Ethernet or FCoE. It incorporates Cisco's next-generation CNA technology and offers a comprehensive feature set, providing investment protection for future feature software releases. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as NICs and HBAs.

Cisco UCS VIC 1387 Virtual Interface Card

The Cisco UCS VIC 1387 Virtual Interface Card is a dual-port Enhanced Quad Small Form-Factor Pluggable (QSFP) 40 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE)-capable half-height PCI Express (PCIe) card designed exclusively for Cisco UCS C-Series Rack Servers. It incorporates Cisco's next-generation converged network adapter (CNA) technology, with a comprehensive feature set, providing investment protection for future feature software releases.

Cisco UCS VIC 1385 Virtual Interface Card

The Cisco UCS VIC 1385 Virtual Interface Cardis a dual-port Enhanced Quad Small Form-Factor Pluggable (QSFP) 40 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE)-capable half-height PCI Express (PCIe) card designed exclusively for Cisco UCS C-Series Rack Servers. It incorporates Cisco's next-generation converged network adapter (CNA) technology, with a comprehensive feature set, providing investment protection for future feature software releases.

Cisco UCS VIC 1227T Virtual Interface Card

The Cisco UCS VIC 1227T Virtual Interface Card is a dual-port 10GBASE-T (RJ-45) 10-Gbps Ethernet and Fibre Channel over Ethernet (FCoE)–capable PCI Express (PCIe) modular LAN-on-motherboard (mLOM) adapter designed exclusively for Cisco UCS C-Series Rack Servers. New to Cisco rack servers, the mLOM slot can be used to install a Cisco VIC without consuming a PCIe slot, which provides greater I/O expandability. It incorporates next-generation converged network adapter (CNA) technology from Cisco, providing Fibre Channel connectivity over low-cost twisted pair cabling with a bit error rate (BER) of 10 to 15 up to 30 meters and investment protection for future feature releases.

Cisco UCS VIC 1225 Virtual Interface Card

The Cisco UCS VIC 1225 Virtual Interface Card is a high-performance, converged network adapter that provides acceleration for the various new operational modes introduced by server virtualization. It brings superior flexibility, performance, and bandwidth to the new generation of Cisco UCS C-Series Rack-Mount Servers.

Viewing Network Adapter Properties

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **show adapter** [*index*] [**detail**]	Displays adapter properties. To display the properties of a single adapter, specify the PCI slot number as the *index* argument.

Example

- This example displays the properties of adapter:

```
Server# scope chassis
Server /chassis # show adapter
PCI Slot Product Name   Serial Number  Product ID     Vendor
-------- -------------- -------------- -------------- --------------------
11       UCS VIC 1455   FCH233770S8    UCSC-PCIE-C... Cisco Systems Inc
Server /chassis # show adapter detail
PCI Slot 11:
    Product Name: UCS VIC 1455
    Serial Number: FCH233770S8
    Product ID: UCSC-PCIE-C25Q-04
    Adapter Hardware Revision: 5
    Current FW Version: 5.1(1.64)
    VNTAG: Disabled
    FIP: Enabled
    LLDP: Enabled
    PORT CHANNEL: Enabled
    Configuration Pending: no
    Cisco IMC Management Enabled: no
    VID: V04
    Vendor: Cisco Systems Inc
    Description:
    Bootloader Version: 5.0(3c)
    FW Image 1 Version: 5.1(1.64)
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: 5.1(1.59)
    FW Image 2 State: BACKUP INACTIVATED
    FW Update Status: Fwupdate never issued
    FW Update Error: No error
    FW Update Stage: No operation (0%)
    FW Update Overall Progress: 0%
Server /chassis #
```

Configuring Network Adapter Properties

Before you begin

- You must log in with admin privileges to perform this task.
- A supported Virtual Interface Card (VIC) must be installed in the chassis and the server must be powered on.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show adapter**	(Optional) Displays the available adapter devices.
Step 3	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 4	Server /chassis/adapter # **set fip-mode** {**disable** | **enable**}	Enables or disables FCoE Initialization Protocol (FIP) on the adapter card. FIP is enabled by default. **Note** • We recommend that you disable this option only when explicitly directed to do so by a technical support representative.
Step 5	Server /chassis/adapter # **set lldp** {**disable** | **enable**}	**Note** For LLDP change to be effective, it is required that you reboot the server. In case of S3260 chassis with two nodes, ensure to reboot the secondary node after making LLDP changes in the primary node. Enables or disables Link Layer Discovery Protocol (LLDP) on the adapter card. LLDP is enabled by default. **Note** We recommend that you do not disable LLDP option, as it disables all the Data Center Bridging Capability Exchange protocol (DCBX) functionality.
Step 6	Server /chassis/adapter # **set vntag-mode** {**disabled** | **enabled**}	Enables or disables VNTAG on the adapter card. VNTAG is disabled by default. **Note** If VNTAG mode is enabled: • vNICs and vHBAs can be assigned to a specific channel.

	Command or Action	Purpose
		• vNICs and vHBAs can be associated to a port profile. • vNICs can fail over to another vNIC if there are communication problems.
Step 7	Server /chassis/adapter # **set portchannel** *disabled*	Allows you to enable or disable the port channel. When you disable port channel, four vNICs and vHBAs are available for use on the adapter. When Port channel is enabled: • Only two vNICs and vHBAs are available for use. • Port 0 and 1 are bundled as one port channel and Port 2 and 3 are bundled as the other port channel. **Note** • This option is enabled by default on Cisco UCS VIC 1455 and 1457. • When you change the port channel configuration, all the previously created vNICs and vHBAs will be deleted and the configuration will be restored to factory defaults. • VNTAG mode is supported only in the port-channel mode.
Step 8	Server /chassis/adapter # **set physical-nic-mode** *enabled*	Allows you to enable or disable the physical NIC mode. This option is disabled by default. When Physical NIC Mode is enabled, up-link ports of the VIC are set to pass-through mode. This allows the host to transmit packets without any modification. VIC ASIC does not rewrite the VLAN tag of the packets based on the VLAN and CoS settings for the vNIC.

	Command or Action	Purpose
		Note This option is available only for Cisco UCS VIC 14xx series and 15xxx series adapters. For the VIC configuration changes to be effective, you must reboot the host. This option cannot be enabled on an adapter that has: • **Port Channel mode** enabled • **VNTAG mode** enabled • **LLDP** enabled • **FIP mode** enabled • **Cisco IMC Management Enabled** value set to **Yes** • multiple user created vNICs
Step 9	Server /chassis/adapter* # **commit**	Commits the transaction to the system configuration.

Example

This example configures the properties of adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # set fip-mode enable
Server /chassis/adapter *# set vntag-mode enabled
Server /chassis/adapter* # set portchannel disabled
Server /chassis/adapter *# commit
Warning: Enabling VNTAG mode
All the vnic configuration will be reset to factory defaults
New VNIC adapter settings will take effect upon the next server reset
Server /chassis/adapter # show detail
PCI Slot 1:
    Product Name: UCS VIC xxxx
    Serial Number: FCHXXXXXZV4
    Product ID: UCSC-PCIE-xxx-04
    Adapter Hardware Revision: 3
    Current FW Version: x.0(0.345)
    VNTAG: Enabled
    FIP: Enabled
    LLDP: Enabled
    PORT CHANNEL: Disabled
    Configuration Pending: no
    Cisco IMC Management Enabled: no
    VID: V00
    Vendor: Cisco Systems Inc
    Description:
    Bootloader Version: xxx
```

```
    FW Image 1 Version: x.0(0.345)
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: gafskl-dev-170717-1500-orosz-ET
    FW Image 2 State: BACKUP INACTIVATED
    FW Update Status: Fwupdate never issued
    FW Update Error: No error
    FW Update Stage: No operation (0%)
    FW Update Overall Progress: 0%
Server /chassis/adapter #
```

Managing vHBAs

Guidelines for Managing vHBAs

When managing vHBAs, consider the following guidelines and restrictions:

- The Cisco UCS Virtual Interface Cards provide two vHBAs and two vNICs by default. You can create up to 14 additional vHBAs or vNICs on these adapter cards.

  The Cisco UCS 1455, 1457, and 1467 Virtual Interface Cards, in non-port channel mode, provide four vHBAs and four vNICs by default. You can create up to 10 additional vHBAs or vNICs on these adapter cards in VNTAG mode.

Note If VNTAG mode is enabled for the adapter, you must assign a channel number to a vHBA when you create it.

- When using the Cisco UCS Virtual Interface Cards in an FCoE application, you must associate the vHBA with the FCoE VLAN. Follow the instructions in the **Modifying vHBA Properties** section to assign the VLAN.
- After making configuration changes, you must reboot the host for settings to take effect.

Viewing vHBA Properties

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.

	Command or Action	Purpose
Step 3	Server /chassis/adapter # **show host-fc-if** [**fc0** | **fc1** | *name*] [**detail**]	Displays properties of a single vHBA, if specified, or all vHBAs.

Example

This example displays all vHBAs on adapter card 1 and the detailed properties of fc0:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # show host-fc-if
Name     World Wide Port Name     FC SAN Boot Uplink Port
-------- ----------------------- ----------- -----------
fc0      20:00:00:22:BD:D6:5C:35  Disabled    0
fc1      20:00:00:22:BD:D6:5C:36  Disabled    1

Server /chassis/adapter # show host-fc-if fc0 detail
Name fc0:
    World Wide Node Name: 10:00:70:0F:6A:C0:97:43
    World Wide Port Name: 20:00:70:0F:6A:C0:97:43
    FC SAN Boot: disabled
    FC Type: fc-initiator
    Persistent LUN Binding: disabled
    Uplink Port: 0
    PCI Link: 0
    MAC Address: 70:0F:6A:C0:97:43
    CoS: 3
    VLAN: NONE
    Rate Limiting: OFF
    PCIe Device Order: 2
    EDTOV: 2000
    RATOV: 10000
    Maximum Data Field Size: 2112
    Channel Number: N/A
    Port Profile: N/A

Server /chassis/adapter #
```

Modifying vHBA Properties

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show adapter**	(Optional) Displays the available adapter devices.
Step 3	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*.

	Command or Action	Purpose
		Note The server must be powered on before you can view or change adapter settings.
Step 4	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 5	Server /chassis/adapter/host-fc-if # **set wwnn** *wwnn*	Specifies a unique World Wide Node Name (WWNN) for the adapter in the form hh:hh:hh:hh:hh:hh:hh:hh. Unless specified by this command, the WWNN is generated automatically by the system.
Step 6	Server /chassis/adapter/host-fc-if # **set wwpn** *wwpn*	Specifies a unique World Wide Port Name (WWPN) for the adapter in the form hh:hh:hh:hh:hh:hh:hh:hh. Unless specified by this command, the WWPN is generated automatically by the system.
Step 7	Server /chassis/adapter/host-fc-if # **set boot** {**disable** | **enable**}	Enables or disables FC SAN boot. The default is disable.
Step 8	Server /chassis/adapter/host-fc-if # **set persistent-lun-binding** {**disable** | **enable**}	Enables or disables persistent LUN binding. The default is disable.
Step 9	Server /chassis/adapter/host-fc-if # **set mac-addr** *mac-addr*	Specifies a MAC address for the vHBA.
Step 10	Server /chassis/adapter/host-fc-if # **set vlan** {**none** | *vlan-id*}	Specifies the default VLAN for this vHBA. Valid VLAN numbers are 1 to 4094; the default is none.
Step 11	Server /chassis/adapter/host-fc-if # **set cos** *cos-value*	Specifies the class of service (CoS) value to be marked on received packets unless the vHBA is configured to trust host CoS. Valid CoS values are 0 to 6; the default is 0. Higher values indicate more important traffic. This setting is not functional in NIV mode.
Step 12	Server /chassis/adapter/host-fc-if # **set rate-limit** {**off** | *rate*}	Specifies a maximum data rate for the vHBA. The range is 1 to 100000 Mbps; the default is off. This setting is not functional in NIV mode.
Step 13	Server /chassis/adapter/host-fc-if # **set order** {**any** | *0-99*}	Specifies the relative order of this device for PCIe bus device number assignment; the default is any.
Step 14	Server /chassis/adapter/host-fc-if # **set error-detect-timeout** *msec*	Specifies the error detect timeout value (EDTOV), the number of milliseconds to wait

	Command or Action	Purpose
		before the system assumes that an error has occurred. The range is 1000 to 100000; the default is 2000 milliseconds.
Step 15	Server /chassis/adapter/host-fc-if # **set resource-allocation-timeout** *msec*	Specifies the resource allocation timeout value (RATOV), the number of milliseconds to wait before the system assumes that a resource cannot be properly allocated. The range is 5000 to 100000; the default is 10000 milliseconds.
Step 16	Server /chassis/adapter/host-fc-if # **set max-data-field-size** *size*	Specifies the maximum size of the Fibre Channel frame payload (in bytes) that the vHBA supports. The range is 1 to 2112; the default is 2112 bytes.
Step 17	Server /chassis/adapter/host-fc-if # **set channel-number** *channel number*	The channel number that will be assigned to this vHBA. Enter an integer between 1 and 1,000. **Note** VNTAG mode is required for this option.
Step 18	Server /chassis/adapter/host-fc-if # **set pci-link** *0|1*	The link through which vNICs can be connected. These are the following values: • 0 — The first cross-edged link where the vNIC is placed. • 1 — The second cross-edged link where the vNIC is placed. **Note** This option is available only on some Cisco UCS C-Series servers.
Step 19	Server /chassis/adapter/host-fc-if # **set uplink** *Port number*	The uplink port associated with the vHBA. **Note** This value cannot be changed for the system-defined vHBAs fc0 and fc1.
Step 20	Server /chassis/adapter/host-fc-if # **set vhba-type** *fc-initiator|fc-target|fc-nvme-initiator|fc-nvme-target*	The vHBA type used in this policy. vHBAs supporting FC and FC-NVMe can now be created on the same adapter. The vHBA type used in this policy can be one of the following: • fc-initiator—Legacy SCSI FC vHBA initiator • fc-target—vHBA that supports SCSI FC target functionality

	Command or Action	Purpose
		Note This option is available as a Tech Preview. • fc-nvme-initiator—vHBA that is an FC NVME initiator, which discovers FC NVME targets and connects to them. • fc-nvme-target—vHBA that acts as an FC NVME target and provides connectivity to the NVME storage.
Step 21	Server /chassis/adapter/host-fc-if # **scope error-recovery**	Enters the Fibre Channel error recovery command mode.
Step 22	Server /chassis/adapter/host-fc-if/error-recovery # **set fcp-error-recovery** {**disable** | **enable**}	Enables or disables FCP Error Recovery. The default is disable.
Step 23	Server /chassis/adapter/host-fc-if/error-recovery # **set link-down-timeout** *msec*	Specifies the link down timeout value, the number of milliseconds the uplink port should be offline before it informs the system that the uplink port is down and fabric connectivity has been lost. The range is 0 to 240000; the default is 30000 milliseconds.
Step 24	Server /chassis/adapter/host-fc-if/error-recovery # **set port-down-io-retry-count** *count*	Specifies the port down I/O retries value, the number of times an I/O request to a port is returned because the port is busy before the system decides the port is unavailable. The range is 0 to 255; the default is 8 retries.
Step 25	Server /chassis/adapter/host-fc-if/error-recovery # **set port-down-timeout** *msec*	Specifies the port down timeout value, the number of milliseconds a remote Fibre Channel port should be offline before informing the SCSI upper layer that the port is unavailable. The range is 0 to 240000; the default is 10000 milliseconds.
Step 26	Server /chassis/adapter/host-fc-if/error-recovery # **exit**	Exits to the host Fibre Channel interface command mode.
Step 27	Server /chassis/adapter/host-fc-if # **scope interrupt**	Enters the interrupt command mode.
Step 28	Server /chassis/adapter/host-fc-if/interrupt # **set interrupt-mode** {**intx** | **msi** | **msix**}	Specifies the Fibre Channel interrupt mode. The modes are as follows: • **intx** —Line-based interrupt (INTx) • **msi** —Message-Signaled Interrupt (MSI)

	Command or Action	Purpose
		• **msix** —Message Signaled Interrupts with the optional extension (MSIx). This is the recommended and default option.
Step 29	Server /chassis/adapter/host-fc-if/interrupt # **exit**	Exits to the host Fibre Channel interface command mode.
Step 30	Server /chassis/adapter/host-fc-if # **scope port**	Enters the Fibre Channel port command mode.
Step 31	Server /chassis/adapter/host-fc-if/port # **set outstanding-io-count** *count*	Specifies the I/O throttle count, the number of I/O operations that can be pending in the vHBA at one time. The range is 1 to 1024; the default is 512 operations.
Step 32	Server /chassis/adapter/host-fc-if/port # **set max-target-luns** *count*	Specifies the maximum logical unit numbers (LUNs) per target, the maximum number of LUNs that the driver will discover. This is usually an operating system platform limitation. The range is 1 to 1024; the default is 256 LUNs.
Step 33	Server /chassis/adapter/host-fc-if/port # **exit**	Exits to the host Fibre Channel interface command mode.
Step 34	Server /chassis/adapter/host-fc-if # **scope port-f-logi**	Enters the Fibre Channel fabric login command mode.
Step 35	Server /chassis/adapter/host-fc-if/port-f-logi # **set flogi-retries** {**infinite** | *count*}	Specifies the fabric login (FLOGI) retries value, the number of times that the system tries to log in to the fabric after the first failure. Enter a number between 0 and 4294967295 or enter **infinite** ; the default is infinite retries.
Step 36	Server /chassis/adapter/host-fc-if/port-f-logi # **set flogi-timeout** *msec*	Specifies the fabric login (FLOGI) timeout value, the number of milliseconds that the system waits before it tries to log in again. The range is 1 to 255000; the default is 2000 milliseconds.
Step 37	Server /chassis/adapter/host-fc-if/port-f-logi # **exit**	Exits to the host Fibre Channel interface command mode.
Step 38	Server /chassis/adapter/host-fc-if # **scope port-p-logi**	Enters the Fibre Channel port login command mode.
Step 39	Server /chassis/adapter/host-fc-if/port-p-logi # **set plogi-retries** *count*	Specifies the port login (PLOGI) retries value, the number of times that the system tries to log in to the fabric after the first failure. The range is 0 and 255; the default is 8 retries.
Step 40	Server /chassis/adapter/host-fc-if/port-p-logi # **set plogi-timeout** *msec*	Specifies the port login (PLOGI) timeout value, the number of milliseconds that the

	Command or Action	Purpose
		system waits before it tries to log in again. The range is 1 to 255000; the default is 2000 milliseconds.
Step 41	Server /chassis/adapter/host-fc-if/port-p-logi # **exit**	Exits to the host Fibre Channel interface command mode.
Step 42	Server /chassis/adapter/host-fc-if # **scope scsi-io**	Enters the SCSI I/O command mode.
Step 43	Server /chassis/adapter/host-fc-if/scsi-io # **set cdb-wq-count** *count*	The number of command descriptor block (CDB) transmit queue resources to allocate. For Cisco UCS VIC 14xx series adapters, enter an integer between 1 and 64. For any other VIC adapter, enter an integer between 1 and 245.
Step 44	Server /chassis/adapter/host-fc-if/scsi-io # **set cdb-wq-ring-size** *size*	The number of descriptors in the command descriptor block (CDB) transmit queue. The range is 64 to 512; the default is 512.
Step 45	Server /chassis/adapter/host-fc-if/scsi-io # **exit**	Exits to the host Fibre Channel interface command mode.
Step 46	Server /chassis/adapter/host-fc-if # **scope trans-queue**	Enters the Fibre Channel transmit queue command mode.
Step 47	Server /chassis/adapter/host-fc-if/trans-queue # **set fc-wq-ring-size** *size*	The number of descriptors in the Fibre Channel transmit queue. The range is 64 to 128; the default is 64.
Step 48	Server /chassis/adapter/host-fc-if/trans-queue # **exit**	Exits to the host Fibre Channel interface command mode.
Step 49	Server /chassis/adapter/host-fc-if # **scope recv-queue**	Enters the Fibre Channel receive queue command mode.
Step 50	Server /chassis/adapter/host-fc-if/recv-queue # **set fc-rq-ring-size** *size*	The number of descriptors in the Fibre Channel receive queue. The range is 64 to 128; the default is 64.
Step 51		
Step 52	Server /chassis/adapter/host-fc-if/recv-queue # **exit**	Exits to the host Fibre Channel interface command mode.
Step 53	Server /chassis/adapter/host-fc-if # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example configures the properties of a vHBA (only few options are shown):

```
Server# scope chassis
Server /chassis # show adapter
PCI Slot Product Name   Serial Number  Product ID     Vendor
-------- -------------- -------------- -------------- --------------------
1        UCS VIC P81E   QCI1417A0QK    N2XX-ACPCI01   Cisco Systems Inc

Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # set boot enable
Server /chassis/adapter/host-fc-if *# scope scsi-io
Server /chassis/adapter/host-fc-if/scsi-io *# set cdb-wq-count 2
Server /chassis/adapter/host-fc-if/scsi-io *# exit
Server /chassis/adapter/host-fc-if *# commit
Server /chassis/adapter/host-fc-if #
```

What to do next

Reboot the server to apply the changes.

Creating a vHBA

The adapter provides two permanent vHBAs. If NIV mode is enabled, you can create up to 16 additional vHBAs.

Note Additional vHBAs can be created only in **VNTAG** mode.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **create host-fc-if** *name*	Creates a vHBA and enters the host Fibre Channel interface command mode. The *name* argument can be up to 32 ASCII characters.

	Command or Action	Purpose
Step 4	Server /chassis/adapter/host-fc-if # **set channel-number** *number*	Assign a channel number to this vHBA. The range is 1 to 1000.
Step 5	Server /chassis/adapter/host-fc-if # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example creates a vHBA on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # create host-fc-if Vhba5
Server /chassis/adapter/host-fc-if *# commit
New host-fc-if settings will take effect upon the next server reset
Server /chassis/adapter/host-fc-if #
```

What to do next

- Reboot the server to create the vHBA.
- If configuration changes are required, configure the new vHBA as described in Modifying vHBA Properties, on page 167.

Deleting a vHBA

Before you begin

You cannot delete the default vHBAs.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **delete host-fc-if** *name*	Deletes the specified vHBA. **Note** You cannot delete either of the two default vHBAs, fc0 or fc1.

	Command or Action	Purpose
Step 4	Server /chassis/adapter # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example deletes a vHBA on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # delete host-fc-if Vhba5
Server /chassis/adapter *# commit
Server /chassis/adapter #
```

vHBA Boot Table

In the vHBA boot table, you can specify up to four LUNs from which the server can boot.

Viewing the Boot Table

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 4	Server /chassis/adapter/host-fc-if # **show boot**	Displays the boot table of the Fibre Channel interface.

Example

This example displays the boot table for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
```

```
Server /chassis/adapter/host-fc-if # show boot
Boot Table Entry  Boot Target WWPN           Boot LUN ID
----------------- ------------------------- ------------
0                 20:00:00:11:22:33:44:55    3
1                 20:00:00:11:22:33:44:56    5

Server /chassis/adapter/host-fc-if #
```

Creating a Boot Table Entry

You can create up to four boot table entries.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 4	Server /chassis/adapter/host-fc-if # **create-boot-entry** *wwpn lun-id*	Creates a boot table entry. • *wwpn* — The World Wide Port Name (WWPN) for the boot target in the form hh:hh:hh:hh:hh:hh:hh:hh. • *lun-id* —The LUN ID of the boot LUN. The range is 0 to 255.
Step 5	Server /chassis/adapter/host-fc-if # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example creates a boot table entry for vHBA fc1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # create-boot-entry 20:00:00:11:22:33:44:55 3
Server /chassis/adapter/host-fc-if *# commit
New boot table entry will take effect upon the next server reset
Server /chassis/adapter/host-fc-if #
```

Deleting a Boot Table Entry

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 4	Server /chassis/adapter/host-fc-if # **show boot**	Displays the boot table. From the Boot Table Entry field, locate the number of the entry to be deleted.
Step 5	Server /chassis/adapter/host-fc-if # **delete boot** *entry*	Deletes the boot table entry at the specified position in the table. The range of *entry* is 0 to 3. The change will take effect upon the next server reset.
Step 6	Server /chassis/adapter/host-fc-if # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example deletes boot table entry number 1 for the vHBA fc1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # show boot
Boot Table Entry  Boot Target WWPN           Boot LUN ID
----------------- -------------------------- ------------
0                 20:00:00:11:22:33:44:55    3
1                 20:00:00:11:22:33:44:56    5

Server /chassis/adapter/host-fc-if # delete boot 1
Server /chassis/adapter/host-fc-if *# commit
New host-fc-if settings will take effect upon the next server reset
Server /chassis/adapter/host-fc-if # show boot
Boot Table Entry  Boot Target WWPN           Boot LUN ID
----------------- -------------------------- ------------
0                 20:00:00:11:22:33:44:55    3

Server /chassis/adapter/host-fc-if #
```

What to do next

Reboot the server to apply the changes.

vHBA Persistent Binding

Persistent binding ensures that the system-assigned mapping of Fibre Channel targets is maintained after a reboot.

Enabling Persistent Binding

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 4	Server /chassis/adapter/host-fc-if # **scope perbi**	Enters the persistent binding command mode for the vHBA.
Step 5	Server /chassis/adapter/host-fc-if/perbi # **set persistent-lun-binding enable**	Enables persistent binding for the vHBA.
Step 6	Server /chassis/adapter/host-fc-if/perbi # **commit**	Commits the transaction to the system configuration.

Example

This example enables persistent binding for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 4
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # scope perbi
Server /chassis/adapter/host-fc-if/perbi # set persistent-lun-binding enable
Server /chassis/adapter/host-fc-if/perbi *# commit
Server /chassis/adapter/host-fc-if/perbi #
```

Disabling Persistent Binding

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 4	Server /chassis/adapter/host-fc-if # **scope perbi**	Enters the persistent binding command mode for the vHBA.
Step 5	Server /chassis/adapter/host-fc-if/perbi # **set persistent-lun-binding disable**	Disables persistent binding for the vHBA.
Step 6	Server /chassis/adapter/host-fc-if/perbi # **commit**	Commits the transaction to the system configuration.

Example

This example disables persistent binding for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 4
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # scope perbi
Server /chassis/adapter/host-fc-if/perbi # set persistent-lun-binding disable
Server /chassis/adapter/host-fc-if/perbi *# commit
Server /chassis/adapter/host-fc-if/perbi #
```

Rebuilding Persistent Binding

Before you begin

Persistent binding must be enabled in the vHBA properties.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-fc-if** {**fc0** | **fc1** | *name*}	Enters the host Fibre Channel interface command mode for the specified vHBA.
Step 4	Server /chassis/adapter/host-fc-if # **scope perbi**	Enters the persistent binding command mode for the vHBA.
Step 5	Server /chassis/adapter/host-fc-if/perbi # **rebuild**	Rebuilds the persistent binding table for the vHBA.

Example

This example rebuilds the persistent binding table for a vHBA:

```
Server# scope chassis
Server /chassis # scope adapter 4
Server /chassis/adapter # scope host-fc-if fc1
Server /chassis/adapter/host-fc-if # scope perbi
Server /chassis/adapter/host-fc-if/perbi # rebuild

Server /chassis/adapter/host-fc-if/perbi #
```

Managing vNICs

Guidelines for Managing vNICs

When managing vNICs, consider the following guidelines and restrictions:

- The Cisco UCS Virtual Interface Cards provide two vHBAs and two vNICs by default. You can create up to 14 additional vHBAs or vNICs on these adapter cards.

  Additional vHBAs can be created using VNTAG mode.

  The Cisco UCS 1455, 1457, and 1467 Virtual Interface Cards, in non-port channel mode, provide four vHBAs and four vNICs by default. You can create up to 10 additional vHBAs or vNICs on these adapter cards.

Note If VNTAG mode is enabled for the adapter, you must assign a channel number to a vNIC when you create it.

- After making configuration changes, you must reboot the host for settings to take effect.

Viewing vNIC Properties

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **show host-eth-if** [**eth0** | **eth1** | *name*] [**detail**]	Displays properties of a single vNIC, if specified, or all vNICs.
Step 4	Server /chassis/adapter # **show ext-eth-if** [**detail**]	Displays the external ethernet interfaces' details.

Example

Following examples display the brief properties of all vNICs and the detailed properties of eth0 and the external interfaces:

Note These examples may show features available only with certain releases.

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # show host-eth-if
Name   MTU  Uplink Port  MAC Address       CoS VLAN PXE Boot iSCSI Boot usNIC
----- ----- -----------  ------------ ---  ------------ --------------- ------
eth0   1500 0            74:A2:E6:28:C6:AE N/A N/A  disabled disabled   0
eth1   1500 1            74:A2:E6:28:C6:AF N/A N/A  disabled disabled   0
srg    1500 0            74:A2:E6:28:C6:B2 N/A N/A  disabled disabled   64
hhh    1500 0            74:A2:E6:28:C6:B3 N/A N/A  disabled disabled   0

Server /chassis/adapter # show host-eth-if eth0 detail
Name eth0:
    MTU: 1500
    Uplink Port: 0
    MAC Address: B0:8B:CF:4C:ED:FF
    CoS: 0
    Trust Host CoS: disabled
    PCI Link: 0
    PCI Order: 0
    VLAN: NONE
    VLAN Mode: TRUNK
    Rate Limiting: OFF
    PXE Boot: disabled
    iSCSI Boot: disabled
    usNIC: 0
    Channel Number: N/A
```

```
    Port Profile: N/A
    Uplink Failover: N/A
    Uplink Failback Timeout: N/A
    aRFS: disabled
    VMQ: disabled
    NVGRE: disabled
    VXLAN: disabled
    CDN Name: VIC-MLOM-eth0
    RoCE Version1: disabled
    RoCE Version2: disabled
    RDMA Queue Pairs: 0
    RDMA Memory Regions: 0
    RDMA Resource Groups: 0
    RDMA COS: 0
    Multi Queue: disabled
    No of subVnics:
    Multi Queue Transmit Queue Count:
    Multi Queue Receive Queue Count:
    Multi Que Completion Queue Count:
    Multi Queue RoCE Version1:
    Multi Queue RoCE Version2:
    Multi Queue RDMA Queue Pairs:
    Multi Queue RDMA Memory Regions:
    Multi Queue RDMA Resource Groups:
    Multi Queue RDMA COS:
    Advanced Filters: disabled
    Geneve Offload: disabled

Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # show ext-eth-if
Port MAC Address       Link State Encap.. Mode Admin Speed Oper..Speed   Link Training
Connector Present Connector Supported
---- ----------------- ---------- ------------ ----------- ------------- -------------
----------------- -------------------
0    74:A2:E6:28:C6:A2 Link       CE           40Gbps      40Gbps          N/A
Yes               Yes
1    74:A2:E6:28:C6:A3 Link       CE           40Gbps      40Gbps          N/A
Yes               Yes

Server /chassis/adapter # show ext-eth-if detail

C220-FCH1834V23X /chassis/adapter # show ext-eth-if detail
Port 0:
    MAC Address: 74:A2:E6:28:C6:A2
    Link State: Link
    Encapsulation Mode: CE
    Admin Speed: 40Gbps
    Operating Speed: 40Gbps
    Link Training: N/A
    Connector Present: Yes
    Connector Supported: Yes
    Connector Type: QSFP_XCVR_CR4
    Connector Vendor: CISCO
    Connector Part Number: 2231254-3
    Connector Part Revision: B
Port 1:
    MAC Address: 74:A2:E6:28:C6:A3
    Link State: Link
    Encapsulation Mode: CE
    Admin Speed: 40Gbps
    Operating Speed: 40Gbps
    Link Training: N/A
    Connector Present: Yes
```

```
    Connector Supported: Yes
    Connector Type: QSFP_XCVR_CR4
    Connector Vendor: CISCO
    Connector Part Number: 2231254-3
    Connector Part Revision: B


Server /chassis/adapter #
```

Modifying vNIC Properties

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show adapter**	(Optional) Displays the available adapter devices.
Step 3	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 4	Server /chassis/adapter # **scope host-eth-if** {**eth0** | **eth1** | *name*}	Enters the host Ethernet interface command mode for the specified vNIC.
Step 5	Server /chassis/adapter/host-eth-if # **set mtu** *mtu-value*	Specifies the maximum transmission unit (MTU) or packet size that the vNIC accepts. Valid MTU values are 1500 to 9000 bytes; the default is 1500.
Step 6	Server /chassis/adapter/host-eth-if # **set uplink** {**0** | **1**}	Specifies the uplink port associated with this vNIC. All traffic for this vNIC goes through this uplink port.
Step 7	Server /chassis/adapter/host-eth-if # **set mac-addr** *mac-addr*	Specifies a MAC address for the vNIC in the form hh:hh:hh:hh:hh:hh or hhhh:hhhh:hhhh.
Step 8	Server /chassis/adapter/host-eth-if # **set cos** *cos-value*	Specifies the class of service (CoS) value to be marked on received packets unless the vNIC is configured to trust host CoS. Valid CoS values are 0 to 6; the default is 0. Higher values indicate more important traffic.

	Command or Action	Purpose
		Note • You must set the **COS** value to 5 for the RDMA enabled interfaces. • If NIV is enabled, this setting is determined by the switch, and the command is ignored.
Step 9	Server /chassis/adapter/host-eth-if # **set trust-host-cos** {**disable** | **enable**}	Specifies whether the vNIC will trust host CoS or will remark packets. The behavior is as follows: • **disable** —Received packets are remarked with the configured CoS. This is the default. • **enable** —The existing CoS value of received packets (host CoS) is preserved.
Step 10	Server /chassis/adapter/host-eth-if # **set order** {**any** | *0-99*}	Specifies the relative order of this device for PCI bus device number assignment; the default is any.
Step 11	Server /chassis/adapter/host-eth-if # **set vlan** {**none** | *vlan-id*}	Specifies the default VLAN for this vNIC. Valid VLAN numbers are 1 to 4094; the default is none. **Note** If NIV is enabled, this setting is determined by the switch, and the command is ignored.
Step 12	Server /chassis/adapter/host-eth-if # **set vlan-mode** {**access** | **trunk**}	Specifies the VLAN mode for the vNIC. The modes are as follows: • **access** —The vNIC belongs to only one VLAN. When the VLAN is set to access mode, any frame received from the specified default VLAN (1-4094) that is received from the switch with a TAG removes that TAG when it is sent to the host OS through the vNIC. • **trunk** —The vNIC can belong to more than one VLAN. This is the default. **Note** If NIV is enabled, this setting is determined by the switch, and the command is ignored.

	Command or Action	Purpose
Step 13	Server /chassis/adapter/host-eth-if # **set rate-limit** {**off** | *rate*}	Specifies a maximum data rate for the vNIC. The range is 1 to 10000 Mbps; the default is off. For VIC 13xx controllers, you can enter an integer between 1 and 40,000. For VIC 1455 and 1457 controllers: • If the adapter is connected to 25 Gbps link on a switch, then you can enter an integer between 1 to 25,000 Mbps. • If the adapter is connected to 10 Gbps link on a switch, then you can enter an integer between 1 to 10,000 Mbps. For VIC 1495 and 1497 controllers: • If the adapter is connected to 40 Gbps link on a switch, then you can enter an integer between 1 to 40,000 Mbps. • If the adapter is connected to 100 Gbps link on a switch, then you can enter an integer between 1 to 100,000 Mbps. **Note** If NIV is enabled, this setting is determined by the switch, and the command is ignored.
Step 14	Server /chassis/adapter/host-eth-if # **set boot** {**disable** | **enable**}	Specifies whether the vNIC can be used to perform a PXE boot. Default value is set to disable for the default vNICs and user-created vNICs.
Step 15	Server /chassis/adapter/host-eth-if # **set channel-number** *number*	If NIV mode is enabled for the adapter, select the channel number that will be assigned to this vNIC. The range is 1 to 1000.
Step 16	Server /chassis/adapter/host-eth-if # **set port-profile** *name*	If NIV mode is enabled for the adapter, select the port profile that should be associated with the vNIC. **Note** The *name* must be a port profile defined on the switch to which this server is connected.
Step 17	Server /chassis/adapter/host-eth-if # **set uplink-failover** {**disable** | **enable**}	If NIV mode is enabled for the adapter, enable this setting if traffic on this vNIC should fail over to the secondary interface if there are communication problems.

	Command or Action	Purpose
Step 18	Server /chassis/adapter/host-eth-if # **set uplink-failback-timeout** *seconds*	After a vNIC has started using its secondary interface, this setting controls how long the primary interface must be available before the system resumes using the primary interface for the vNIC. Enter a number of *seconds* between 0 and 600.
Step 19	Server /chassis/adapter/host-eth-if # **set vmq** {**disabled** | **enabled**}	Enables or disables Virtual Machine Queue (VMQ) for this adapter. **Note** • Ensure that VMQ is not enabled when SR-IOV is enabled on the adapter. • This option is available only on some Cisco UCS C-Series servers with 1495 or 1497 adapters.
Step 20	Server /chassis/adapter/host-eth-if # **set multi-queue** {**disabled** | **enabled**}	Enables or disables the multi queue option for this adapter and allows you to set the following multi queue parameters: • **mq-rq-count**—The number of receive queue resources to allocate. Enter an integer between 1 and 1000. • **mq-wq-count**—The number of transmit queue resources to allocate. Enter an integer between 1 and 1000. • **mq-cq-count**—The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 2000.

	Command or Action	Purpose
		Note • Multi queue is supported only on C-Series servers with 14xx adapters. • VMQ must be in enabled state to enable this option. • When you enable this option on one of the vNICs, configuring only VMQ (without choosing multi-queue) on other vNICs is not supported. • When this option is enabled usNIC configuration will be disabled.
Step 21	Server /chassis/adapter/host-eth-if # **set arfs** {**disable** | **enable**}	Enables or disables Accelerated Receive Flow steering (aRFS) for this adapter.
Step 22	Server /chassis/adapter/host-eth-if # **set geneve** {**disable** | **enable**}	Beginning with release 4.1(2a), Cisco IMC supports Generic Network Virtualization Encapsulation (Geneve) Offload feature with Cisco VIC 14xx series adapters in ESX 7.0 (NSX-T 3.0) and ESX 6.7U3(NSX-T 2.5) OS. Geneve is a tunnel encapsulation functionality for network traffic. Enable this feature if you want to enable Geneve Offload encapsulation in Cisco VIC 14xx series adapters. Disable this feature to disable Geneve Offload, in order to prevent non-encapsulated UDP packets whose destination port numbers match with the Geneve destination port from being treated as tunneled packets. If you enable Geneve Offload feature, then Cisco recommends the following settings: • Transmit Queue Count—1 • Transmit Queue Ring Size—4096 • Receive Queue Count—8 • Receive Queue Ring Size—4096 • Completion Queue Count—9 • Interrupt Count—11

	Command or Action	Purpose
		Note You cannot enable the following when Geneve Offload is enabled: • RDMA on the same vNIC • usNIC on the same vNIC • Non-Port Channel Mode • aRFS • Advanced Filters • NetQueue Outer IPV6 is not supported with GENEVE Offload feature. **Downgrade Limitation**—If Geneve Offload is enabled, you cannot downgrade to any release earlier than 4.1(2a).
Step 23	Server /chassis/adapter/host-eth-if # **scope interrupt**	Enters the interrupt command mode.
Step 24	Server /chassis/adapter/host-eth-if/interrupt # **set interrupt-count** *count*	Specifies the number of interrupt resources. The range is 1 to 514; the default is 8. In general, you should allocate one interrupt resource for each completion queue.
Step 25	Server /chassis/adapter/host-eth-if/interrupt # **set coalescing-time** *usec*	The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent. The range is 1 to 65535 microseconds; the default is 125. To turn off coalescing, enter 0 (zero).
Step 26	Server /chassis/adapter/host-eth-if/interrupt # **set coalescing-type** {**idle** | **min**}	The coalescing types are as follows: • **idle** —The system does not send an interrupt until there is a period of no activity lasting as least as long as the time specified in the coalescing time configuration. • **min** —The system waits for the time specified in the coalescing time configuration before sending another interrupt event. This is the default.
Step 27	Server /chassis/adapter/host-eth-if/interrupt # **set interrupt-mode** {**intx** | **msi** | **msix**}	Specifies the Ethernet interrupt mode. The modes are as follows: • **intx** —Line-based interrupt (PCI INTx)

	Command or Action	Purpose
		• **msi** —Message-Signaled Interrupt (MSI) • **msix** —Message Signaled Interrupts with the optional extension (MSI-X). This is the recommended and default option.
Step 28	Server /chassis/adapter/host-eth-if/interrupt # **exit**	Exits to the host Ethernet interface command mode.
Step 29	Server /chassis/adapter/host-eth-if # **scope recv-queue**	Enters receive queue command mode.
Step 30	Server /chassis/adapter/host-eth-if/recv-queue # **set rq-count** *count*	The number of receive queue resources to allocate. The range is 1 to 256; the default is 4.
Step 31	Server /chassis/adapter/host-eth-if/recv-queue # **set rq-ring-size** *size*	The number of descriptors in the receive queue. The range is 64 and 16384; the default is 512. VIC 14xx Series adapters support a 4K (4096) maximum Ring Size. VIC15xxx Series adapters support up to 16K Ring Size.
Step 32	Server /chassis/adapter/host-eth-if/recv-queue # **exit**	Exits to the host Ethernet interface command mode.
Step 33	Server /chassis/adapter/host-eth-if # **scope trans-queue**	Enters transmit queue command mode.
Step 34	Server /chassis/adapter/host-eth-if/trans-queue # **set wq-count** *count*	The number of transmit queue resources to allocate. The range is 1 to 256; the default is 1.
Step 35	Server /chassis/adapter/host-eth-if/trans-queue # **set wq-ring-size** *size*	The number of descriptors in the transmit queue. The range is 64 to 16384; the default is 256. VIC 14xx Series adapters support a 4K (4096) maximum Ring Size. VIC15xxx Series adapters support up to 16K Ring Size.
Step 36	Server /chassis/adapter/host-eth-if/trans-queue # **exit**	Exits to the host Ethernet interface command mode.
Step 37	Server /chassis/adapter/host-eth-if # **scope comp-queue**	Enters completion queue command mode.
Step 38	Server /chassis/adapter/host-eth-if/comp-queue # **set cq-count** *count*	The number of completion queue resources to allocate. The range is 1 to 512; the default is 5.

	Command or Action	Purpose
		In general, the number of completion queues equals the number of transmit queues plus the number of receive queues.
Step 39	Server /chassis/adapter/host-eth-if/comp-queue # **exit**	Exits to the host Ethernet interface command mode.
Step 40	Server /chassis/adapter/host-eth-if/ # **set rdma_mr** *number*	Sets the number of memory regions to be used per adapter. The values range from 4096 to 524288.
Step 41	Server /chassis/adapter/host-eth-if/ # **set rdma_qp** *number*	Sets the number of queue pairs to be used per adapter. The values range from 1-8192 queue pairs.
Step 42	Server /chassis/adapter/host-eth-if/ # **set rdma_resgrp** *number*	Sets the number of resource groups to be used. The values range from 1-128 resource groups. **Note** After committing the RoCE details, you are required to reboot the server for the changes to take place.
Step 43	Server /chassis/adapter/host-eth-if # **scope offload**	Enters TCP offload command mode.
Step 44	Server /chassis/adapter/host-eth-if/offload # **set tcp-segment-offload** {**disable** | **enable**}	Enables or disables TCP Segmentation Offload as follows: • **disable** —The CPU segments large TCP packets. • **enable** —The CPU sends large TCP packets to the hardware to be segmented. This option may reduce CPU overhead and increase throughput rate. This is the default. **Note** This option is also known as Large Send Offload (LSO).
Step 45	Server /chassis/adapter/host-eth-if/offload # **set tcp-rx-checksum-offload** {**disable** | **enable**}	Enables or disables TCP Receive Offload Checksum Validation as follows: • **disable** —The CPU validates all packet checksums. • **enable** —The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. This is the default.

	Command or Action	Purpose
Step 46	Server /chassis/adapter/host-eth-if/offload # **set tcp-tx-checksum-offload** {**disable** | **enable**}	Enables or disables TCP Transmit Offload Checksum Validation as follows: • **disable** —The CPU validates all packet checksums. • **enable** —The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. This is the default.
Step 47	Server /chassis/adapter/host-eth-if/offload # **set tcp-large-receive-offload** {**disable** | **enable**}	Enables or disables TCP Large Packet Receive Offload as follows: • **disable** —The CPU processes all large packets. • **enable** —The hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput. This is the default.
Step 48	Server /chassis/adapter/host-eth-if/offload # **exit**	Exits to the host Ethernet interface command mode.
Step 49	Server /chassis/adapter/host-eth-if # **scope rss**	Enters Receive-side Scaling (RSS) command mode.
Step 50	Server /chassis/adapter/host-eth-if/rss # **set rss** {**disable** | **enable**}	Enables or disables RSS, which allows the efficient distribution of network receive processing across multiple CPUs in multiprocessor systems. The default is enable for the two default vNICs, and disable for user-created vNICs.
Step 51	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-ipv4** {**disable** | **enable**}	Enables or disables IPv4 RSS. The default is enable.
Step 52	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-tcp-ipv4** {**disable** | **enable**}	Enables or disables TCP/IPv4 RSS. The default is enable.
Step 53	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-ipv6** {**disable** | **enable**}	Enables or disables IPv6 RSS. The default is enable.
Step 54	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-tcp-ipv6** {**disable** | **enable**}	Enables or disables TCP/IPv6 RSS. The default is enable.
Step 55	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-ipv6-ex** {**disable** | **enable**}	Enables or disables IPv6 Extension RSS. The default is disable.

	Command or Action	Purpose
Step 56	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-tcp-ipv6-ex** {**disable** | **enable**}	Enables or disables TCP/IPv6 Extension RSS. The default is disable.
Step 57	Server /chassis/adapter/host-eth-if/rss # **exit**	Exits to the host Ethernet interface command mode.
Step 58	Server /chassis/adapter/host-eth-if # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example configures the properties of a vNIC:

```
Server# scope chassis
Server /chassis # show adapter
PCI Slot Product Name   Serial Number  Product ID     Vendor
-------- -------------- -------------- -------------- --------------------
1        UCS VIC P81E   QCI1417A0QK    N2XX-ACPCI01   Cisco Systems Inc

Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if Test1
Server /chassis/adapter/host-eth-if # set uplink 1
Server /chassis/adapter/host-eth-if # set vmq enabled
Server /chassis/adapter/host-eth-if # set multi-queue enabled
Server /chassis/adapter/host-eth-if # enable arfs
Server /chassis/adapter/host-eth-if *# scope offload
Server /chassis/adapter/host-eth-if/offload *# set tcp-segment-offload enable
Server /chassis/adapter/host-eth-if/offload *# exit
Server /chassis/adapter/host-eth-if *# commit
Server /chassis/adapter/host-eth-if #
```

What to do next

Reboot the server to apply the changes.

Setting Admin Link Training on External Ethernet Interfaces

Admin link training for the port profile on the external ethernet interfaces of the specified vNIC can be enabled or disabled.

Before you begin

You must log in with admin privileges to perform this task.

Note This option is available only on some of the adapters and servers.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show adapter**	(Optional) Displays the available adapter devices.
Step 3	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 4	Server /chassis / adapter # **scope ext-eth-if 0** | **1** *name*	Enters the external ethernet interface command mode for the specified vNIC.

Step 5	Server /chassis / adapter / ext-eth-if # **set admin-link-training on** | **off** |**auto**	Sets the admin link training to the chosen option for the specified vNIC.
		Admin Link Training is set to `auto`, by default.
		Beginning from 4.2(2a), the below different settings apply only to Cisco UCS VIC 15xxx adapters and Copper cables at speeds 10G/25G/50G only.
		• If `admin-link-training` is set to `auto`, then Adapter firmware sets `oper-link-training` value as `on` or `off`, depending upon the transceivers.
		  • `Auto Negotiate` disabled with 25G copper
		  • `Auto Negotiate` enabled with 50G copper
		• If `admin-link-training` is set to `on`, then Adapter firmware sets `oper-link-training` as `on`.
		  • `Auto Negotiate` enabled with 25G copper
		  • `Auto Negotiate` enabled with 50G copper
		• If `admin-link-training` is `off`, then Adapter firmware sets `oper-link-training` as `off`.
		  • `Auto Negotiate` disabled with 25G copper

	Command or Action	Purpose
		• `Auto Negotiate` disabled for 50G copper **Note** • For all non-passive copper cables, `oper-link-training` mode is set to `off`, irrespective of the `admin-link-training` mode. • Any changes in the `admin-link-training` settings leads to the reset of the Series for that port, even if the `oper-link-training` value remains the same.
Step 6	Server /chassis / adapter / ext-eth-if * # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to set admin link training to `auto` on the external ethernet interface.

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope ext-eth-if 1
Server /chassis/adapter/ext-eth-if # set admin-link-training auto
Server /chassis/adapter/ext-eth-if* # commit
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Port 1:
    MAC Address: 74:A2:E6:28:C6:A3
    Link State: Link
    Encapsulation Mode: CE
    Admin Speed: 40Gbps
    Operating Speed: -
    Admin Link Training: Auto
    Connector Present: Yes
    Connector Supported: Yes
    Connector Type: QSFP_XCVR_CR4
    Connector Vendor: CISCO
    Connector Part Number: 2231254-3
    Connector Part Revision: B
Server /chassis/adapter/ext-eth-if
```

Setting Admin FEC Mode on External Ethernet Interfaces

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show adapter**	(Optional) Displays the available adapter devices.
Step 3	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 4	Server /chassis / adapter # **scope ext-eth-if** {**0** | **1** *name*}	Enters the external ethernet interface command mode for the specified vNIC.
Step 5	Server /chassis / adapter / ext-eth-if # **set admin-fec-mode** {|**cl108** |**cl91-cons16**| **cl91**|**cl74** | **off**}	Sets the admin FEC mode. The default value is **cl91**. **Note** Admin Forward Error Correction (FEC) mode apply only to Cisco UCS VIC 14xx adapters at speed 25/100G and Cisco UCS VIC 15xxx adapters at speeds 25G/50G. **Operating FEC Mode**— The value of **Operating FEC Mode** is the same as **Admin FEC mode** with these exceptions: • The value is Off when the speed is 10 Gbps or 40 Gbps. This is because FEC is not supported. • The value is Off for QSFP-100G-LR4-S transceiver. • The value is Off for QSFP-40/100-SRBD transceiver.
Step 6	Server /chassis / adapter / ext-eth-if * # **commit**	At the prompt, select **y**. Commits the transaction to the system configuration.

Example

This example shows how to set the admin FEC mode on the external ethernet interface.

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope ext-eth-if 1
Server /chassis/adapter/ext-eth-if # set admin-fec-mode cl74
Server /chassis/adapter/ext-eth-if* # commit
Changes to the network settings will be applied immediately.
You may lose connectivity to the Cisco IMC and may have to log in again.
Do you wish to continue? [y/N] y
Port 1:
    MAC Address: 00:5D:73:1C:6C:58
    Link State: LinkDown
    Encapsulation Mode: CE
    Admin Speed: Auto
    Operating Speed: -
    Admin Link Training: N/A
    Admin FEC Mode: cl74
    Operating FEC Mode: Off
    Connector Present: NO
    Connector Supported: N/A
    Connector Type: N/A
    Connector Vendor: N/A
    Connector Part Number: N/A
    Connector Part Revision: N/A
Server /chassis/adapter/ext-eth-if #
```

Creating a vNIC

The adapter provides two permanent vNICs. You can create up to 16 additional vNICs.

Before you begin

You must log in with user or admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **create host-eth-if** *name*	Creates a vNIC and enters the host Ethernet interface command mode. The *name* argument can be up to 32 ASCII characters.

	Command or Action	Purpose
Step 4	(Optional) Server /chassis/adapter/host-eth-if # **set channel-number** *number*	If NIV mode is enabled for the adapter, you must assign a channel number to this vNIC. The range is 1 to 1000.
Step 5	Server /chassis/adapter/host-eth-if # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example creates a vNIC on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # create host-eth-if Vnic5
Server /chassis/adapter/host-eth-if *# commit
New host-eth-if settings will take effect upon the next server reset
Server /chassis/adapter/host-eth-if #
```

Deleting a vNIC

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **delete host-eth-if** *name*	Deletes the specified vNIC. **Note** You cannot delete either of the two default vNICs, eth0 or eth1.
Step 4	Server /chassis/adapter # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example deletes a vNIC on adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # delete host-eth-if Vnic5
Server /chassis/adapter *# commit
Server /chassis/adapter #
```

Creating Cisco usNIC Using the Cisco IMC CLI

Note Even though several properties are listed for Cisco usNIC in the usNIC properties dialog box, you must configure only the following properties because the other properties are not currently being used.

- **cq-count**
- **rq-count**
- **tq-count**
- **usnic-count**

Before you begin

You must log in to the Cisco IMC CLI with administrator privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	server# **scope chassis**	Enters chassis command mode.
Step 2	server/chassis# **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** Make sure that the server is powered on before you attempt to view or change adapter settings. To view the index of the adapters configured on you server, use the **show adapter** command.
Step 3	server/chassis/adapter# **scope host-eth-if** {**eth0** | **eth1**}	Enters the command mode for the vNIC. Specify the Ethernet ID based on the number of vNICs that you have configured in your environment. For example, specify **eth0** if you configured only one vNIC.

	Command or Action	Purpose
Step 4	server/chassis/adapter/host-eth-if# **create usnic-config 0**	Creates a usNIC config and enters its command mode. Make sure that you always set the index value to 0. **Note** To create a Cisco usNIC for the first time for a given vNIC using the Cisco IMC CLI, you must first create a **usnic-config**. Subsequently, you only need to scope into the **usnic-config** and modify the properties for Cisco usNIC. For more information about modifying Cisco usNIC properties, see Modifying a Cisco usNIC value using the Cisco IMC CLI, on page 201.
Step 5	server/chassis/adapter/host-eth-if/usnic-config# **set cq-count** *count*	Specifies the number of completion queue resources to allocate. We recommend that you set this value to 6. The number of completion queues equals the number of transmit queues plus the number of receive queues.
Step 6	server/chassis/adapter/host-eth-if/usnic-config# **set rq-count** *count*	Specifies the number of receive queue resources to allocate. We recommend that you set this value to 6.
Step 7	server/chassis/adapter/host-eth-if/usnic-config# **set tq-count** *count*	Specifies the number of transmit queue resources to allocate. We recommend that you set this value to 6.
Step 8	server/chassis/adapter/host-eth-if/usnic-config# **set usnic-count** *number of usNICs* .	Specifies the number of Cisco usNICs to create. Each MPI process that is running on the server requires a dedicated Cisco usNIC. Therefore, you might need to create up to 64 Cisco usNICs to sustain 64 MPI processes running simultaneously. We recommend that you create at least as many Cisco usNICs, per Cisco usNIC-enabled vNIC, as the number of physical cores on your server. For example, if you have 8 physical cores on your server, create 8 Cisco usNICs.
Step 9	server/chassis/adapter/host-eth-if /usnic-config# **commit**	Commits the transaction to the system configuration. **Note** The changes take effect when the server is rebooted.

	Command or Action	Purpose
Step 10	server/chassis/adapter/host-eth-if/usnic-config# **exit**	Exits to host Ethernet interface command mode.
Step 11	server/chassis/adapter/host-eth-if# **exit**	Exits to adapter interface command mode.
Step 12	server/chassis/adapter# **exit**	Exits to chassis interface command mode.
Step 13	server/chassis# **exit**	Exits to server interface command mode.
Step 14	server# **scope bios**	Enters Bios command mode.
Step 15	server/bios# **scope advanced**	Enters the advanced settings of BIOS command mode.
Step 16	server/bios/advanced# **set IntelVTD Enabled**	Enables the Intel Virtualization Technology.
Step 17	server/bios/advanced# **set ATS Enabled**	Enables the Intel VT-d Address Translation Services (ATS) support for the processor.
Step 18	server/bios/advanced# **set CoherencySupport Enabled**	Enables Intel VT-d coherency support for the processor.
Step 19	server /bios/advanced# **commit**	Commits the transaction to the system configuration. **Note** The changes take effect when the server is rebooted.

Example

This example shows how to configure Cisco usNIC properties:

```
Server # scope chassis
server /chassis # show adapter
server /chassis # scope adapter 2
server /chassis/adapter # scope host-eth-if eth0
server /chassis/adapter/host-eth-if # create usnic-config 0
server /chassis/adapter/host-eth-if/usnic-config *# set usnic-count 64
server /chassis/adapter/host-eth-if/usnic-config *# set cq-count 6
server /chassis/adapter/host-eth-if/usnic-config *# set rq-count 6
server /chassis/adapter/host-eth-if/usnic-config *# set tq-count 6
server /chassis/adapter/host-eth-if/usnic-config *# commit
Committed settings will take effect upon the next server reset
server /chassis/adapter/host-eth-if/usnic-config # exit
server /chassis/adapter/host-eth-if # exit
server /chassis/adapter # exit
server /chassis # exit
server # exit
server# scope bios
server /bios # scope advanced
server /bios/advanced # set IntelVTD Enabled
server /bios/advanced *# set ATS Enabled*
server /bios/advanced *# set CoherencySupport Enabled
server /bios/advanced *# commit
Changes to BIOS set-up parameters will require a reboot.
```

```
Do you want to reboot the system?[y|N]y
A system reboot has been initiated.
```

Modifying a Cisco usNIC value using the Cisco IMC CLI

Before you begin

You must log in to the Cisco IMC GUI with administrator privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	server# **scope chassis**	Enters chassis command mode.
Step 2	server/chassis# **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** Make sure that the server is powered on before you attempt to view or change adapter settings. To view the index of the adapters configured on you server, use the **show adapter** command.
Step 3	server/chassis/adapter# **scope host-eth-if** {**eth0** | **eth1**}	Enters the command mode for the vNIC. Specify the Ethernet ID based on the number of vNICs that you have configured in your environment. For example, specify **eth0** if you configured only one vNIC.
Step 4	server/chassis/adapter/host-eth-if# **scope usnic-config 0**	Enters the command mode for the usNIC. Make sure that you always set the index value as 0 to configure a Cisco usNIC.
Step 5	server/chassis/adapter/host-eth-if/usnic-config# **set usnic-count** *number of usNICs* .	Specifies the number of Cisco usNICs to create. Each MPI process running on the server requires a dedicated Cisco usNIC. Therefore, you might need to create up to 64 Cisco usNIC to sustain 64 MPI processes running simultaneously. We recommend that you create at least as many Cisco usNIC, per Cisco usNIC-enabled vNIC, as the number of physical cores on your server. For example, if you have 8 physical cores on your server, create 8 usNICs.
Step 6	server /chassis/adapter/host-eth-if /usnic-config# **commit**	Commits the transaction to the system configuration.

	Command or Action	Purpose
		Note The changes take effect when the server is rebooted.
Step 7	server/chassis/adapter/host-eth-if/usnic-config# **exit**	Exits to host Ethernet interface command mode.
Step 8	server/chassis/adapter/host-eth-if# **exit**	Exits to adapter interface command mode.
Step 9	server/chassis/adapter# **exit**	Exits to chassis interface command mode.
Step 10	server/chassis# **exit**	Exits to server interface command mode.

Example

This example shows how to configure Cisco usNIC properties:

```
server # scope chassis
server /chassis # show adapter
server /chassis # scope adapter 2
server /chassis/adapter # scope host-eth-if eth0
server /chassis/adapter/host-eth-if # scope usnic-config 0
server /chassis/adapter/host-eth-if/usnic-config # set usnic-count 32
server /chassis/adapter/host-eth-if/usnic-config # commit
Committed settings will take effect upon the next server reset
server /chassis/adapter/host-eth-if/usnic-config # exit
server /chassis/adapter/host-eth-if # exit
server /chassis/adapter # exit
server /chassis # exit
server # exit
```

Viewing usNIC Properties

Before you begin

You must log in with admin privileges to perform this task.

usNIC must be configured on a vNIC.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.

	Command or Action	Purpose
Step 3	Server /chassis/adapter # **scope host-eth-if** {**eth0** | **eth1** | *name*}	Enters the host Ethernet interface command mode for the specified vNIC.
Step 4	Server /chassis/adapter/host-eth-if # **show usnic-config** *index*	Displays the usNIC properties for a vNIC.

Example

This example displays the usNIC properties for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # show usnic-config 0
Idx usNIC Count TQ Count RQ Count CQ Count TQ Ring Size RQ Ring Size Interrupt Count
--- ----------- -------- -------- -------- ------------ ------------ ---------------
0   113         2        2        4        256          512          4
Server /chassis/adapter/host-eth-if #
```

Deleting Cisco usNIC from a vNIC

Before you begin

You must log in to Cisco IMC CLI with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	server# **scope chassis**	Enters chassis command mode.
Step 2	server/chassis# **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** Make sure that the server is powered on before you attempt to view or change adapter settings. To view the index of the adapters configured on you server, use the **show adapter** command.
Step 3	server/chassis/adapter# **scope host-eth-if** {**eth0** | **eth1**}	Enters the command mode for the vNIC. Specify the Ethernet ID based on the number of vNICs that you have configured in your environment. For example, specify **eth0** if you configured only one vNIC.
Step 4	Server/chassis/adapter/host-eth-if# **delete usnic-config 0**	Deletes the Cisco usNIC configuration for the vNIC.

	Command or Action	Purpose
Step 5	Server/chassis/adapter/host-eth-if# **commit**	Commits the transaction to the system configuration **Note** The changes take effect when the server is rebooted.

Example

This example shows how to delete the Cisco usNIC configuration for a vNIC:

```
server # scope chassis
server/chassis # show adapter
server/chassis # scope adapter 1
server/chassis/adapter # scope host-eth-if eth0
server/chassis/adapter/host-eth-if # delete usnic-config 0
server/chassis/host-eth-if/iscsi-boot *# commit
New host-eth-if settings will take effect upon the next adapter reboot

server/chassis/host-eth-if/usnic-config #
```

Configuring iSCSI Boot Capability

Configuring iSCSI Boot Capability for vNICs

To configure the iSCSI boot capability on a vNIC:

- You must log in with admin privileges to perform this task.
- To configure a vNIC to boot a server remotely from an iSCSI storage target, you must enable the PXE boot option on the vNIC.

Note You can configure a maximum of 2 iSCSI vNICs for each host.

Configuring iSCSI Boot Capability on a vNIC

You can configure a maximum of 2 iSCSI vNICs for each host.

Before you begin

- To configure a vNIC to boot a server remotely from an iSCSI storage target, you must enable the PXE boot option on the vNIC.
- You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-eth-if** {**eth0** | **eth1** | *name*}	Enters the host Ethernet interface command mode for the specified vNIC.
Step 4	Server /chassis/adapter/host-eth-if # **create iscsi-boot** *index*	Creates the iSCSI boot index for the vNIC. At this moment, only 0 is allowed as the index.
Step 5	Server /chassis/adapter/host-eth-if/iscsi-boot* # **create iscsi-target** *index*	Creates an iSCSI target for the vNIC. The value can either be 0 or 1.
Step 6	Server /chassis/adapter/host-eth-if/iscsi-boot* # **set dhcp-net-settings enabled**	Enables the DHCP network settings for the iSCSI boot.
Step 7	Server /chassis/adapter/host-eth-if/iscsi-boot* # **set initiator-name** *string*	Sets the initiator name. It cannot be more than 223 characters.
Step 8	Server /chassis/adapter/host-eth-if/iscsi-boot* # **set dhcp-iscsi-settings enabled**	Enables the DHCP iSCSI settings.
Step 9	Server /chassis/adapter/host-eth-if/iscsi-boot* # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

Example

This example shows how to configure the iSCSI boot capability for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # create iscsi-boot 0
Server /adapter/host-eth-if/iscsi-boot *# set dhcp-net-settings enabled
Server /adapter/host-eth-if/iscsi-boot *# set initiator-name iqn.2012-01.com.adser:abcde
Server /adapter/host-eth-if/iscsi-boot *# set dhcp-iscsi-settings enabled
Server /adapter/host-eth-if/iscsi-boot *# commit

New host-eth-if settings will take effect upon the next server reset
Server /adapter/host-eth-if/iscsi-boot #
```

Deleting an iSCSI Boot Configuration for a vNIC

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **scope host-eth-if** {**eth0** | **eth1** | *name*}	Enters the host Ethernet interface command mode for the specified vNIC.
Step 4	Server /chassis/adapter/host-eth-if # **delete iscsi-boot 0**	Deletes the iSCSI boot capability for the vNIC.
Step 5	Server /chassis/adapter/host-eth-if* # **commit**	Commits the transaction to the system configuration **Note** The changes will take effect upon the next server reboot.

Example

This example shows how to delete the iSCSI boot capability for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # delete iscsi-boot 0
Server /adapter/host-eth-if/iscsi-boot *# commit
New host-eth-if settings will take effect upon the next server reset

Server /adapter/host-eth-if/iscsi-boot #
```

Backing Up and Restoring the Adapter Configuration

Exporting the Adapter Configuration

The adapter configuration can be exported as an XML file to a TFTP server.

Important If any firmware or BIOS updates are in progress, do not export the adapter configuration until those tasks are complete.

Before you begin

A supported Virtual Interface Card (VIC) must be installed in the chassis and the server must be powered on.

Obtain the TFTP server IP address.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **export-vnic** *protocol remote server IP address*	Starts the export operation. The adapter configuration file will be stored at the specified path and filename on the remote server at the specified IP address. The protocol can be one of the following: • TFTP • FTP • SFTP • SCP • HTTP

	Command or Action	Purpose
		Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.

Example

This example exports the configuration of adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # export-vnic ftp 192.0.20.34 //test/dnld-ucs-k9-bundle.1.0.2h.bin
Server /chassis/adapter #
```

Importing the Adapter Configuration

Important If any firmware or BIOS updates are in progress, do not import the adapter configuration until those tasks are complete.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope adapter** *index*	Enters the command mode for the adapter card at the PCI slot number specified by *index*. **Note** The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **import-vnic** *tftp-ip-address path-and-filename*	Starts the import operation. The adapter downloads the configuration file from the specified path on the TFTP server at the specified IP address. The configuration will be installed during the next server reboot.

Example

This example imports a configuration for the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # import-vnic 192.0.2.34 /ucs/backups/adapter4.xml
Import succeeded.
New VNIC adapter settings will take effect upon the next server reset.
Server /chassis/adapter #
```

What to do next

Reboot the server to apply the imported configuration.

Restoring Adapter Defaults

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **adapter-reset-defaults** *index*	Restores factory default settings for the adapter at the PCI slot number specified by the *index* argument. **Note** Resetting the adapter to default settings sets the port speed to 4 X 10 Gbps. Choose 40 Gbps as the port speed only if you are using a 40 Gbps switch.

Example

This example restores the default configuration of the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # adapter-reset-defaults 1
This operation will reset the adapter to factory default.
All your configuration will be lost.
Continue?[y|N] y
Server /chassis #
```

Managing Adapter Firmware

Adapter Firmware

A Cisco UCS C-Series network adapter contains the following firmware components:

- Adapter firmware —The main operating firmware, consisting of an active and a backup image, can be installed from the Cisco IMC GUI or CLI interface or from the Host Upgrade Utility (HUU). You can upload a firmware image from either a local file system or a TFTP server.
- Bootloader firmware—The bootloader firmware cannot be installed from the Cisco IMC. You can install this firmware using the Host Upgrade Utility.

Installing Adapter Firmware

Important If any firmware or BIOS updates are in progress, do not install the adapter firmware until those tasks are complete.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **update-adapter-fw** *tftp-ip-address path-and-filename* {**activate** | **no-activate**} [*pci-slot*] [*pci-slot*]	Downloads the specified adapter firmware file from the TFTP server, then installs the firmware as the backup image on one or two specified adapters or, if no adapter is specified, on all adapters. If the **activate** keyword is specified, the new firmware is activated after installation.

	Command or Action	Purpose
Step 3	(Optional) Server /chassis # **recover-adapter-update** [*pci-slot*] [*pci-slot*]	Clears an incomplete firmware update condition on one or two specified adapters or, if no adapter is specified, on all adapters.

Example

This example begins an adapter firmware upgrade on the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # update-adapter-fw 192.0.2.34 /ucs/adapters/adapter4.bin activate 1
Server /chassis #
```

What to do next

To activate the new firmware, see Activating Adapter Firmware, on page 211.

Activating Adapter Firmware

Important While the activation is in progress, do not:

- Reset, power off, or shut down the server.
- Reboot or reset Cisco IMC.
- Activate any other firmware.
- Export technical support or configuration data.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **activate-adapter-fw** *pci-slot* {**1** | **2**}	Activates adapter firmware image 1 or 2 on the adapter in the specified PCI slot. **Note** The changes will take effect upon the next server reboot.

Example

This example activates adapter firmware image 2 on the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # activate-adapter-fw 1 2
Firmware image activation suceeded
Please reset the server to run the activated image
Server /chassis #
```

What to do next

Reboot the server to apply the changes.

Resetting the Adapter

Before you begin

You must log in with admin privileges to perform this task.

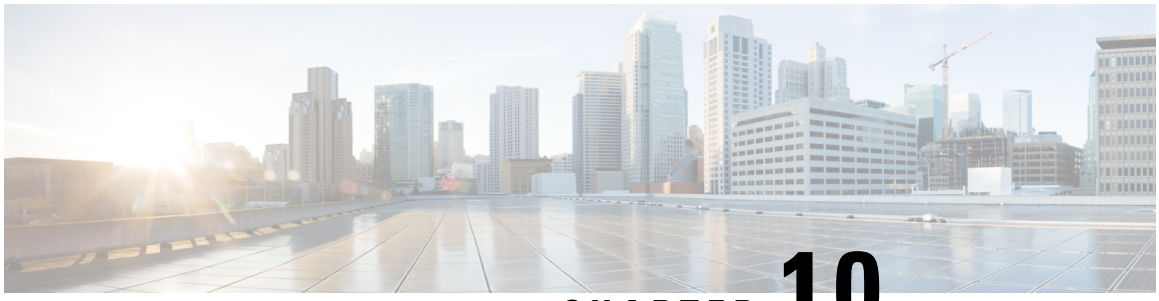
Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server/chassis # **adapter-reset** *index*	Resets the adapter at the PCI slot number specified by the *index* argument. **Note** Resetting the adapter also resets the host.

Example

This example resets the adapter in PCI slot 1:

```
Server# scope chassis
Server /chassis # adapter-reset 1
This operation will reset the adapter and the host if it is on.
You may lose connectivity to the CIMC and may have to log in again.
Continue?[y|N] y
Server /chassis #
```



CHAPTER 10

Managing Storage Adapters

This chapter includes the following sections:

Creating Virtual Drives from Unused Physical Drives

Before you begin

You must log in with admin privileges to perform this task.

This is available only on some C-series servers.

Note Cisco IMC now provides single drive support in M.2 RAID controller along with existing dual drive support. With single drive support, you cannot create a virtual disk.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **create virtual-drive**	At this point, you are prompted to enter information corresponding to the RAID level, the physical drives to be used, the size, enabling full disk encryption of the drive and the write policy for the new virtual drive. Enter the appropriate information at each prompt. When you have finished specifying the virtual drive information, you are prompted to confirm that the information is correct. Enter **y** (yes) to confirm, or **n** (no) to cancel the operation. **Note** Enabling full disk encryption secures the drive.

	Command or Action	Purpose
Step 4	Server /chassis/storageadapter # **show virtual-drive**	Displays the existing virtual drives.

Example

This example shows how to create a new virtual drive that spans two unused physical drives.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # create-virtual-drive
Please enter RAID level
0, 1, 5, 10, 50 --> 1

Please choose from the following 10 unused physical drives:
    ID  Size(MB)       Model        Interface  Type
     1  571776         SEAGATE      SAS        HDD
     2  571776         SEAGATE      SAS        HDD
     4  571776         SEAGATE      SAS        HDD
     5  428672         SEAGATE      SAS        HDD
     6  571776         SEAGATE      SAS        HDD
     7  571776         SEAGATE      SAS        HDD
     8  571776         SEAGATE      SAS        HDD
     9  428672         SEAGATE      SAS        HDD
    10  571776         SEAGATE      SAS        HDD
    11  953344         SEAGATE      SAS        HDD

Specify physical disks for span 0:
  Enter comma-separated PDs from above list--> 1,2
  Please enter Virtual Drive name (15 characters maximum)--> test_v_drive
  Please enter Virtual Drive size in MB, GB, or TB
   Example format: '400 GB' --> 10 GB

Optional attribute:

  stripsize: defaults to 64K Bytes

     0: 8K Bytes
    1: 16K Bytes
    2: 32K Bytes
    3: 64K Bytes
    4: 128K Bytes
    5: 256K Bytes
    6: 512K Bytes
    7: 1024K Bytes
  Choose number from above options or hit return to pick default--> 2
stripsize will be set to 32K Bytes (6 and 'strip-size\:32k')

  Disk Cache Policy: defaults to Unchanged

     0: Unchanged
    1: Enabled
    2: Disabled
  Choose number from above options or hit return to pick default--> 0
Disk Cache Policy will be set to Unchanged (0 and 'disk-cache-policy\:unchanged'

         )

  Read Policy: defaults to No Read Ahead
```

```
     0: No Read Ahead
    1: Always
  Choose number from above options or hit return to pick default--> 0
Read Policy will be set to No Read Ahead (0 and 'read-policy\:no-read-ahead')

  Write Policy: defaults to Write Through

     0: Write Through
    1: Write Back Good BBU
    2: Always Write Back
  Choose number from above options or hit return to pick default--> 0
Write Policy will be set to Write Through (0 and 'write-policy\:write-through')

  IO Policy: defaults to Direct I/O

     0: Direct I/O
    1: Cached I/O
  Choose number from above options or hit return to pick default--> 0
IO Policy will be set to Direct I/O (0 and 'io-policy\:direct-io')

  Access Policy: defaults to Read Write

     0: Read Write
    1: Read Only
    2: Blocked
  Choose number from above options or hit return to pick default--> 0
Access Policy will be set to Read Write (0 and 'access-policy\:read-write')
Enable SED security on virtual drive (and underlying drive group)?
Enter y or n--> y
Virtual drive and drive group will be secured

New virtual drive will have the following characteristics:
  - Spans: '[1.2]'
  - RAID level: '1'
  - Name: 'test_v_drive'
  - Size: 10 GB
  - stripsize: 32K Bytes
  - Disk Cache Policy: Unchanged
  - Read Policy: No Read Ahead
  - Write Policy: Write Through
  - IO Policy: Direct I/O
  - Access Policy: Read Write
  - Encryption: FDE

OK? (y or n)--> y

Server /chassis/storageadapter # show virtual-drive
Virtual Drive Health         Status               Name             Size       RAID Level
Boot Drive
------------- -------------- -------------------- ---------------- ---------- ----------
----------
0             Good           Optimal                               150528 MB  RAID 0
false
1             Good           Optimal                               20480 MB   RAID 0
true
2             Good           Optimal                               114140 MB  RAID 0
false
3             Good           Optimal              test_v_drive     10000 MB   RAID 1
false
4             Good           Optimal              new_from_test    500 MB     RAID 1
false

Server /chassis/storageadapter #
```

Creating Virtual Drive from an Existing Drive Group

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **carve-virtual-drive**	At this point, you are prompted to enter information corresponding to the virtual drives to be used, and the size and the write policy for the new virtual drive. Enter the appropriate information at each prompt. When you have finished specifying the virtual drive information, you are prompted to confirm that the information is correct. Enter **y** (yes) to confirm, or **n** (no) to cancel the operation.
Step 4	Server /chassis/storageadapter # **show virtual-drive**	Displays the existing virtual drives.

Example

This example shows how to carve a new virtual drive out of unused space in an existing RAID 1 drive group:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # carve-virtual-drive
  < Fetching virtual drives...>

ID  Name              RL  VDSize        MaxPossibleSize PD(s)
-------------------------------------------------------------------
0  RAID0_12          0   100 MB        Unknown         1,2

Please choose from the above list the virtual drive number
whose space the new virtual drive will share--> 0
New virtual drive will share space with VD 0

Please enter Virtual Drive name (15 characters maximum)--> test_v_drive
Please enter Virtual Drive size in MB, GB, or TB (maximum: Unknown)
  Example format: '400 GB' --> 10 GB

Optional attributes:

  stripsize: defaults to 64K Bytes
     0: 8K Bytes
```

```
    1: 16K Bytes
    2: 32K Bytes
    3: 64K Bytes
    4: 128K Bytes
    5: 256K Bytes
    6: 512K Bytes
    7: 1024K Bytes
  Choose number from above options or hit return to pick default--> 0
stripsize will be set to 8K Bytes (4 and 'strip-size\:8k')

  Disk Cache Policy: defaults to Unchanged
     0: Unchanged
    1: Enabled
    2: Disabled
  Choose number from above options or hit return to pick default--> 0
Disk Cache Policy will be set to Unchanged (0 and 'disk-cache-policy\:unchanged')

  Read Policy: defaults to No Read Ahead
     0: No Read Ahead
    1: Always
  Choose number from above options or hit return to pick default--> 0
Read Policy will be set to No Read Ahead (0 and 'read-policy\:no-read-ahead')

  Write Policy: defaults to Write Through
     0: Write Through
    1: Write Back Good BBU
    2: Always Write Back
  Choose number from above options or hit return to pick default--> 0
Write Policy will be set to Write Through (0 and 'write-policy\:write-through')

  IO Policy: defaults to Direct I/O
     0: Direct I/O
    1: Cached I/O
  Choose number from above options or hit return to pick default--> 0
IO Policy will be set to Direct I/O (0 and 'io-policy\:direct-io')

  Access Policy: defaults to Read Write
     0: Read Write
    1: Read Only
    2: Blocked
  Choose number from above options or hit return to pick default--> 0
Access Policy will be set to Read Write (0 and 'access-policy\:read-write')

New virtual drive will have the following characteristics:
  - It will share space with virtual drive 0
  - Name: 'amit'
  - Size: 10 GB
  - stripsize: 8K Bytes
  - Disk Cache Policy: Unchanged
  - Read Policy: No Read Ahead
  - Write Policy: Write Through
  - IO Policy: Direct I/O
  - Access Policy: Read Write

OK? (y or n)--> y
Server /chassis/storageadapter # show virtual-drive
Virtual Drive Health         Status               Name             Size       RAID Level
Boot Drive
------------- -------------- -------------------- ---------------- ---------- ----------
----------
0             Good           Optimal                               150528 MB  RAID 0
false
1             Good           Optimal                               20480 MB   RAID 0
true
```

```
2             Good           Optimal                              114140 MB  RAID 0
false
3             Good           Optimal             test_v_drive     10000 MB   RAID 1
false
4             Good           Optimal             new_from_test    500 MB     RAID 1
false

Server /chassis/storageadapter #
```

Setting a Virtual Drive as Transport Ready

Before you begin

- You must log in with admin privileges to perform this task.
- The virtual drive must be in optimal state to enable transport ready.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot ID*	Enters the command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters the command mode for the specified virtual drive.
Step 4	Server /chassis/storageadapter/virtual-drive # **set-transport-ready** *{include-all | exclude-all | include-dhsp}*	Sets the virtual drive to transport ready and assigns the chosen properties. Enter the initialization type using which you can set the selected virtual drive as transport ready. This can be one of the following: • **exlude-all**— Excludes all the dedicated hot spare drives. • **include-all**— Includes any exclusively available or shared dedicated hot spare drives. • **include-dhsp**— Includes exclusive dedicated hot spare drives. When you are prompted to confirm the action. Enter **y** to confirm. **Note** When you set a virtual drive to transport ready all the physical drives associated with it are displayed as Ready to remove.

	Command or Action	Purpose
Step 5	(Optional) Server /chassis/storageadapter/virtual-drive # **show detail**	Display the virtual drive properties with the change.

Example

This example shows how to set virtual drive 5 to transport ready:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-HBA
Server /chassis/storageadapter # scope virtual-drive 5
Server /chassis/storageadapter/virtual-drive # set-transport-ready exclude-all
Since they belong to same drive group, all these virtual drives will be set to Transport
Ready - 0
Are you sure you want to proceed?[y|N]y
Server /chassis/storageadapter/virtual-drive # show detail
Virtual Drive 0:
    Health: Good
    Status: Optimal
    Visibility : Visible
    Name: RAID0_124_RHEL
    Size: 2858160 MB
    Physical Drives: 1, 2, 4
    RAID Level: RAID 0
    Boot Drive: false
    FDE Capable: 0
    FDE Enabled: 0
    Target ID: 0
    Strip Size: 64 KB
    Drives Per Span: 3
    Span Depth: 1
    Access Policy: Transport Ready
    Cache Policy: Direct
    Read Ahead Policy: None
    Requested Write Cache Policy: Write Through
    Current Write Cache Policy: Write Through
    Disk Cache Policy: Unchanged
    Auto Snapshot: false
    Auto Delete Oldest: true
    Allow Background Init: true
Server /chassis/storageadapter/virtual-drive #
```

Clearing a Virtual Drive as Transport Ready

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope storageadapter** *slot ID*	Enters the command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters the command mode for the specified virtual drive.
Step 4	Server /chassis/storageadapter/virtual-drive # **clear-transport-ready**	This reverts the selected transport ready virtual drive to its original status. When you are prompted to confirm the action. Enter **y** to confirm.
Step 5	(Optional) Server /chassis/storageadapter/virtual-drive # **show detail**	Display the virtual drive properties with the change.

Example

This example shows how to revert the selected transport ready virtual drive to its original state:

```
Server # scope chassis
Server /chassis # scope server 1
Server /chassis # scope storageadapter SLOT-HBA
Server /chassis/storageadapter # scope virtual-drive 5
Server /chassis/storageadapter/virtual-drive # clear-transport-ready
Since they belong to same drive group, all these virtual drives will be moved out of Transport
 Ready - 0
Are you sure you want to proceed?[y|N]y
Server /chassis/storageadapter/virtual-drive # show detail
Virtual Drive 0:
    Health: Good
    Status: Optimal
    Visibility : Visible
    Name: RAID0_124_RHEL
    Size: 2858160 MB
    Physical Drives: 1, 2, 4
    RAID Level: RAID 0
    Boot Drive: false
    FDE Capable: 0
    FDE Enabled: 0
    Target ID: 0
    Strip Size: 64 KB
    Drives Per Span: 3
    Span Depth: 1
    Access Policy: Read-Write
    Cache Policy: Direct
    Read Ahead Policy: None
    Requested Write Cache Policy: Write Through
    Current Write Cache Policy: Write Through
    Disk Cache Policy: Unchanged
    Auto Snapshot: false
    Auto Delete Oldest: true
    Allow Background Init: true
Server /chassis/storageadapter/virtual-drive #
```

Configuring Physical Drive Status Auto Config Mode for Storage Controllers

In Cisco UCS C220 and C240 C-series M6 servers, auto config allows controller to auto configure the drives into JBOD or single drive RAID0 VD with every boot. Manually configured drives are not considered as part of Auto config.

The table below shows the behavior of Autoconfiguration in different scenarios.

Physical Drive Status Auto Config Mode	Reboot or OCR	Hotplug	User Action
unconfigured-good	All **unconfigured-good** drives remain **unconfigured-good**. All previously configured **jbod** remain **jbod**.	• Inserted drive remains **unconfigured-good**. • JBOD from a different server remains **unconfigured-good** on this controller.	• Inserted drive remains **unconfigured-good**. • Disabling Autoconfig has no impact on the existing configuration. • Any **jbod** device remains as **jbod** across controller boot. • Any **unconfigured-good** remains **unconfigured-good** across controller boot.
jbod	All **unconfigured-good** are converted to **jbod**.	Newly inserted unconfigured device is converted to **jbod**.	All **unconfigured-good** drives (non-user created) on the controller while running Autoconfig is converted to **jbod**. User created **unconfigured-good** drive remains **unconfigured-good** until next reboot. During reboot, **unconfigured-good** gets converted to **jbod**.
raid-0-writeback	All **unconfigured-good** converted to **raid-0-writeback**.	Newly inserted unconfigured device is converted to **raid-0-writeback**.	All **unconfigured-good** drives (non-user created) on the controller while running Autoconfig is converted to **raid-0-writeback**. User created **unconfigured-good** remains **unconfigured-good** across controller reboot. Any **raid-0-writeback** device remains as **raid-0-writeback** across controller reboot.

Selecting **jbod** as the default configuration does not retain the **unconfigured-good** state across host reboot. The drive state can be retained by disabling the automatic configuration feature. If the **set-auto-cfg-option** option is used, the default automatic configuration will always mark a drive as **unconfigured-good**.

When automatic configuration is selected, then the drive is configured to the desired drive state. And the JBOD and unconfigured drives will set the drive state accordingly on the next controller boot or OCR.

The following table shows sample use cases for different automatic configuration scenarios.

Use Case Scenario	Physical Drive Status Auto Config Mode
Using the server for JBOD Only	**jbod**
Using the server for RAID volume	**unconfigured-good**
Using the server for Mixed JBOD and RAID volume	**unconfigured-good**
Using the server for per drive RAID0 Write Back	**raid-0-writeback**

Setting Physical Drive Status Auto Config Mode

The following procedure explains how to set physical drive status auto config mode in the controller.

Before you begin

You must log in with admin privileges to perform this task.

Note You can set physical drive status auto config mode only on some UCS C-Series servers.

Procedure

Step 1 Server# **scope chassis**

Enters the chassis command mode.

Step 2 Server /chassis# **scope storageadapter**

Enters the command mode for the storage adapter.

Step 3 Server /chassis/storageadapter# **set-auto-cfg-option** *unconfigured-good*

The following message is displayed:

```
Are you sure you want to change auto config option?
Enter 'yes' to confirm -> yes
```

At the confirmation prompt, enter yes. Enables **unconfigured-good** mode. This is the default option.

Name	Description
Physical Drive Status Auto Config Mode options	This can be one of the following: • **unconfigured-good** - The default option. Select this option if you are using the server for RAID volume and mixed JBOD. • **raid-0-writeback** - Select this option if you are using the server for per drive R0 WB. • **jbod** - Select this option if you are using the server for JBOD only.

Note All the status of the unused physical drives changes when you select the appropriate option in the **Auto Config** mode.

Example

This example set the **physical drive status auto config mode** to **unconfigured-good**.

```
Server# scope chassis
Server /chassis # scope storageadapter
Server /chassis/storageadapter # set-auto-cfg-option unconfigured-good
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Importing Foreign Configuration

When one or more physical drives that have previously been configured with a different controller are inserted into a server, they are identified as foreign configurations. You can import these foreign configurations to a controller.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **import-foreign-config**	You are prompted to confirm the action. Enter **yes** to confirm. **Note** If you do not enter **yes**, the action is aborted.

Example

This example shows how to import all foreign configurations on the MegaRAID controller in slot 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # import-foreign-config
Are you sure you want to import all foreign configurations on this controller?
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Unlocking Foreign Configuration Drives

When a set of physical drives hosting a secured drive group are inserted into a different server or controller (or the same controller but whose security-key has been changed while they were not present), they become foreign configurations. Since they are secured, these foreign configurations must be unlocked before they can be imported. The following procedure explains how to unlock a foreign configuration drive:

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **unlock-foreign-configuration**	At the prompt, enter the security key and enter **yes** at the confirmation prompt.
Step 4	(Optional) Server /chassis/storageadapter # **scope physical-drive 2**	Enters the physical drive command mode.
Step 5	(Optional) Server /chassis/storageadapter/physicsl-drive # **show detail**	Displays the status of the unlocked foreign drive.

Example

This example shows how to unlock a foreign configuration drive:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # unlock-foreign-configuration
Please enter the security key to unlock the foreign configuration -> testSecurityKey
Server /chassis/storageadapter # import-foreign-config
Are you sure you want to import all foreign configurations on this controller?
Enter 'yes' to confirm -> yes
```

```
Server /chassis/storageadapter # scope physical-drive 2
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 2:
    Controller: SLOT-HBA
    Health: Good
    Status: Online
    .
    .
    FDE Capable: 1
    FDE Enabled: 1
    FDE Secured: 1
    FDE Locked: 0
    FDE locked foreign config: 0

Server /chassis/storageadapter/physical-drive #
```

Clearing Foreign Configuration

Important This task clears all foreign configuration on the controller. Also, all configuration information from all physical drives hosting foreign configuration is deleted. This action cannot be reverted.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **clear-foreign-config**	You are prompted to confirm the action. Enter **yes** to confirm. **Note** If you do not enter **yes**, the action is aborted.

Example

This example shows how to clear all foreign configurations on the MegaRAID controller in slot 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # clear-foreign-config
Are you sure you want to clear all foreign configurations on this controller?
All data on the drive(s) will be lost.
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Enabling JBOD

Note You can enable Just a Bunch of Disks (JBOD) only on some UCS C-Series servers.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis /storageadapter # **enable-jbod-mode**	Enables the JBOD Mode for the selected controller

Example

This example enables the JBOD mode for the selected controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # enable-jbod-mode
Are you sure you want to enable JBOD mode?
Enter 'yes' to confirm -> yes
Server/chassis/storageadapter # show settings
PCI Slot SLOT-3:
    Info Valid: Yes
    Enable JBOD Mode: true
```

Disabling JBOD

Note This option is available only on some UCS C-Series servers.

Before you begin

JBOD mode must be enabled for the selected controller.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis /storageadapter # **disable-jbod-mode**	Disables the JBOD Mode for the selected controller

Example

This example disables the JBOD mode for the selected controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # disable-jbod-mode
Are you sure you want to disable JBOD mode?
Enter 'yes' to confirm -> yes
Server/chassis/storageadapter # show settings
PCI Slot SLOT-3:
    Info Valid: Yes
    Enable JBOD Mode: false
```

Clearing a Boot Drive

Important This task clears the boot drive configuration on the controller. This action cannot be reverted.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **clear-boot-drive**	You are prompted to confirm the action. Enter **yes** to confirm. **Note** If you do not enter **yes**, the action is aborted.

Example

This example shows how to clear the boot drive configuration on the MegaRAID controller in slot 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # clear-boot-drive
Are you sure you want to clear the controller's boot drive?
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Enabling Security on a JBOD

you can enable security on a physical drive only if it is a JBOD. The following procedure explains how to enable security on a JBOD:

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive 2**	Enters the physical drive command mode.
Step 4	Server /chassis/storageadapter # **enable-security-on-jbod**	At the confirmation prompt, enter **yes**. Enables security on the JBOD.
Step 5	(Optional) Server /chassis/storageadapter/physicsl-drive # **show detail**	Displays details of the physical drive.

Example

This example shows how to enable security on a JBOD:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
savbu-stordev-dn1-2-cimc /chassis/storageadapter # scope physical-drive 2
server /chassis/storageadapter/physical-drive # enable-security-on-jbod
Are you sure you want to enable security on this JBOD?
NOTE: this is not reversible!
Enter 'yes' to confirm -> yes
server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 2:
```

```
    .
    .
    Status: JBOD
    .
    .
    FDE Capable: 1
    FDE Enabled: 1
    FDE Secured: 1
server /chassis/storageadapter/physical-drive #
```

Clearing a Secure Physical Drive

Clearing a secure drive converts an FDE drive from secured to unsecured. The Physical drive status must be Unconfigured good to perform this action. This erases the data on the physical drive. The following procedure explains how to clear a secure SED physical drive:

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive 2**	Enters the physical drive command mode.
Step 4	Server /chassis/storageadapter/physicsl-drive # **clear-secure-drive**	At the confirmation prompt, enter **yes**. This clears the secure SED physical drive and all the data will be lost.
Step 5	(Optional) Server /chassis/storageadapter/physicsl-drive # **show detail**	Displays the physical drive details.

Example

This example shows how to clear an SED foreign configuration physical drive:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 2
Server /chassis/storageadapter/physical-drive #  clear-secure-drive
Are you sure you want to erase all data from this physical drive?
NOTE: this is not reversible!  ALL DATA WILL BE LOST!!
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 2:
```

```
    Controller: SLOT-HBA
    Health: Good
    Status: Unconfigured Good
    .
    .
    FDE Capable: 1
    FDE Enabled: 0
    FDE Secured: 0

Server /chassis/storageadapter/physical-drive #
```

Clearing a Secure SED Foreign Configuration Physical Drive

Coverts a locked foreign configuration Full Disk Encryption drive to a unsecured and unlocked drive. This erases the data on the physical drive. The following procedure explains how to clear a secure SED foreign configuration physical drive:

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive 2**	Enters the physical drive command mode.
Step 4	Server /chassis/storageadapter/physicsl-drive # **clear-secure-foreign-config-drive**	At the confirmation prompt, enter **yes**. This clears the secure SED foreign configuration physical drive and all the data will be lost.
Step 5	(Optional) Server /chassis/storageadapter/physicsl-drive # **show detail**	Displays the physical drive details.

Example

This example shows how to clear an SED foreign configuration physical drive:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 2
Server /chassis/storageadapter/physical-drive # clear-secure-foreign-config-drive
Are you sure you want to erase all data from this foreign-configuration physical drive?
NOTE: this is not reversible!  ALL DATA WILL BE LOST!!
Enter 'yes' to confirm -> yes
```

```
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 2:
    Controller: SLOT-HBA
    Health: Good
    Status: Unconfigured Good
    .
    .
    FDE Capable: 1
    FDE Enabled: 0
    FDE Secured: 0
    FDE Locked: 0
    FDE Locked Foreign Config: 0

Server /chassis/storageadapter/physical-drive #
```

Retrieving Storage Firmware Logs for a Controller

This task retrieves the Storage Firmware Logs for the controller and places it in the `/var/log` location. This ensures that this log data is available when Technical Support Data is requested.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **get-storage-fw-log**	
Step 4	Server /chassis/storageadapter # **show detail**	Displays the status of the retrieval process. **Important** Retrieving Storage Firmware Logs for a controller could take up to 2-4 minutes. Until this process is complete, do not initiate exporting technical support data.

Example

This example shows how to retrieve Storage Firmware Logs for a MegaRAID controller in slot 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # get-storage-fw-log
Server /chassis/storageadapter # show detail
PCI Slot SLOT-3:
TTY Log Status: In progress (8192 bytes fetched)
```

```
Server /chassis/storageadapter # show detail
PCI Slot SLOT-3:
TTY Log Status: In progress (90112 bytes fetched)
Server /chassis/storageadapter # show detail
PCI Slot SLOT-3:
TTY Log Status: Complete (172032 bytes fetched)
```

Self Encrypting Drives (Full Disk Encryption)

Cisco IMC supports self encrypting drives (SED). A special hardware in the drives encrypts incoming data and decrypts outgoing data in real-time. This feature is also called Full Disk Encryption (FDE).

The data on the drive is encrypted on its way into the drive and decrypted on its way out. However, if you lock the drive, no security key is required to retrieve the data.

When a drive is locked, an encryption key is created and stored internally. All data stored on this drive is encrypted using that key, and stored in encrypted form. Once you store the data in this manner, a security key is required in order to un-encrypt and fetch the data from the drive. Unlocking a drive deletes that encryption key and renders the stored data unusable. This is called a Secure Erase. The FDE comprises a key ID and a security key.

The FDE feature supports the following operations:

- Enable and disable security on a controller
- Create a secure virtual drive
- Secure a non-secure drive group
- Unlock foreign configuration drives
- Enable security on a physical drive (JBOD)
- Clear secure SED drives
- Clear secure foreign configuration

Scenarios to consider While Configuring Controller Security in a Dual or Multiple Controllers Environment

Note Dual or Multiple controllers connectivity is available only on some servers.

Controller security can be enabled, disabled, or modified independently. However, local and remote key management applies to all the controllers on the server. Therefore security action involving switching the key management modes must be performed with caution. In a scenario where both controllers are secure, and you decide to move one of the controllers to a different mode, you need to perform the same operation on the other controller as well.

Consider the following two scenarios:

- Scenario 1—Key management is set to remote; both controllers are secure and use remote key management. If you now wish to switch to local key management, switch the key management for each controller and disable remote key management.

- Scenario 2—Key management is set to local; both controllers are secure and use local key management. If you now wish to switch to remote key management, enable remote key management and switch the key management for each controller.

If you do not modify the controller security method on any one of the controllers, it renders the secure key management in an unsupported configuration state.

Enabling Drive Security on a Controller

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **enable-controller-security**	At this point, you are prompted to enter a security key, you can either enter a security key of your choice or you can use the suggested security key. If you choose to assign a security key of your choice, enter the security key at the prompt. Depending on whether you want to use the suggested security key or a security key of your choice, enter **y** (yes) to confirm, or **n** (no) to cancel the operation at the appropriate prompt.
Step 4	Server /chassis/storageadapter # **show detail**	Displays the storage drive details.

Example

The following example shows how to enable security on a controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # enable-controller-security
Use generated key-id 'UCSC-MRAID12G_FHH18250010_1d85dcd3'?  (y or n)--> y
Use suggested security-key '6ICsmuX@oVB7e9wXt79qsTgp6ICsmuX@'?  (y or n)--> n
Enter security-key --> testSecurityKey
Will use security-key 'testSecurityKey'
Server /chassis/storageadapter show detail
PCI Slot SLOT-HBA:
    <stuff deleted>
    Controller is Secured: 1

Server /chassis/storageadapter #
```

Disabling Drive Security on a Controller

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **disable-controller-security**	A confirmation prompt appears. At the confirmation prompt, enter **yes** to confirm, or **n** (no) to cancel the operation. Another prompt to enter the security key appears. Enter the security key. This disables the controller security.
Step 4	Server /chassis/storageadapter # **show detail**	Displays the storage drive details.

Example

The following example shows how to disable security on a controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter #  disable-controller-security
Note: this operation will fail if any secured drives are present.
Are you sure you want to disable security on this controller?
Enter 'yes' to confirm -> yes
Please enter the controller's security-key -> testSecurityKey
savbu-stordev-dn1-2-cimc /chassis/storageadapter # show detail
PCI Slot SLOT-HBA:
    <stuff deleted>
    Controller is Secured: 0

Server /chassis/storageadapter #
```

Modifying Controller Security Settings

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **modify-controller-security**	At this point, you are prompted to enter the current security key, option to choose whether you want to reset the key-id and the new security key. Enter the appropriate information. At the confirmation prompt, enter **y** (yes) to confirm, or **n** (no) to cancel the operation.

Example

The following example shows how to modify the security settings of a controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # modify-controller-security
Please enter current security-key --> testSecurityKey
Keep current key-id 'UCSC-MRAID12G_FHH18250010_1d85dcd3'? (y or n)--> n
Enter new key-id: NewKeyId
Will change key-id to 'NewKeyId'
Keep current security-key? (y or n)--> y

Server /chassis/storageadapter #
```

Verifying the Security Key Authenticity

If you are not sure about the security key, you can use this procedure to verify whether the security key that you provide matches the controller security key.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **verify-controller-security-key**	At the prompt, enter the security key and press Enter.

	Command or Action	Purpose
		If you enter a security key that does not match the controller security key, a verification failure message appears.

Example

The following example shows how to verify the security key of a controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter #  verify-controller-security-key
Please enter the security key to verify -> WrongSecurityKey
verify-controller-security-key failed.
Error: "r-type: RAID controller: SLOT-HBA command-status: Lock key from backup failed
verification"
savbu-stordev-dn1-2-cimc /chassis/storageadapter #
savbu-stordev-dn1-2-cimc /chassis/storageadapter # verify-controller-security-key
Please enter the security key to verify -> testSecurityKey

Server /chassis/storageadapter #
```

Switching Controller Security From Remote to Local Key Management

This task allows you to switch controller security from local management to remote management, and from remote to local management.

Before you begin

- You must log in with admin privileges to perform this task.
- KMIP must be enabled.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *Slot-ID*	Enters storage adapter command mode.
Step 3	Server /chassis/storageadapter # **switch-to-local-key-mgmt**	Enter **y** at the confirmation prompt. **Note** If you have multiple controller you must switch the security on those as well.
Step 4	Server /chassis/server/storageadapter # *key id*	Enter the new key ID at the prompt. Switches to local key management.

Example

The following example shows how to switch controller security from remote to local key management:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-HBA 1
Server /chassis/storageadapter # switch-to-local-key-mgmt
Executing this command will require you to disable remote key management once switch is
complete.
Do you want to continue(y or n)?y
Proceeding to switch to local key management.
Enter new security-key: test
Will change security-key to 'test'
Switch to local key management complete on controller in SLOT-HBA.
***Remote key management needs to be disabled***
Please disable remote key management.
Server /chassis/server/storageadapter #
```

What to do next

After you switch from Remote to Local Key Management, ensure that you disable KMIP secure key management.

Switching Controller Security From Local to Remote Key Management

This task allows you to switch controller security from local management to remote management, and from remote to local management.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *Slot-ID*	Enters storage adapter command mode.
Step 3	Server /chassis/storageadapter # **switch-to-remote-key-mgmt**	Enter **y** at the confirmation prompt.
Step 4	Server /chassis/storageadapter # *security id*	Enter the security key at the prompt. Switches to remote key management.

Example

The following example shows how to switch controller security from local to remote key management:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-HBA 1
Server /chassis/server/storageadapter # switch-to-remote-key-mgmt
Changing the security key requires existing security key.
```

```
Please enter current security-key --> test
Switch to remote key management complete on controller in SLOT-HBA.
Server /chassis/server/storageadapter #
```

Deleting a Virtual Drive

Important This task deletes a virtual drive, including the drives that run the booted operating system. So back up any data that you want to retain before you delete a virtual drive.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 4	Server /chassis/storageadapter/virtual-drive # **delete-virtual-drive**	You are prompted to confirm the action. Enter **yes** to confirm. **Note** If you do not enter **yes**, the action is aborted.

Example

This example shows how to delete virtual drive 3.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # delete-virtual-drive
Are you sure you want to delete virtual drive 3?
All data on the drive will be lost.  Enter 'yes' to confirm -> yes
Server /chassis/storageadapter/virtual-drive #
```

Initializing a Virtual Drive

All data on a virtual drive is lost when you initialize the drive. Before you run an initialization, back up any data on the virtual drive that you want to save.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 4	Server /chassis/storageadapter/virtual-drive # **start-initialization**	Initializes the specified virtual drive.
Step 5	Server /chassis/storageadapter/virtual-drive # **cancel-initialization**	(Optional) Cancels the initialization of the specified virtual drive.
Step 6	Server /chassis/storageadapter/physical-drive # **get-operation-status**	Displays the status of the task that is in progress on the drive.

Example

This example shows how to initialize virtual drive 3 using fast initialization:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # start-initialization
Are you sure you want to initialize virtual drive 3?
All data on the drive will be lost.  Enter 'yes' to confirm -> yes
Fast (0) or full (1) initialization?  -> 0
Server /chassis/storageadapter/virtual-drive # get-operation-status

progress-percent: 20%
elapsed -seconds: 30
operation-in-progress: initializing virtual drive

Server /chassis/storageadapter/virtual-drive #
```

Set as Boot Drive

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 4	Server /chassis/storageadapter # **set-boot-drive**	Specifies the controller to boot from this virtual drive.

Example

This example shows how to specify the controller to boot from virtual drive 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # set-boot-drive
Are you sure you want to set virtual drive 3 as the boot drive?
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter/virtual-drive #
```

Editing a Virtual Drive

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server chassis /storageadapter # **scope virtual-drive** *drive number*	Enters command mode for the specified virtual drive.

	Command or Action	Purpose
Step 4	Server chassis /storageadapter /virtual-drive # **modify-attributes**	Prompts you to select a different current policy.
Step 5	Server chassis /storageadapter /virtual-drive# **set raid-level** *value*	Specifies the RAID level for the specified virtual drive.
Step 6	Server chassis /storageadapter /virtual-drive# **set physical-drive** *value*	Specifies the physical drive for the specified virtual drive.

Example

This example shows to edit a virtual drive:

```
Server# scope chassis
Server /chassis # scope storageadapter slot-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive #set raid-level 1
Server /chassis/storageadapter/virtual-drive *# physical-drive 1
Server /chassis/storageadapter/virtual-drive* #commit
Server /chassis/storageadapter /virtual-drive # modify-attribute
Current write policy: Write Back Good BBU

    0: Write Through
    1: Write Back Good BBU
    2: Always Write Back
  Choose number from above options--> 0
The following attribute will be modified:
  - Write Policy: Write Through

OK? (y or n)--> y
Server /chassis/storageadapter/virtual-drive #
```

Securing a Virtual Drive

Important This task secures all the VDs in an existing drive group, where virtual-drive is the target ID of a virtual drive in the drive group.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 4	Server /chassis/storageadapter/virtual-drive # **secure-drive-group**	You are prompted to confirm the action. Enter **yes** to confirm. **Note** If you do not enter **yes**, the action is aborted.

Example

This example shows how to secure the virtual drive group.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # secure-drive-group
This will enable security for virtual drive 16, and all virtual drives sharing this drive
group.
It is not reversible.  Are you quite certain you want to do this?
Enter 'yes' to confirm -> yes
server /chassis/storageadapter/virtual-drive # show detail
Virtual Drive 16:
    .
    .
    FDE Capable: 1
    FDE Enabled: 1
    .
    .
 server /chassis/storageadapter/virtual-drive #
```

Modifying Attributes of a Virtual Drive

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.

	Command or Action	Purpose
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *3*	Enters the command mode for the virtual drive.
Step 4	Server /chassis/storageadapter/virtual-drive # **modify-attributes**	Prompts you to select a different current policy.

Example

This example shows how to carve a new virtual drive out of unused space in an existing RAID 1 drive group:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive
Server /chassis/storageadapter/virtual-drive # modify-attributes

Current write policy: Write Back

  0: Write Through
  1: Write Back
  2: Write Back even if Bad BBU

Choose number from above options --> 0

The following attribute will be modified:

 - Write policy: Write Through

OK? (y or n) --> y

operation in progress.

Server /chassis/storageadapter/virtual-drive #
```

Making a Dedicated Hot Spare

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive** *drive-number*	Enters command mode for the specified physical drive.

	Command or Action	Purpose
Step 4	Server /chassis/storageadapter/physical-drive # **make-dedicated-hot-spare**	You are prompted to choose a virtual drive for which the dedicated hot spare is being created.

Example

This example shows how to make physical drive 3 a dedicated hot spare for virtual drive 6:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # make-dedicated-hot-spare
  5: VD_OS_1, RAID 0, 102400 MB, physical disks: 1
  6: VD_OS_2, RAID 0, 12288 MB, physical disks: 1
  7: VD_OS_3, RAID 0, 12288 MB, physical disks: 1
  8: VD_DATA_1, RAID 0, 12512 MB, physical disks: 1
  9: RAID1_2358, RAID 1, 40000 MB, physical disks: 2,3,5,8
  11: JFB_RAID1_67, RAID 1, 20000 MB, physical disks: 6,7
  12: JFB_Crv_R1_40, RAID 1, 40000 MB, physical disks: 6,7
  13: JFB_R1_10GB, RAID 1, 10000 MB, physical disks: 6,7

  Please choose from the above 8 virtual drives-->6

Server /chassis/storageadapter/physical-drive #
```

Making a Global Hot Spare

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive** *drive-number*	Enters command mode for the specified physical drive.
Step 4	Server /chassis/storageadapter/physical-drive # **make-global-hot-spare**	
Step 5	Server /chassis/storageadapter/physical-drive # **get-operation-status**	Displays the status of the task that is in progress on the drive.

Example

This example shows how to make physical drive 3 a global hot spare:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # make-global-hot-spare
Server /chassis/storageadapter/physical-drive #
```

Preparing a Drive for Removal

You can confirm this task only on physical drives that display the **Unconfigured Good** status.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive** *drive-number*	Enters command mode for the specified physical drive.
Step 4	Server /chassis/storageadapter/physical-drive # **prepare-for-removal**	

Example

This example shows how to prepare physical drive 3 for removal.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # prepare-for-removal
Server /chassis/storageadapter/physical-drive #
```

Toggling Physical Drive Status

Before you begin

- You must log in with admin privileges to perform this task.
- The controller must support the JBOD mode and the JBOD mode must be enabled.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive 4**	Enters command mode for the physical drive.
Step 4	Server /chassis/storageadapter/physical-drive # **make-unconfigured-good**	Modifies the status of the drive to Unconfigured good.
Step 5	Server /chassis/storageadapter/physical-drive # **make-jbod**	Enables the JBOD mode on the physical drive.

Example

This example shows how to toggle between the status of the physical drive:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 4
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 4:
    Controller: SLOT-4
    Health: Good
    Status: JBOD
    Boot Drive: true
    Manufacturer: ATA
    Model: ST500NM0011
    Predictive Failure Count: 0
    Drive Firmware: CC02
    Coerced Size: 476416 MB
    Type: HDD
Server /chassis/storageadapter/physical-drive # make-unconfigured-good
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 4:
    Controller: SLOT-4
    Health: Good
    Status: Unconfigured Good
    Boot Drive: true
    Manufacturer: ATA
    Model: ST500NM0011
    Predictive Failure Count: 0
    Drive Firmware: CC02
    Coerced Size: 476416 MB
    Type: HDD
Server /chassis/storageadapter/physical-drive # make-jbod
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 4:
    Controller: SLOT-4
    Health: Good
    Status: JBOD
    Boot Drive: true
    Manufacturer: ATA
    Model: ST500NM0011
    Predictive Failure Count: 0
```

```
    Drive Firmware: CC02
    Coerced Size: 476416 MB
    Type: HDD
```

Setting a Physical Drive as a Controller Boot Drive

Before you begin

- You must log in with admin privileges to perform this task.
- The controller must support the JBOD mode and the JBOD mode must be enabled.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive 4**	Enters command mode for the physical drive.
Step 4	Server /chassis/storageadapter/physical-drive # **set-boot-drive**	You are prompted to confirm the action. Enter **yes** to confirm. **Note** If you do not enter **yes**, the action is aborted.

Example

This example shows how to set a physical drive as a boot drive for a controller:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # show detail
PCI Slot SLOT-4:
    Health: Good
    Controller Status: Optimal
    ROC Temperature: Not Supported
    Product Name: MegaRAID 9240-8i (RAID 0,1,10,5)
    Serial Number: SP23807413
    Firmware Package Build: 20.11.1-0159
    Product ID: LSI Logic
    Battery Status: no battery
    Cache Memory Size: 0 MB
    Boot Drive: none
    Boot Drive is PD: false
    TTY Log Status: Not Downloaded
Server /chassis/storageadapter # scope physical-drive 4
Server /chassis/storageadapter/physical-drive # set-boot-drive
Are you sure you want to set physical drive 4 as the boot drive?
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter/physical-drive # exit
```

```
Server /chassis/storageadapter # show detail
PCI Slot SLOT-4:
    Health: Good
    Controller Status: Optimal
    ROC Temperature: Not Supported
    Product Name: MegaRAID 9240-8i (RAID 0,1,10,5)
    Serial Number: SP23807413
    Firmware Package Build: 20.11.1-0159
    Product ID: LSI Logic
    Battery Status: no battery
    Cache Memory Size: 0 MB
    Boot Drive: 4
    Boot Drive is PD: true
    TTY Log Status: Not Downloaded
```

Removing a Drive from Hot Spare Pools

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive** *drive-number*	Enters command mode for the specified physical drive.
Step 4	Server /chassis/storageadapter/physical-drive # **remove-hot-spare**	Removes a drive from the host spare pool.

Example

This example shows how to remove physical drive 3 from the hot spare pools:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # remove-hot-spare
Server /chassis/storageadapter/physical-drive #
```

Undo Preparing a Drive for Removal

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive** *drive-number*	Enters command mode for the specified physical drive.
Step 4	Server /chassis/storageadapter/physical-drive # **undo-prepare-for-removal**	

Example

This example shows how to respin physical drive 3 after preparing the drive for removal.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # undo-prepare-for-removal
Server /chassis/storageadapter/physical-drive #
```

Enabling Auto Learn Cycles for the Battery Backup Unit

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope bbu**	Enter the battery backup unit command mode.
Step 4	Server /chassis/storageadapter # **enable-auto-learn**	Enables the battery auto-learn cycles

Example

This example shows how to enable the battery auto-learn cycles:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope bbu
Server /chassis/storageadapter/bbu # enable-auto-learn
Automatic BBU learn cycles will occur without notice if enabled.
Are you sure? [y/n] --> y
enable-auto-learn initiated
Server /chassis/storageadapter/bbu #
```

Disabling Auto Learn Cycles for the Battery Backup Unit

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope bbu**	Enter the battery backup unit command mode.
Step 4	Server /chassis/storageadapter # **disable-auto-learn**	Disables the battery auto-learn cycles

Example

This example shows how to disables the battery auto-learn cycles:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope bbu
Server /chassis/storageadapter/bbu # disable-auto-learn
Automatic BBU learn cycles will no longer occur if disabled.
Are you sure? [y/n] --> y
disable-auto-learn initiated

Server /chassis/storageadapter/bbu #
```

Starting a Learn Cycle for a Battery Backup Unit

Before you begin

You must be logged in as an admin to use this command.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope bbu**	Enter the battery backup unit command mode.
Step 4	Server /chassis/storageadapter # **start-learn-cycle**	Starts the learn cycle for the battery.

Example

This example shows how to initiate the learn cycles for a battery:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope bbu
Server /chassis/storageadapter/bbu # start-learn-cycle
Server /chassis/storageadapter/bbu #
```

Toggling the Locator LED for a Physical Drive

Before you begin

You must be logged in as an admin to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **scope physical-drive 3**	Enters the physical drive command mode.
Step 4	Server /chassis/storageadapter/physical-drive # **locator-led** {**on** | **off**}	Enables or disables the physical drive locator LED.

Example

This example shows how to enable the locator LED for physical drive 3:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # locator-led on
Server /chassis/storageadapter/physical-drive* # commit
Server /chassis/storageadapter/physical-drive #
```

Viewing Storage Controller Logs

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter** *slot*	Enters command mode for an installed storage card.
Step 3	Server /chassis/storageadapter # **show log**	Displays the storage controller logs.

Example

This example shows how to display storage controller logs:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # show log

Time                        Severity        Description
----                        --------       -------------
Fri March 1 09:52:19 2013   Warning      Predictive Failure
Fri March 1 07:50:19 2013   Info         Battery charge complete
Fri March 1 07:50:19 2013   Info         Battery charge started
Fri March 1 07:48:19 2013   Info         Battery relearn complete
Fri March 1 07:47:19 2013   Info         Battery is discharging
Fri March 1 07:45:19 2013   Info         Battery relearn started

Server /chassis/storageadapter #
```

Viewing NVMe Controller Details

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show nvmeadapter**	Displays the available NVMe adapters.
Step 3	Server /chassis/nvmeadapter # **scope nvmeadapter** *NVMe Adapter Name*	Enters the chosen NVMe adapter command mode.
Step 4	Server /chassis/nvmeadapter # **show detail**	Displays the NVMe controller details.

Example

This example shows how to view the controller information:

```
Server# scope chassis
Server /chassis # show nvmeadapter
PCI Slot
----------------------------
NVMe-direct-U.2-drives
PCIe-Switch
Server /chassis # scope nvmeadapter PCIe-Switch
Server /chassis/nvmeadapter # show detail
PCI Slot: PCIe-Switch
    Health: Good
    Drive Count: 8
    Vendor ID: MICROSEM
    Product ID: PFX 48XG3
    Component ID: 8533
    Product Revision: RevB
    P2P Vendor ID: f811
    P2P Device ID: efbe
    Running Firmware Version: 1.8.0.58-24b1
    Pending Firmware Version: 1.8.0.58
    Switch temperature: 49 degrees C
    Switch status: Optimal
    Link Status: Optimal
Server /chassis/nvmeadapter #
```

Viewing NVMe Physical Drive Details

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show nvmeadapter**	Displays the available NVMe adapters.

	Command or Action	Purpose
Step 3	Server /chassis/nvmeadapter # **scope nvmeadapter** *NVMe Adapter Name*	Enters the chosen NVMe adapter command mode.
Step 4	Server /chassis/nvmeadapter # **show nvme-physical-drive**	Displays the available physical drives.
Step 5	Server /chassis/nvmeadapter # **scope nvme-physical-drive** *Physical Drive Number*	Enters the chosen physical drive command mode.
Step 6	Server /chassis/nvmeadapter/nvme-physical-drive # **show detail**	Displays the NVMe physical drive details.

Example

This example shows how to view the physical drive information:

```
Server# scope chassis
Server /chassis # scope nvmeadapter NVMe-direct-U.2-drives
Server /chassis/nvmeadapter # show nvme-physical-drive
Physical Drive Number Product Name Manufacturer Serial Number Temperature % Drive Life Used
 Performance Level LED Fault status % Power on Hours
--------------------- ----- ------------ ------------- ----------- -----------------
----------------- ---------------- -----------------
REAR-NVME-1           Ci... HGST         SDM00000E5EC  48 degre... 3                 100
             Healthy. Driv... 2
REAR-NVME-2           Ci... HGST         SDM00000DC90  47 degre... 2                 100
             Healthy          3
Server /chassis/nvmeadapter # scope nvme-physical-drive REAR-NVME-1
Server /chassis/nvmeadapter/nvme-physical-drive # show detail
Physical Drive Number REAR-NVME-1:
    Product Name: Cisco UCS (SN200) 2.5 inch 800 GB NVMe based PCIe SSD
    Manufacturer: HGST
    Serial Number: SDM00000E5EC
    Temperature: 48 degrees C
    % Drive Life Used: 3
    Performance Level: 100
    LED Fault status: Healthy. Drive is overused based on current write pattern
    % Power on Hours: 2
    Firmware Revision:
    PCI Slot: REAR-NVME-1
    Managed Id: 10
    Controller Type: NVME-SFF
    Controller Temperature: 48 degrees C
    Fault State: 0
    Throttle Start Temperature: 70 degrees C
    Shutdown Temperature: 75 degrees C
Server /chassis/nvmeadapter/nvme-physical-drive #
```

Viewing SIOC NVMe Drive Details

You must scope to a particular CMC to view the NVMe drives in SIOC associated with that CMC.

Note This feature is available only on some S-Series servers.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope cmc** *[1 | 2]*	Enters the CMC command mode.
Step 3	Server /chassis/CMC # **scope nvmeadapter** *adapter name*	Enters the NVMe adapter command mode.
Step 4	Server /chassis/CMC/nvmeadapter # **show nvme-physical-drive detail**	Displays the SIOC NVMe physical drive details.

Example

This example shows how to view SIOC NVMe drive details:

```
Server # scope chassis
Server /chassis # scope cmc
Server /chassis/cmc # show detail
Firmware Image Information:
    ID: 1
    Name: CMC1
    SIOC PID: UCS-S3260-PCISIOC
    Serial Number: FCH21277K8T
    Update Stage: ERROR
    Update Progress: OS_ERROR
    Current FW Version: 4.0(0.166)
    FW Image 1 Version: 0.0(4.r17601)
    FW Image 1 State: BACKUP INACTIVATED
    FW Image 2 Version: 4.0(0.166)
    FW Image 2 State: RUNNING ACTIVATED
    Reset Reason: ac-cycle
    Secure Boot: ENABLED
Server /chassis # scope cmc 1
Server /chassis/cmc # scope nvmeadapter NVMe-direct-U.2-drives
Server /chassis/cmc/nvmeadapter # show nvme-physical-drive detail
Physical Drive Number SIOCNVMe1:
    Product Name: Cisco 2.5 inch  1TB Intel P4501 NVMe Med. Perf. Value Endurance
    Manufacturer: Intel
    Serial Number: PHLF7303008G1P0KGN
    Temperature: 39 degrees C
    % Drive Life Used: 1
    Performance Level: 100
    LED Fault status: Healthy
    Drive Status: Optimal
    % Power on Hours: 8
    Firmware Version: QDV1CP03
    PCI Slot: SIOCNVMe1
    Managed Id: 1
    Controller Type: NVME-SFF
    Controller Temperature: 39
    Throttle State: 0
```

```
    Throttle Start Temperature: 70
    Shutdown Temperature: 80
Physical Drive Number SIOCNVMe2:
    Product Name: Cisco 2.5 inch 500GB Intel P4501 NVMe Med. Perf. Value Endurance
    Manufacturer: Intel
    Serial Number: PHLF73440068500JGN
    Temperature: 39 degrees C
    % Drive Life Used: 1
    Performance Level: 100
    LED Fault status: Healthy
    Drive Status: Optimal
    % Power on Hours: 7
    Firmware Version: QDV1CP03
    PCI Slot: SIOCNVMe2
    Managed Id: 2
    Controller Type: NVME-SFF
    Controller Temperature: 39
    Throttle State: 0
    Throttle Start Temperature: 70
    Shutdown Temperature: 80
Server /chassis/cmc/nvmeadapter #
```

Viewing PCI Switch Details

This feature is available only on some C-Series servers.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show pci-switch**	Displays the list of PCI switches available in the system.
Step 3	Server /chassis # **show pci-switch detail**	Displays the details of the PCI switches available in the system.

Example

This example shows how to view PCI Switch details:

```
Server # scope chassis
Server /chassis # show pci-switch
Slot-ID                  Product Name         Manufacturer
------------------------ -------------------- --------------------
PCI-Switch-1             PEX 8764             PLX
PCI-Switch-2             PEX 8764             PLX
PCI-Switch-3             PEX 8764             PLX
PCI-Switch-4             PEX 8764             PLX
Server /chassis # show pci-switch detail
PCI SWITCH:
    Slot-ID: PCI-Switch-1
    Product Name: PEX 8764
    Product Revision: 0xab
    Manufacturer: PLX
```

```
    Device Id: 0x8764
    Vendor Id: 0x10b5
    Sub Device Id: 0x8764
    Sub Vendor Id: 0x10b5
    Temperature: 43
    Composite Health: Good
    Adapter Count: 3
PCI SWITCH:
    Slot-ID: PCI-Switch-2
    Product Name: PEX 8764
    Product Revision: 0xab
    Manufacturer: PLX
    Device Id: 0x8764
    Vendor Id: 0x10b5
    Sub Device Id: 0x8764
    Sub Vendor Id: 0x10b5
    Temperature: 43
    Composite Health: Good
    Adapter Count: 3
PCI SWITCH:
    Slot-ID: PCI-Switch-3
    Product Name: PEX 8764
    Product Revision: 0xab
    Manufacturer: PLX
    Device Id: 0x8764
    Vendor Id: 0x10b5
    Sub Device Id: 0x8764
    Sub Vendor Id: 0x10b5
    Temperature: 42
    Composite Health: Good
    Adapter Count: 3
PCI SWITCH:
    Slot-ID: PCI-Switch-4
    Product Name: PEX 8764
    Product Revision: 0xab
    Manufacturer: PLX
    Device Id: 0x8764
    Vendor Id: 0x10b5
    Sub Device Id: 0x8764
    Sub Vendor Id: 0x10b5
    Temperature: 43
    Composite Health: Degraded
    Adapter Count: 3
C480-FCH2213WH02 /chassis #
Server /chassis/ #
```

Viewing Details of a Particular PCI Switch

This feature is available only on some C-Series servers.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show pci-switch**	Displays the list of PCI switches available in the system.

	Command or Action	Purpose
Step 3	Server /chassis # **scope pci-switch** *PCI-Switch Number*	Enters the PCI switch command mode of the chosen switch.
Step 4	Server /chassis/pci-switch # **show detail**	Displays the details of the PCI switch.
Step 5	Server /chassis/pci-switch # **show adapter-list**	Displays the details of the adapters present on the PCI switch.

Example

This example shows how to view details of a particular PCI Switch:

```
Server # scope chassis
Server /chassis # show pci-switch
Slot-ID                  Product Name         Manufacturer
------------------------ -------------------- --------------------
PCI-Switch-1             PEX 8764             PLX
PCI-Switch-2             PEX 8764             PLX
PCI-Switch-3             PEX 8764             PLX
PCI-Switch-4             PEX 8764             PLX
Server /chassis # scope pci-switch PCI-Switch-1
Server /chassis/pci-switch show detail
PCI SWITCH:
    Slot-ID: PCI-Switch-1
    Product Name: PEX 8764
    Product Revision: 0xab
    Manufacturer: PLX
    Device Id: 0x8764
    Vendor Id: 0x10b5
    Sub Device Id: 0x8764
    Sub Vendor Id: 0x10b5
    Temperature: 43
    Composite Health: Good
    Adapter Count: 3
Server /chassis/pci-switch # show adapter-list
Slot                 Link Status          Link Speed           Link Width           Status
-------------------- -------------------- -------------------- -------------------- --
--------------------
GPU-3                up                   8.0                  16                   Good
GPU-4                up                   8.0                  16                   Good
12                   up                   8.0                  16                   Good
Server /chassis/pci-switch #
```

Managing the Flexible Flash Controller

Cisco Flexible Flash

On the M5 servers, Flexible Flash Controller is inserted into the mini storage module socket. The mini storage socket is inserted into the M.2 slot on the motherboard. M.2 slot also supports SATA M.2 SSD slots.

Note M.2 slot does not support NVMe in this release.

Some C-Series Rack-Mount Servers support an internal Secure Digital (SD) memory card for storage of server software tools and utilities. The SD card is hosted by the Cisco Flexible Flash storage adapter.

The SD storage is available to Cisco IMC as a single hypervisor (HV) partition configuration. Prior versions had four virtual USB drives. Three were preloaded with Cisco UCS Server Configuration Utility, Cisco drivers and Cisco Host Upgrade Utility, and the fourth as user-installed hypervisor. A single HV partition configuration is also created when you upgrade to the latest version of Cisco IMC or downgrade to the prior version, and reset the configuration.

For more information about installing and configuring the M.2 drives, see the **Storage Controller Considerations (Embbeded SATA RAID Requirements)** and **Replacing an M.2 SSD in a Mini-Storage Carrier For M.2** sections in the Cisco UCS Server Installation and Service Guide for the C240 M5 servers at this URL:

https://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-c-series-rack-servers/products-installation-guides-list.html

For information about the Cisco software utilities and packages, see the *Cisco UCS C-Series Servers Documentation Roadmap* at this URL:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

Card Management Feature in the Cisco Flexible Flash Controller

The Cisco Flexible Flash controller supports management of both single and two SD cards as a RAID-1 pair. With the introduction of card management, you can perform the following tasks:

Note

- If you want to upgrade from version 1.4(5e) to 1.5(4) or higher versions, you must first upgrade to version1.5(2) and then upgrade to a higher version of Cisco IMC.
- Reset the Cisco Flexible Flash controller to load the latest Flex Flash firmware after every Cisco IMC firmware upgrade.

Action	Description
Reset Cisco Flex Flash	Allows you to reset the controller.
Reset Partition Defaults	Allows you to reset the configuration in the selected slot to the default configuration.
Synchronize Card Configuration	Allows you to retain the configuration for an SD card that supports firmware version 253 and later.
Configure Operational Profile	Allows you to configure the SD cards on the selected Cisco Flexible Flash controller.

RAID Partition Enumeration

Non-RAID partitions are always enumerated from the primary card and the enumeration does not depend on the status of the primary card.

Following is the behavior of the RAID partition enumeration when there are two cards in the Cisco Flexible Flash controller:

Scenario	Behavior
Single card	RAID partitions are enumerated if the card is healthy, and if the mode is either **Primary** or **Secondary-active**.
Dual paired cards	RAID partitions are enumerated if one of the cards is healthy. When only one card is healthy, all read/write operations occur on this healthy card. You must use UCS SCU to synchronize the two RAID partitions.
Dual unpaired cards	If this scenario is detected when the server is restarting, then neither one of the RAID partitions is enumerated. If this scenario is detected when the server is running, when a user connects a new SD card, then the cards are not managed by the Cisco Flexible Flash controller. This does not affect the host enumeration. You must pair the cards to manage them. You can pair the cards using the **Reset Partition Defaults** or **Synchronize Card Configuration** options.

Upgrading from Single Card to Dual Card Mirroring with FlexFlash

You can upgrade from a single card mirroring to dual card mirroring with FlexFlash in one of the following methods:

- Add an empty FlexFlash card to the server, and then upgrade its firmware to the latest version.
- Upgrade the FlexFlash firmware to the latest version and then add an empty card to the server.

Prior to using either of these methods, you must keep in mind the following guidelines:

- To create RAID1 mirroring, the empty card that you want to add to the server must be of the exact size of the card that is already in the server. Identical card size is a must to set up RAID1 mirroring.
- Ensure that the card with valid data in the Hypervisor partition is marked as the primary healthy card. You can determine this state either in the Cisco IMC GUI or from the Cisco IMC CLI. To mark the state of the card as primary healthy, you can either use the **Reset Configuration** option in the Cisco IMC GUI or run the **reset-config** command in the Cisco IMC CLI. When you reset the configuration of a particular card, the secondary card is marked as secondary active unhealthy.
- In a Degraded RAID health state all read-write transactions are done on the healthy card. In this scenario, data mirroring does not occur. Data mirroring occurs only in the Healthy RAID state.

- Data mirroring is only applicable to RAID partitions. In the C-series servers, only Hypervisor partitions operate in the RAID mode.
- If you have not configured SD cards for use with prior versions, then upgrading to the latest version loads the latest 253 firmware and enumerates all four partitions to the host.

While upgrading versions of the FlexFlash, you may see the following error message:

```
Unable to communicate with Flexible Flash controller: operation ffCardsGet, status
CY_AS_ERROR_INVALID_RESPONSE"
```

In addition, the card status may be shown as **missing**. This error occurs because you accidently switched to an alternate release or a prior version, such as 1.4(x). In this scenario, you can either revert to the latest version, or you can switch back to the FlexFlash 1.4(x) configuration. If you choose to revert to the latest Cisco IMC version, then the Cisco FlexFlash configuration remains intact. If you choose to switch back to the prior version configuration, you must reset the Flexflash configuration. In this scenario, you must be aware of the following:

- If multiple cards are present, and you revert to a prior version, then the second card cannot be discovered or managed.
- If the card type is SD253, then you must run the **reset-config** command twice from the Cisco IMC CLI - once to reload the old firmware on the controller and to migrate SD253 to SD247 type, and the second time to start the enumeration.

Configuring the Flexible Flash Controller Properties for C220 M5 and C240 M5 Servers

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash**	Enters the Cisco Flexible Flash controller command mode for the specified controller.
Step 3	Server /chassis/flexflash # **scope operational-profile**	Enters the operational profile command mode.
Step 4	Server /chassis/flexflash/operational-profile # **set read-error-count- slot1-threshold** *threshold*	Specifies the number of read errors that are permitted while accessing the Cisco Flexible Flash card in slot 1. If the number of errors exceeds this threshold, the Cisco Flexible Flash card is disabled and you must reset it manually before Cisco IMC attempts to access it again.

	Command or Action	Purpose
		To specify a read error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter **0** (zero).
Step 5	Server /chassis/flexflash/operational-profile # **set read-error-count- slot2-threshold** *threshold*	Specifies the number of read errors that are permitted while accessing the Cisco Flexible Flash card in slot 2. If the number of errors exceeds this threshold, the Cisco Flexible Flash card is disabled and you must reset it manually before Cisco IMC attempts to access it again. To specify a read error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter **0** (zero).
Step 6	Server /chassis/flexflash/operational-profile # **set write-error-count-slot2-threshold** *threshold*	Specifies the number of write errors that are permitted while accessing the Cisco Flexible Flash card in slot 2. If the number of errors exceeds this threshold, the Cisco Flexible Flash card is disabled and you must reset it manually before Cisco IMC attempts to access it again. To specify a write error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter **0** (zero).
Step 7	Server /chassis/flexflash/operational-profile # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to configure the properties of the Flash controller:

```
Server# scope chassis
Server /chassis # scope flexflash FlexFlash-0
Server /chassis/flexflash # scope operational-profile
Server /chassis/flexflash/operational-profile # set read-err-count-slot1-threshold 9
Server /chassis/flexflash/operational-profile *# set read-err-count-slot2-threshold 10
Server /chassis/flexflash/operational-profile *# set write-err-count-slot1-threshold 11
Server /chassis/flexflash/operational-profile *# set write-err-count-slot2-threshold 12
Server /chassis/flexflash/operational-profile *# commit
Server /chassis/flexflash/operational-profile # show detail
FlexFlash Operational Profile:
    Firmware Operating Mode: util
    SLOT1 Read Error Threshold: 9
    SLOT1 Write Error Threshold: 11
    SLOT2 Read Error Threshold: 10
    SLOT2 Write Error Threshold: 12
```

Resetting the Flexible Flash Controller

In normal operation, it should not be necessary to reset the Cisco Flexible Flash. We recommend that you perform this procedure only when explicitly directed to do so by a technical support representative.

Note This operation will disrupt traffic to the virtual drives on the Cisco Flexible Flash controller.

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash** *index*	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible *index* value is **FlexFlash-0**.
Step 3	Server /chassis/flexflash # **reset**	Resets the Cisco Flexible Flash controller.

Example

This example resets the flash controller:

```
Server# scope chassis
Server /chassis # scope flexflash FlexFlash-0
Server /chassis/flexflash # reset
This operation will reset Cisco Flexible Flash controller.
Host traffic to VDs on this device will be disrupted.
Continue?[y|N] y

Server /chassis/flexflash #
```

Configuring the Flexible Flash Controller Cards in Mirror Mode

Configuring controller cards in mirror mode:

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash**	Enters the Cisco Flexible Flash controller command mode for the specified controller.
Step 3	Server /chassis/flexflash # **configure-cards-mirror SLOT-1**.	Configures SLOT-1 as healthy primary.
Step 4	Enter **y** at the **Enable auto sync(by default auto sync is disabled)?[y|N]** prompt.	Sync the card on slot 1 with the card on slot 2.
Step 5	Enter **y** at the **Set Mirror Partition Name(Default name is Hypervisor)?[y|N]** prompt.	Enables you to set the name of the mirror partition.
Step 6	Enter the name of the mirror partition at the **Enter Partition Name Mirror Partition Name :***Hypervisor* prompt.	Sets the name of the mirror partition.
Step 7	Enter **y** at the **Set Virtual Drive as non-removable (Default is removable)?[y|N]** prompt.	Enables you to set the VD as non-removable. The following message displays: This action will mark the SLOT-1 as healthy primary slot and SLOT-2 (if card existing) as unhealthy secondary. This operation may disturb the host connectivity as well.
Step 8	Enter **y** at the **Continue?[y|N]y** prompt.	Configures the cards in Mirror mode and sets the card in SLOT-1 as primary healthy and SLOT-2 (if card existing) as unhealthy secondary.
Step 9	(Optional) Server /chassis/flexflash # **show physical-drive**	Displays the status of the configured cards. **Note** • • If the cards are configured in auto sync mode and if a card goes out of sync, then syncing from a good card starts automatically. • If the server is running with one auto mirror healthy card and if a new card is inserted then the metadata is automatically created on the new card and data syncing starts from auto mirror configured card to the new paired card.

Example

This example shows how to configure the controller cards in mirror mode:

```
Server# scope chassis
Server /chassis # scope flexflash
Server /chassis/flexflash #  configure-cards-mirror SLOT-1
Enable auto sync(by default auto sync is disabled)?[y|N]y
Set Mirror Partition Name(Default name is Hypervisor)?[y|N]y
Enter Partition Name Mirror Partition Name :HV
Set Virtual Drive as non-removable (Default is removable)?[y|N]y
This action will mark the SLOT-1 as healthy primary slot and SLOT-2 (if card existing) as
unhealthy secondary.
This operation may disturb the host connectivity as well.
Continue?[y|N]y
Server /chassis/flexflash # show detail
Controller FlexFlash-0:
    Product Name: Cisco FlexFlash
    Controller HW: FX3S
    Vendor: Cypress
    Firmware Version: 1.3.2 build 159
    Firmware Operating Mode: mirror
    Firmware Configured Mode: mirror
    Has Error: No
    Error Description:
    Internal State: Disconnected
    Controller Status: OK
    Cards Manageable: Yes
    Startup Firmware Version: 1.3.2 build 159

Server /chassis/flexflash # show physical-drive
Physical Drive  Status    Controller   Card Type         Card mode         Health     Sync
 Mode
--------------- --------- ------------ ----------------- ----------------- ----------
----------
SLOT-1          present   FlexFlash-0  FX3S configured   mirror-primary    healthy    auto
SLOT-2          present   FlexFlash-0  FX3S configured   mirror-secondary  unhealthy  auto

Server /chassis/flexflash #
```

Enabling Virtual Drives

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash**	Enters the Cisco Flexible Flash controller command mode for the specified controller.

	Command or Action	Purpose
Step 3	Required: Server /chassis/ flexflash # **scope virtual-drive**	Enters the virtual drive command mode for the specified controller.
Step 4	Server /chassis/flexflash/virtual-drive # **enable-vds** *"SCU HUU dlfd"*	Enables the virtual drives to the host.

Example

This example shows how to enable the virtual drives to the host:

```
Server# scope chassis
Server /chassis # scope flexflash
Server /chassis/flexflash #  scope virtual-drive
Server /chassis/flexflash/virtual-drive # enable-vds "SCU HUU dlfd"
Server /chassis/flexflash/virtual-drive # show detail

Virtual Drive SCU:
    VD ID: 1
    Size: 2560 MB
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive HUU:
    VD ID: 2
    Size: 1536 MB
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive Drivers:
    VD ID: 3
    Size: 8192 MB
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive dlfd:
    VD ID: 4
    Size: 9952 MB
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive dfdff:
    VD ID: 5
    Size: 30432 MB
```

```
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none

Server /chassis/flexflash/virtual-drive #
```

Erasing Virtual Drives

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash**	Enters the Cisco Flexible Flash controller command mode for the specified controller.
Step 3	Required: Server /chassis/ flexflash # **scope virtual-drive**	Enters the virtual drive command mode for the specified controller.
Step 4	Server /chassis/flexflash/virtual-drive # **erase-vds "SCU HUU"**	Initiates erasing FAT32.

Example

This example shows how to erase data on the virtual drives:

```
Server# scope chassis
Server /chassis # scope flexflash
Server /chassis/flexflash #  scope virtual-drive
Server /chassis/flexflash/virtual-drive #  erase-vds "SCU HUU"
Server /chassis/flexflash/virtual-drive # show detail

Virtual Drive SCU:
    VD ID: 1
    Size: 2560 MB
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: Erasing
    Last Operation completion status: none
Virtual Drive HUU:
    VD ID: 2
    Size: 1536 MB
```

```
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Connected
    Operation in progress: Erase-Pending
    Last Operation completion status: none
Virtual Drive Drivers:
    VD ID: 3
    Size: 8192 MB
    VD Scope: Non-Raid
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive dlfd:

Server /chassis/flexflash/virtual-drive #
```

Syncing Virtual Drives

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.
- The cards must be configured in manual mirror mode.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash**	Enters the Cisco Flexible Flash controller command mode for the specified controller.
Step 3	Required: Server /chassis/ flexflash # **scope virtual-drive**	Enters the virtual drive command mode for the specified controller.

	Command or Action	Purpose
Step 4	Server /chassis/flexflash/virtual-drive # **sync-vds** *Hypervisor*	Syncs the virtual drives. **Note** • If the cards are configured in auto sync mode and if a card goes out of sync, then syncing from a good card starts automatically. • If the server is running with one auto mirror healthy card and if a new card is inserted then the metadata is automatically created on the new card and data syncing starts from auto mirror configured card to the new paired card.

Example

This example shows how to sync the virtual drives:

```
Server# scope chassis
Server /chassis # scope flexflash
Server /chassis/flexflash #  scope virtual-drive
Server /chassis/flexflash/virtual-drive # sync-vds Hypervisor
Server /chassis/flexflash/virtual-drive # show detail

Virtual Drive Hypervisor:
    VD ID: 1
    Size: 30432 MB
    VD Scope: Raid
    VD Status: Degraded
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: Syncing(Manual)10% done
    Last Operation completion status: none

Server /chassis/flexflash/virtual-drive #
```

Viewing FlexFlash Logs

Before you begin

Cisco Flexible Flash must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexflash** *index*	Enters the Cisco Flexible Flash controller command mode.
Step 3	Server /chassis/flexflash # **show logs**	Displays the Flexible Flash controller logs.

Example

An example of the Flexible Flash Controller logs.

```
Server # scope chassis
Server /chassis # scope chassis flexflash FlexFlash-0
Server /chassis/flexflash # show logs
TimeStamp                    Severity      Description
---------                    --------      -----------
2017 July 10 07:16:17 UTC    warning       "CYWB_LOG: CYWB: USB connection status, 3.0
enable=1, 3.0 mode=1"
2017 July 10 07:46:05 UTC    warning       "CYWB_LOG: CYWB: USB connection status, 3.0
enable=1, 3.0 mode=1"
2017 July 10 07:46:05 UTC    warning       "CYWB_LOG: CYWB FWLOG (usbapp): USB HSChirp
event, data=1"
2017 July 10 07:45:07 UTC    warning       "CYWB_LOG: CYWB FWLOG (usbapp): USB Suspend
event, data=0"
2017 July 10 07:45:06 UTC    warning       "CYWB_LOG: CYWB FWLOG (usbapp): USB VbusValid
event, data=0"
2017 July 10 07:44:23 UTC    warning       "CYWB_LOG: CYWB FWLOG (usb): connect done,
usb_state=4 ctrl_reg=0"
2017 July 10 07:44:23 UTC    info          "cywb_blkdev_create_disks: Finished changing
disks: S0=0 S1=0 RAID=0 TOTAL=0"
2017 July 10 07:44:23 UTC    info         "cywbblkdev_blk_put: disk=cd3ad400 queue=cd3bd360
 port=0 unit=0 usage=0"
2017 July 10 07:44:23 UTC    info          "cywb_blkdev_create_disks: S2 unit 0 has become
 unavailable"
2017 July 10 07:44:23 UTC    info         "CYWB_LOG: Found 0 RAID partitions, 0 partitions
 on port0 and 0 partitions on port 1"
2017 July 10 07:44:23 UTC    info          cywb_blkdev_create_disks called
2017 July 10 07:44:23 UTC    info          "cywb_blkdev_create_disks: Scheduling driver
callback"
2017 July 10 07:44:23 UTC    info          "cywbblkdev: Added disk=cd3ad400 queue=cd3bd360
 port=0 unit=0"
2017 July 10 07:44:23 UTC    info         "cywbblkdev: Registered block device cydiskraida
 with capacity 124727295 (major=254, minor=0)"
2017 July 10 07:44:23 UTC    info          cywbblkdev_blk_release exit
2017 July 10 07:44:23 UTC    info         "cywbblkdev_blk_put: disk=cd3ad400 queue=cd3bd360
 port=0 unit=0 usage=1"
2017 July 10 07:44:23 UTC    info          cywbblkdev_blk_release entry
2017 July 10 07:44:23 UTC    warning       "CYWB_LOG: CyWb: Disk on port0, unit0 is busy,
waiting"
2017 July 10 07:44:23 UTC    warning      "CYWB_LOG: CYWB: No device found on storage port
 0"
2017 July 10 07:44:23 UTC    info          cywbblkdev_revalidate_disk called
2017 July 10 07:44:23 UTC    info          cywbblkdev_blk_open exit
2017 July 10 07:44:23 UTC    info          cywbblkdev_media_changed called
2017 July 10 07:44:23 UTC    info          cywbblkdev_blk_open entry
```

```
2017 July 10 07:44:23 UTC    info          "cywb_blkdev_create_disks: Finished changing
disks: S0=0 S1=0 RAID=1 TOTAL=1"
```

Managing the FlexUtil Controller

The C-Series M5 Rack-Mount servers support microSD memory card for storage of server software tools and utilities. Riser 1 has this microSD memory card slot. Cisco FlexUtil supports only 32GB microSD card.

The following user visible partitions are present on the microSD card:

- Server Configuration Utility (SCU) – 1.25 GB
- Diagnostics – 0.25 GB
- Host Update Utility (HUU) – 1.5 GB
- Drivers – 8 GB
- User

Note The number of partitions and size of each partition on microSD is fixed.

At any time, two partitions can be mapped onto the host. These partitions (except the user partition) can also be updated through a CIFS or NFS share. A second level BIOS boot order support is also available for all the bootable partitions.

Note User partition must be used only for storage. This partition does not support OS installations.

Configuring FlexUtil Operational Profiles

Before you begin

- You must log in as a user with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope operational-profile**	Enters the operational profile command mode.

	Command or Action	Purpose
Step 4	Server /chassis/flexutil/operational-profile # **set read-err-count-threshold** *count*	Sets the read error threshold count. **Note** Zero value for threshold will be treated as special case, cards will not be marked unhealthy if error count crosses zero threshold.
Step 5	Server /chassis/flexutil/operational-profile* # **set write-err-count-threshold** *count*	Sets the write error threshold count. **Note** Zero value for threshold will be treated as special case, cards will not be marked unhealthy if error count crosses zero threshold.
Step 6	Server /chassis/flexutil/operational-profile* # **commit**	Commits the transaction to the system.

Example

This example shows how to configure the FlexUtil operational profile:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope operational-profile
Server /chassis/flexutil/operational-profile # set read-err-count-threshold 49
Server /chassis/flexutil/operational-profile* # set write-err-count-threshold 49
Server /chassis/flexutil/operational-profile* # commit
Server /chassis/flexutilServer /chassis/flexutil/operational-profile
```

Resetting FlexUtil Card Configuration

Before you begin

- You must log in as a user with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Server /chassis/flexutil # **reset-card-config**	At the confirmation prompt enter **y**. Resets the FlexUtil card configuration.

Example

This example shows how to reset the FlexUtil card configuration:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # reset-card-config
This operation will wipe all the data on the card.
Any VD connected to host (except UserPartition) will be disconnected from host.
This task will take few minutes to complete.
Do you want to continue?[y|N]y
Server /chassis/flexutil #
```

Viewing FlexUtil Properties

Before you begin

Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Server /chassis/flexutil # **show detail**	Displays the FlexUtil controller properties.

Example

This example displays the FlexUtil controller properties:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # show detail
Controller Flexutil:
    Product Name: Cisco Flexutil
    Internal State: Connected
    Controller Status: OK
    Physical Drive Count: 1
    Virtual Drive Count: 5
Server /chassis/flexutil #
```

Viewing FlexUtil Physical Drives Details

Before you begin

Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Server /chassis/flexutil # **show physical-drive detail**	Displays the FlexUtil physical drives properties.

Example

This example displays the FlexUtil physical drives properties:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # show physical-drive detail
Physical Drive microSD:
    Status: present
    Controller: Flexutil
    Health: healthy
    Capacity: 30624 MB
    Write Enabled: true
    Read Error Count: 0
    Read Error Threshold: 49
    Write Error Count: 0
    Write Error Threshold : 49
    Product Name: SD32G
    Product Revision: 3.0
    Serial#: 0x1cafb
    Manufacturer Id: 39
    OEM Id: PH
    Manufacturing Date : 12/2016
    Block Size: 512 bytes
    Partition Count: 5
    Drives Enabled: SCU Diagnostics HUU Drivers UserPartition
Server /chassis/flexutil #
```

Viewing FlexUtil Virtual Drives Details

Before you begin

Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope virtual-drive**	Enters the virtual drive command mode.

	Command or Action	Purpose
Step 4	Server /chassis/flexutil/virtual-drive # **show detail**	Displays the FlexUtil physical drives properties.

Example

This example displays the FlexUtil physical drives properties:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope virtual-drive
Server /chassis/flexutil/virtual-drive # show detail
Virtual Drive SCU:
    ID: 1
    LUN ID: NA
    Size: 1280 MB
    VD Scope: Non-RAID
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive Diagnostics:
    ID: 2
    LUN ID: 0
    Size: 256 MB
    VD Scope: Non-RAID
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive HUU:
    ID: 3
    LUN ID: NA
    Size: 1536 MB
    VD Scope: Non-RAID
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive Drivers:
    ID: 4
    LUN ID: NA
    Size: 8192 MB
    VD Scope: Non-RAID
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none
Virtual Drive UserPartition:
    ID: 5
    LUN ID: NA
    Size: 11159 MB
    VD Scope: Non-RAID
```

```
    VD Status: Healthy
    VD Type: Removable
    Read/Write: R/W
    Host Accessible: Not-Connected
    Operation in progress: NA
    Last Operation completion status: none
Server /chassis/flexutil/virtual-drive #
```

Adding an Image to a FlexUtil Virtual Drive

Before you begin

- Log in with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	server # **scope chassis**	Enters chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope vd-image-configs**	Enters the virtual drive image configuration command mode.
Step 4	Server /chassis/flexutil/vd-image-configs # **vd-image-cifs** {**virtual-drive-name remote-share remote-file-path** [*mount options*]	Maps a CIFS file for the FlexUtil virtual drive. You must specify the following: • Name of the virtual drive • Remote share including IP address (IPv4 or IPv6 address) and the exported directory • Path of the remote file corresponding to the exported directory. • (Optional) Mapping options • Username and password to connect to the server
Step 5	Server /chassis/flexutil/vd-image-configs # **vd-image-nfs** {**virtual-drive-name remote-share remote-file-path** [*mount options*]	Maps an NFS file for the FlexUtil virtual drive. You must specify the following: • Name of the virtual drive • Remote share including IP address (IPv4 or IPv6 address) • Path of the remote file • (Optional) Mapping options

	Command or Action	Purpose
Step 6	Server /chassis/flexutil/vd-image-configs # **vd-image-www** {**virtual-drive-name** | **remote-share** | **remote-file-path** [*mount options*]	Maps an HTTPS file to the virtual drive. You must specify the following: • Name of the virtual drive to map • Remote share including IP address and the exported directory • Path of the remote file corresponding to the exported directory. • (Optional) Mapping options • Username and password to connect to the server
Step 7	Server /chassis/flexutil/vd-image-configs # **show detail**	Displays the FlexUtil virtual drive image details.

Example

This example shows how to map an image to a FlexUtil virtual drive:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope vd-image-configs
Server /chassis/flexutil/vd-image-configs # vd-image-nfs HUU 10.10.10.10:/nfsdata
ucs-c240m5-huu-3.1.0.182.iso
Server /chassis/flexutil/vd-image-configs # show detail
Virtual drive: SCU
    mount-type: nfs
    remote-share: 10.10.10.10:/nfsshare
    remote-file: ucs-cxx-scu-4.0.12.3.iso
    mount-options: 'nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072'

Virtual drive: Diagnostics
    mount-type: nfs
    remote-share: 10.10.10.10:/nfsshare
    remote-file: ucs-cxx-diag.5.0.1a.iso
    mount-options: 'nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072'

Virtual drive: HUU
    mount-type: nfs
    remote-share: 10.10.10.10:/nfsdata
    remote-file: ucs-c240m5-huu-3.1.0.182.iso
    mount-options: "nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072"

Virtual-drive: Drivers
    mount-type: None
    remote-share: None
    remote-file: None
    mount-options: None
Server /chassis/flexutil/vd-image-configs #
```

Updating a FlexUtil Virtual Drive

Before you begin

- You must be logged in with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope virtual-drive**	Enters the virtual drive command mode.
Step 4	Server /chassis/flexutil/virtual-drive # **update-vds** *virtual-drive*	Updates the chosen virtual drive.
Step 5	(Optional) Server /chassis/flexutil/virtual-drive # **update-vds-cancel**	Cancels an ongoing virtual drive update.
Step 6	Server /chassis/flexutil/virtual-drive # **show detail**	Displays the FlexUtil virtual drive image details.

Example

This example shows how to updates a FlexUtil virtual drive:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope virtual-drive
Server /chassis/flexutil/virtual-drive # update-vds HUU
Server /chassis/flexutil/virtual-drive # show detail

Virtual-drive: SCU
    partition-id: 1
    lun-id: NA
    size: 1280 MB
    partition-scope: Non-RAID
    partition-status: Healthy
    partition-type: Removable
    writable: R/W
    host-accessible: Not-Connected
    operation-in-progress: NA
    operation-completion-status: none

 Virtual-drive: Diagnostics
    partition-id: 2
    lun-id: NA
    size: 256 MB
    partition-scope: Non-RAID
    partition-status: Healthy
    partition-type: Removable
    writable: R/W
```

```
    host-accessible: Not-Connected
    operation-in-progress: NA
    operation-completion-status: none

Virtual-drive: HUU
    partition-id: 3
    lun-id: NA
    size: 1536 MB
    partition-scope: Non-RAID
    partition-status: Healthy
    partition-type: Removable
    writable: R/W
    host-accessible: Not-Connected
    operation-in-progress: Updating
    operation-completion-status: none

Virtual-drive: Drivers
    partition-id: 4
    lun-id: NA
    size: 8192 MB
    partition-scope: Non-RAID
    partition-status: Healthy
    partition-type: Removable
    writable: R/W
    host-accessible: Not-Connected
    operation-in-progress: NA
    operation-completion-status: none

 Virtual drive: UserPartition
    partition-id: 5
    lun-id: NA
    size: 11159 MB
    partition-scope: Non-RAID
    partition-status: Healthy
    partition-type: Removable
    writable: R/W
    host-accessible: Not-Connected
    operation-in-progress: NA
    operation-completion-status: none
Server /chassis/flexutil/virtual-drive #
```

Enabling FlexUtil Virtual Drive

Before you begin

- You must be logged in with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.
- Update the virtual drive image before maping the drive to a host.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.

	Command or Action	Purpose
Step 3	Required: Server /chassis/flexutil # **scope virtual-drive**	Enters the virtual drive command mode.
Step 4	Server /chassis/flexutil/virtual-drive # **enable-vds** *virtual-drive*	Maps the virtual drive to host.
Step 5	Server /chassis/flexutil/virtual-drive # **show detail**	Displays the FlexUtil virtual drive image details.

Example

This example shows how to map a virtual drive image to a host:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope virtual-drive
Server /chassis/flexutil/virtual-drive # enable-vds HUU
Server /chassis/flexutil/virtual-drive # show detail
Virtual Drive  ID     LUN ID Size     VD Status    Host Accessible   Operation in    Last
Operation
               progress  completion status
-------------- ------ ------ -------- ------------ ----------------- ------------
----------------
SCU            1      NA     1280 MB  Healthy      Not-Connected     NA         none
Diagnostics    2      0      256 MB   Healthy      Connected         NA
Update-Success
HUU            3      1      1536 MB  Healthy      Connected         NA
Update-Success
Drivers        4      NA     8192 MB  Healthy      Not-Connected     NA              none
UserPartition  5      NA     11159 MB Healthy      Not-Connected     NA              none
Server /chassis/flexutil/vd-image-configs #
```

Mapping an Image to a Virtual Drive

Before you begin

- You must be logged in with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope vd-image-configs**	Enters the virtual drive image configuration command mode.

	Command or Action	Purpose
Step 4	Required: /chassis/flexutil/vd-image-configs # **vd-image-nfs HUU** *nfs/cifs share IP and path ISO image file*	Specify the IP and the path of the nfs/cifs share, and the ISO image file.
Step 5	/chassis/flexutil/vd-image-configs # **show detail**	Displays the FlexUtil virtual drive image details.

Example

This example shows how to add an image to a FlexUtil virtual drive:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope vd-image-configs
Server /chassis/flexutil/vd-image-configs #  vd-image-nfs HUU 10.127.54.176:/nfsdata
ucs-c240m5-huu-3.1.0.182.iso
Server /chassis/flexutil/vd-image-configs # show detail

    virtual-drive: SCU
    mount-type: nfs
    remote-share: 10.104.236.81:/nfsshare
    remote-file: ucs-cxx-scu-4.0.12.3.iso
    mount-options: 'nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072'

    virtual-drive: Diagnostics
    mount-type: nfs
    remote-share: 10.104.236.81:/nfsshare
    remote-file: ucs-cxx-diag.5.0.1a.iso
    mount-options: 'nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072'

    virtual-drive: HUU
    mount-type: nfs
    remote-share: 10.127.54.176:/nfsdata
    remote-file: ucs-c240m5-huu-3.1.0.182.iso
    mount-options: "nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072"

    virtual-drive: Drivers
    mount-type: None
    remote-share: None
    remote-file: None
    mount-options: None

Server /chassis/flexutil/vd-image-configs
```

Unmapping an Image From a Virtual Drive

Before you begin

- You must be logged in with admin privileges to perform this task.
- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope vd-image-configs**	Enters the virtual drive image configuration command mode.
Step 4	Server /chassis/flexutil/vd-image-configs # **unmap** *virtual-drive*	Unmaps the chosen virtual drive image.
Step 5	Server /chassis/flexutil/vd-image-configs # **show detail**	Displays the FlexUtil virtual drive image details.

Example

This example shows how to unmap a FlexUtil virtual drive:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope vd-image-configs
Server /chassis/flexutil/vd-image-configs # unmap HUU
Server /chassis/flexutil/vd-image-configs # show detail
Virtual drive: SCU
    mount-type: nfs
    remote-share: 10.10.10.10:/nfsshare
    remote-file: ucs-cxx-scu-4.0.12.3.iso
    mount-options: 'nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072'

Virtual drive: Diagnostics
    mount-type: nfs
    remote-share: 10.10.10.10:/nfsshare
    remote-file: ucs-cxx-diag.5.0.1a.iso
    mount-options: 'nolock,noexec,noac,soft,timeo=60,retry=2,rsize=3072,wsize=3072'

Virtual drive: HUU
    mount-type: None
    remote-share: None
    remote-file: None
    mount-options: None

Virtual-drive: Drivers
    mount-type: None
    remote-share: None
    remote-file: None
    mount-options: None
Server /chassis/flexutil/vd-image-configs #
```

Erasing an Image on a Virtual Drive

Before you begin

- You must be logged in with admin privileges to perform this task.

- Cisco FlexUtil must be supported by your platform.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Required: Server /chassis # **scope flexutil**	Enters the FlexUtil controller command mode.
Step 3	Required: Server /chassis/flexutil # **scope virtual-drive**	Enters the virtual drive command mode.
Step 4	Server /chassis/flexutil/virtual-drive # **erase-vds** *virtual-drive*	Erases a virtual drive image.
Step 5	Server /chassis/flexutil/virtual-drive # **show detail**	Displays the FlexUtil virtual drive image details.

Example

This example shows how to erase a virtual drive image:

```
Server# scope chassis
Server /chassis # scope flexutil
Server /chassis/flexutil # scope virtual-drive
Server /chassis/flexutil/virtual-drive # erase-vds SCU
This operation will erase data on the VD
Continue?[y|N]y
Server /chassis/flexutil/virtual-drive # show detail
Virtual Drive  ID     LUN ID Size     VD Status    Host Accessible   Operation in    Last
Operation
               progress  completion status
-------------- ------ ------ -------- ------------ ----------------- ------------
-----------------
SCU            1      NA     1280 MB  Healthy      Not-Connected     Erasing         none
Diagnostics    2      0      256 MB   Healthy      Connected         NA
Update-Success
HUU            3      1      1536 MB  Healthy      Connected         NA
Update-Success
Drivers        4      NA     8192 MB  Healthy      Not-Connected     NA              none
UserPartition  5      NA     11159 MB Healthy      Not-Connected     NA              none
C220-WZP210606A7 /chassis/flexutil/virtual-drive #
```

Cisco Boot Optimized M.2 Raid Controller

Viewing Cisco Boot Optimized M.2 Raid Controller Details

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.

	Command or Action	Purpose
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.
Step 3	Server /chassis/storageadapter # **show detail**	Displays the Cisco Boot Optimized M.2 raid controller details.

Example

This example shows how to view the controller information:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # show detail
PCI Slot MSTOR-RAID:
    Health: Good
    Controller Status: Optimal
    Product Name: Cisco Boot optimized M.2 Raid controller
    Serial Number: FCH222877A7
    Firmware Package Build: 2.3.17.1009
    Product ID: Marvell
    Flash Memory Size: 2 MB
    Product PID: UCS-M2-HWRAID
Server /chassis/storageadapter #
```

Viewing Cisco Boot Optimized M.2 Raid Controller Physical Drive Details

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.
Step 3	Server /chassis/storageadapter # **scope physical-drive** *Physical Drive Number*	Enters the physical drive command mode.
Step 4	Server /chassis/storageadapter/physical-drive # **show general**	Displays the general physical drive information.
Step 5	Server /chassis/storageadapter/physical-drive # **show detail**	Displays the physical drive details.
Step 6	Server /chassis/storageadapter/physical-drive # **show inquiry-data**	Displays the physical drive serial number.
Step 7	Server /chassis/storageadapter/physical-drive # **show status**	Displays the health status of the physical drive.

Example

This example shows how to view the physical drive information:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # scope physical-drive 253
Server /chassis/storageadapter/physical-drive # show general
PCI Slot MSTOR-RAID:
    Health: Good
    Controller Status: Optimal
    Product Name: Cisco Boot optimized M.2 Raid controller
    Serial Number: FCH222877A7
    Firmware Package Build: 2.3.17.1009
    Product ID: Marvell
    Flash Memory Size: 2 MB
    Product PID: UCS-M2-HWRAID
Server /chassis/storageadapter/physical-drive # show detail
Physical Drive Number 253:
    Controller: MSTOR-RAID
    Info Valid: Yes
    Info Invalid Cause:
    Drive Number: 253
    Health: Good
    Status: Online
    Manufacturer: ATA
    Model: Micron_5100_MTFDDAV240TCB
    Drive Firmware: D0MU054
    Type: SSD
    Block Size: 512
    Physical Block Size: 512
    Negotiated Link Speed: 6.0 Gb/s
    State: online
    Operating Temperature: 32
    Enclosure Association: Direct Attached
    Interface Type: SATA
    Block Count: 468862127
    Raw Size: 228936 MB
    Non Coerced Size: 228936 MB
    Coerced Size: 228936 MB
    Power State: active
Server /chassis/storageadapter/physical-drive # show inquiry-data
Physical Drive Number 253:
    Controller: MSTOR-RAID
    Info Valid: Yes
    Info Invalid Cause:
    Vendor: ATA
    Product ID: Micron_5100_MTFDDAV240TCB
    Drive Firmware: D0MU054
    Drive Serial Number: 18201CB94A2C
Server /chassis/storageadapter/physical-drive # show status
Physical Drive Number 253:
    Controller: MSTOR-RAID
    Info Valid: Yes
    Info Invalid Cause:
    State: online
    Online: true
    Fault: false
Server /chassis/storageadapter/physical-drive #
```

Viewing Cisco Boot Optimized M.2 Raid Controller Virtual Drive Details

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.
Step 3	Server /chassis/storageadapter # **scope virtual-drive** *Virtual Drive Number*	Enters the virtual drive command mode.
Step 4	Server /chassis/storageadapter/virtual-drive # **show detail**	Displays the virtual drive information.
Step 5	Server /chassis/storageadapter/virtual-drive # **show lrop-info**	Displays the status of the virtual drive rebuild.

Example

This example shows how to view the virtual drive information:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # scope virtual-drive 0
Server /chassis/storageadapter/virtual-drive # show detail
Virtual Drive 0:
    Health: Good
    Status : Optimal
    Name: test
    Size: 228872 MB
    Physical Drives: 253, 254
    RAID Level: RAID 1
    Target ID: 0
    Strip Size: 32 KB
Server /chassis/storageadapter/virtual-drive # show detail
LROP:
    LROP In Progress: false
    Current Long-Running Op: No operation in progress
    Percent Complete: 0
Server /chassis/storageadapter/virtual-drive #
```

Creating a Cisco Boot Optimized M.2 Raid Controller Virtual Drive

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.

	Command or Action	Purpose
Step 3	Server /chassis/storageadapter # **create-virtual-drive**	Enters the virtual drive name and the stripsize at the respective prompts. This creates the virtual drive.

Example

This example shows how to create a virtual drive:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # create-virtual-drive
Please enter Virtual Drive name (15 characters maximum, hit return to skip name)--> test

Unused physical drives available 2:
    ID  Size(MB)       Model        Interface  Type
   253  228936         ATA          SATA       SSD
   254  915715         ATA          SATA       SSD

PD sizes NOT equal. NOT Assigning VD_size for RAID1

Optional attribute:

  stripsize: defaults to 64K Bytes

     0: 32K Bytes
    1: 64K Bytes
  Choose number from above options or hit return to pick default--> 0
stripsize will be set to 32K Bytes (4 and 'strip-size\:32k')

New virtual drive will have the following characteristics:
  - RAID level: '1'
  - Name: 'test'
  - stripsize: 32K Bytes

OK? (y or n)--> y
Server /chassis/storageadapter #
```

Deleting a Cisco Boot Optimized M.2 Raid Controller Virtual Drive

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.
Step 3	Server /chassis/storageadapter # **delete-virtual-drive**	Enters **yes** at the confirmation prompts. This deletes the virtual drive.

Example

This example shows how to delete a virtual drive:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # delete-virtual-drive
Are you sure you want to delete virtual drive 0?
All data on the drive will be lost.  Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Importing Cisco Boot Optimized M.2 Raid Controller Foreign Configuration

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.
Step 3	Server /chassis/storageadapter # **import-foreign-config**	Enter **yes** at the confirmation prompt to import the controller configuration.

Example

This example shows how to import the controller configuration:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # import-foreign-config
Are you sure you want to import all foreign configurations on this controller?
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Clearing Cisco Boot Optimized M.2 Raid Controller Foreign Configuration

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope storageadapter MSTOR-RAID**	Enters the Cisco Boot Optimized M.2 raid controller command mode.
Step 3	Server /chassis/storageadapter # **clear-foreign-config**	Enter **yes** at the confirmation prompt to clear the controller configuration.

Example

This example shows how to clear the controller configuration:

```
Server# scope chassis
Server /chassis # show storageadapter MSTOR-RAID
Server /chassis/storageadapter # clear-foreign-config
Are you sure you want to clear all foreign configurations on this controller?
All data on the drive(s) will be lost.
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

Cisco FlexMMC

Viewing Cisco FlexMMC Details

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server/chassis # **Scope flexmmc**	Enters the FlexMMC mode.
Step 3	Server/chassis/flexmmc # **show detail**	Displays the FlexMMC details.

Example

This example shows how to view the controller information:

```
Server# scope chassis
Server /chassis # scope flexmmc
Server /chassis/flexmmc # show detail
Cisco FlexMMC Storage:
    Total Memory For IMC Utilities: 2048 MB
    Available Memory For IMC Utilities: 1970 MB
    Total Memory For User Files: 6144 MB
    Available Memory For User Files: 6144 MB
```

Uploading New Image File

Before you begin

Ensure that there are no file upload in progress. You can upload only one image file at any time. To upload a new file, you should first un-map and delete the existing file.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server/chassis # **scope flexmmc**	Enters the FlexMMC mode.
Step 3	Server/chassis/flexmmc # **download-file** *location mount_type serverip/remote_share remote_file option_string*	Uploads the image file for mapping.

Example

This example shows how to upload an image file:

```
Server# scope chassis
Server /chassis # scope flexmmc
Server /chassis/flexmmc # download-file file location
```

Deleting an Image File

Before you begin

Ensure that:

- there are no file uploads in progress. You cannot delete a file for which the upload is in progress.
- there are no files mapped. You cannot delete a file which is already mapped. You should first un-map the file before deleting the file.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server/chassis # **scope flexmmc**	Enters the FlexMMC mode.
Step 3	Server/chassis/flexmmc # **delete-file** *file_ID*	Deletes the image file.

Example

This example shows how to delete an image file:

```
Server# scope chassis
Server /chassis # scope flexmmc
Server /chassis/flexmmc # delete-file file ID
```

Mapping an Image

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server/chassis # **scope flexmmc**	Enters the FlexMMC mode.
Step 3	Server/chassis/flexmmc # **scope flexmmc-file** *file_ID*	Selects the file to be mapped.
Step 4	Server/chassis/flexmmc/flexmmc-file # **map**	

Example

This examples shows how to map an already uploaded image file.

```
Server# scope chassis
Server /chassis # scope flexmmc
Server /chassis/flexmmc # scope flexmmc-file file ID
Server /chassis/flexmmc/flexmmc-file # map
```

Resetting FlexMMC to Default Settings

Perform this procedure to reset FlexMMC to default Cisco IMC settings.

Note Performing this procedure deletes all the uploaded images.

Before you begin

Ensure that:

- there are no file uploads in progress. You cannot reset FlexMMC to default settings while a file upload is in progress.
- there are no files mapped. You cannot reset FlexMMC if a file is already mapped. You should first un-map the file before resetting FlexMMC.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server/chassis # **scope flexmmc**	Enters the FlexMMC mode.
Step 3	Server/chassis/flexmmc # **reset-to-default**	
Step 4	Enter **yes** to confirm.	Resets FlexMMC to default settings.

Example

This example shows how to reset FlexMMC to default settings:

```
Server# scope chassis
Server /chassis # scope flexmmc
Server /chassis/flexmmc # reset-to-default
Are you sure you want to reset the Cisco FlexMMC to default? All the files will be
deleted/wiped
Please enter 'yes' to confirm: yes
Server /chassis/flexmmc
```

Configuring Drive Diagnostics

Overview of Drive Diagnostics

Drive Diagnostics feature supports running diagnostics on HDD/SSD and SAS/SATA drive types. The feature allows you to determine the device health by obtaining information from the device to determine usage, temperature, age, media wear, resource consumption etc. In addition, you can collect and read log pages maintained by the drive to gather diagnostic data and perform analytics.

Beginning from release 4.2(2a), you can perform drive diagnostic self-test on SATA drives.

From release 4.1(3b) onwards, you can perform drive diagnostic self-test on SSD drives.

You can perform the device self-test in two modes:

- On-demand device self-test: In this mode, you can perform the drive self-test by executing the commands and view the diagnostic report using the technical support utility.
- Background device self-test: In this mode, you can schedule periodic self-tests on the drives and view the diagnostic report using the technical support utility.

  You can schedule the periodic background self-test mode for the following frequencies:

  - Daily
  - Weekly
  - Fortnightly
  - Monthly

Note By default, this frequency is set to weekly.

When the controller puts the unconfigured good and hot spare HDD drives in power-save mode, the diagnostic self-test cannot be initiated on drives. So, the drives have to be spun up to run the diagnostic drive self-test. You can use the parameter **bg_diag_powersave_override** to set the diagnostic drive self-test policy on the HDDs which are in power-save mode. For more information, see Setting the Diagnostics Drive Self-test Policy on HDDs in Power-Save Mode, on page 299.

You can evaluate the actual state and health of the device using the comprehensive set of results from the device self-test. You can run the commands to collect the diagnostic data by using the two interfaces in Cisco IMC: CLI and Redfish API.

Note This feature is available on all UCS C-series M5 and M6 servers.

Initiating the On-Demand Device Self Test

You can initiate the on-demand device self test and use the Technical Support utility to download the diagnostic data.

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

Step 1 Server# **scope chassis**

Enters the chassis command mode.

Step 2 Server chassis# **scope storageadapter**

Enters the storage adapter command mode.

Step 3 Server chassis storageadapter# **show physical-drive** {*1*}

View the list of the physical drives in the storage adapter and select the physical drive in the megaraid controller on which you want to run the on-demand device self test.

Step 4 Server chassis storageadapter# **scope physical-drive** {*1*}

Enters the command mode for the physical drive 1.

Step 5 Server chassis storageadapter physical-drive# **start-diag**

Initializes the on-demand self device test on the physical drive 1 connected to the megaraid controller, to collect the diagnostic data.

The on-demand diagnostic self-test job runs in the background on the physical drive.

Note If the `bg_diag_powersave_override` parameter is set to `false` in the drive self-test, then the drive self-test will not be run on the drives in power-save mode.

Example

This example initializes the on-demand device self test on the SATA drive to collect the diagnostic data.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive drive-number
Server /chassis/storageadapter/physical-drive # start-diag
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
You are initiating drive self test diagnostics via Cisco IMC.
This task will take a few minutes to complete. You may monitor the status
  of the retrieval by running the 'get-diag-status' command.
When the self test is finished, the 'selftest-percent-complete' value shows
  '100%'.
You may then download the diag report using the Technical Support facility
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Do you want to proceed?
Enter 'yes' to confirm -> yes
Self test operation on drive: MRAID/10 initiated successfully

Server /chassis/storageadapter/physical-drive # get-diag-status
  selftest-type: Self test immediate offline
  selftest-status: Self test in progress
  selftest-percent-complete: 20

Server /chassis/storageadapter/physical-drive # get-diag-status
  selftest-type: Self test immediate offline
  selftest-status: Self test completed without error
  selftest-percent-complete: 100
Server /chassis/storageadapter/physical-drive #
```

What to do next

- See Viewing the Status of the Drive Self-test, on page 295: You can view the status of the current running device self-test.
- See Viewing the Diagnostic Self Test Report, on page 300: You can use the technical support utility to view the diagnostic report

Viewing the Status of the Drive Self-test

Run the self device test on the physical drive and verify the self-test status is completed until the field `selftest-percent-complete` displays the value `100` and the test is complete with no errors. You can then use the Technical Support utility to download the diagnostic data.

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

Step 1 Server# **scope chassis**

Enters the chassis command mode.

Step 2 Server chassis# **scope storageadapter**

Enters storage adapter command mode.

Step 3 Server chassis storageadapter# **scope physical-drive**

Enters the command mode for the physical drive.

Step 4 Server chassis storageadapter physical-drive# **get-diag-status**

Gets the status of the current running self device test on the drive.

Example

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive drive-number
Server /chassis/storageadapter/physical-drive # get-diag-status
selftest-type: Background
selftest-status: Self test in progress
selftest-percent-complete:11
Server /chassis/storageadapter/physical-drive # get-diag-status
selftest-type: Background
selftest-status: Self test in progress
selftest-percent-complete:34
Server /chassis/storageadapter/physical-drive # get-diag-status
selftest-type: Background
selftest-status: Self test completed without error
selftest-percent-complete:100
Server /chassis/storageadapter/physical-drive #
```

What to do next

You can use the Technical Support utility and view the diagnostic results. See Viewing the Diagnostic Self Test Report, on page 300.

Aborting the Diagnostic Self Test

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

Step 1 Server# **scope chassis**

Enters the chassis command mode.

Step 2 Server chassis# **scope storageadapter**

Enters storage adapter command mode.

Step 3 Server chassis storageadapter# **scope physical-drive**

Enters the command mode for the physical drive.

Step 4 Server chassis storageadapter physical-drive# **cancel-diag**

Aborts the current running self device test on the drive.

Example

This example aborts the on-demand device self test on the SATA drive and views the status of the ongoing self-test.

```
Server /chassis/storageadapter/physical-drive # get-diag-status
  selftest-type: Self test immediate offline
  selftest-status: Self test in progress
  selftest-percent-complete: 20

Server /chassis/storageadapter/physical-drive # cancel-diag
Self test operation on drive: MRAID/10 aborted successfully


Server /chassis/storageadapter/physical-drive # get-diag-status
  selftest-type: Self test immediate offline
  selftest-status: Self test aborted by host
  selftest-percent-complete: 0
```

Initiating Background Diagnostic Drive Self Test

Before you begin

You must verify and set the following configuration parameters before you set the background diagnostic drive self-test policy.

- **bg_diag_enabled**: This configuration parameter specifies whether the background diagnostics should be run on the system or not. By default, this parameter is set to **false**.
- **bg_diag_frequency_interval**: This configuration parameter specifies the frequency at which the drive diagnostic job is initiated on the drives.

  You can schedule the background diagnostic drive self-test mode to run on the physical drive for the following frequencies:

  - Daily
  - Weekly
  - Fortnightly
  - Monthly

  By default, this parameter is set to **weekly**.
- **bg_diag_powersave_override**: This configuration parameter sets the diagnostic drive self-test policy on HDDs which are in power-save mode.

  If you enable this parameter, then the drives in power-save mode are spun-up and drive self-test is run. If you disable this parameter, then the drive self-test is not initiated on the drives in power-save mode.

  By default, this parameter is set to **true**.

Procedure

Step 1 Server # **scope diag-config**

Enters the diag config mode.

Step 2 Server diag-config # **scope drive-diag-config**

Enters the drive-diag-config mode.

Step 3 Server diag-config/drive-diag-config # **show**

Displays the configured background diagnostic self-test parameters.

Step 4 (Optional) Server diag-config/drive-diag-config # **set bg_diag_enabled** {*true*|*false*}

Set the background diagnostic enabled parameter to `true` to enable the background drive self-test.

Step 5 (Optional) Server diag-config/drive-diag-config # **set bg_diag_frequency_interval** {*daily*|*weekly*|*fortnightly*|*monthly*}

Set the background diagnostic frequency interval parameter to the desired frequency for which the background diagnostic device self-test must run on the physical drive.

Note To change the frequency parameter value change to be immediately take into effect, you must disable and enable the `bg_diag_enabled` parameter.

Step 6 (Optional) Server diag-config/drive-diag-config # **set bg_diag_powersave_override**{*true*|*false*}

Set the background diagnostic power-save parameter to `false` to disable the power-save mode on the physical drive.

By default, this parameter is set to **true**.

Step 7 Server diag-config/drive-diag-config # **commit**

Commits the changes made to the configuration parameters to the system configuration.

Example

This example displays the background drive self-test configuration parameters :

```
Server# scope diag-config
Server /diag-config # scope drive-diag-config
scope /diag-config/drive-diag-config* # set  bg_diag_frequency_interval fortnightly
scope /diag-config/drive-diag-config # set  bg_diag_enabled true
scope /diag-config/drive-diag-config # set  bg_diag_powersave_override false
scope /diag-config/drive-diag-config* # commit
Config parameters committed successfully
scope /diag-config/drive-diag-config* # show
Background DST Enabled Background DST Frequency   Powersave Override
---------------------- -------------------------- ----------------------
True                   fortnightly                      False
```

What to do next

You can view the diagnostic drive self-test report from the technical support utility.

Setting the Diagnostics Drive Self-test Policy on HDDs in Power-Save Mode

When the controller puts the unconfigured good and hot spare HDD drives in power-save mode, the diagnostic self-test cannot be initiated on drives. So, the drives have to be spun up to run the diagnostic drive self-test.

You can use the parameter **bg_diag_powersave_override** to set the diagnostic drive self-test policy on the HDDs which are in power-save mode.

By default, the **bg_diag_powersave_override** parameter is enabled. So the drives in power-save mode are spun up to initiate the diagnostic drive self-test.

If you do not want to run the diagnostic drive self-test to be run on the drives in power-save mode, then you must disable the **bg_diag_powersave_override** parameter.

Procedure

Step 1 Server # **scope diag-config**

Enters the diag config mode.

Step 2 Server diag-config # **scope drive-diag-config**

Enters the drive-diag-config mode.

Step 3 Server diag-config/drive-diag-config # **show**

Displays the drive diagnostics configuration parameters.

Step 4 (Optional) Server diag-config/drive-diag-config # **set bg_diag_powersave_override** {*true*|*false*}

Set the **bg_diag_powersave_override** parameter to `false` to disable the power-save mode in the HDD.

Note By default, the **bg_diag_powersave_override** parameter is enabled.

Step 5 Server diag-config/drive-diag-config # **commit**

Commits the changes made to the configuration parameters to the system configuration.

Example

This example displays the drive diagnostics configuration parameters and how to disable the `bg_diag_powersave_override` parameter:

```
Server# scope diag-config
Server /diag-config # scope drive-diag-config
scope /diag-config/drive-diag-config # set  bg_diag_powersave_override false
scope /diag-config/drive-diag-config* # commit
Config parameters committed successfully
scope /diag-config/drive-diag-config* # show
Background DST Enabled Background DST Frequency   Powersave Override
```

```
---------------------- -------------------------- ----------------------
True                   weekly                     False
```

Viewing the Diagnostic Self Test Report

Initiate the technical support utility and view the details of the drive diagnostic self-test report.

Before you begin

Perform this task when requested by the Cisco Technical Assistance Center (TAC). The technical support utility creates a summary report containing configuration information, logs and diagnostic data that will help TAC in troubleshooting and resolving a technical issue.

Important If any firmware or BIOS updates are in progress, do not export the technical support data until those tasks are complete.

Note See Overview of the Diagnostic Self-Test Report, on page 301 to know more about the information available in the diagnostic self-test report.

Procedure

Step 1 Server # **scope chassis**

Enters chassis command mode.

Step 2 Server /chassis # **scope tech-support**

Enters the tech-support command mode.

Step 3 Server /chassis/tech-support # **set remote-ip** *ip-address*

Specifies the IP address of the remote server on which the technical support data file should be stored.

Step 4 Server /chassis/tech-support # **set remote-path** *path/filename*

Specifies the file name in which the diagnostic self-test report should be stored on the remote server. When you enter this name, include the relative path for the file from the top of the server tree to the desired location.

Tip To have the system auto-generate the file name, enter the file name as **`default.tar.gz`**.

Step 5 Server /chassis/tech-support # **set remote-protocol** *protocol*

Specifies the protocol to connect to the remote server. It can be of the following types:

- TFTP
- FTP
- SFTP

- SCP
- HTTP

Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type.

If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint.

The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.

Step 6 Server /chassis/tech-support # **set remote-username** *name*

Specifies the user name on the remote server on which the technical support data file should be stored. This field does not apply if the protocol is TFTP or HTTP.

Step 7 Server /chassis/tech-support # **set remote-password** *password*

Specifies the password on the remote server on which the technical support data file should be stored. This field does not apply if the protocol is TFTP or HTTP.

Step 8 Server /chassis/tech-support # **commit**

Commits the transaction to the system configuration.

Step 9 Server /chassis/tech-support # **start**

Begins the transfer of the data file to the remote server.

Step 10 (Optional) Server /chassis/tech-support # **show detail**

Displays the progress of the transfer of the data file to the remote server.

Step 11 Server cimc tech-support# **tar -xzvf nv/log/storaged/diag/***diagnosic-report.tar.gz*

Navigate to the filepath: `nv/log/storaged/diag/` and access the diagnostic report.

What to do next

Provide the generated report file to Cisco TAC.

Overview of the Diagnostic Self-Test Report

The technical support utility creates a self-test report containing the summary of the configuration information, logs and diagnostic data that will help TAC in troubleshooting and resolving a technical issue.

The self-test reports are generated in `.txt` and `.bin` formats.

The following list provides the configuration information and log details that are available in the diagnostic self-test report:

- Drive Slot ID

- Drive self-test result
- Vendor name
- Manufacture Part number
- Serial Number
- Firmware revision
- Manufacture date
- Build date
- Self-Monitoring, Analysis, and Reporting Technology (SMART) monitoring system values
- Temperature reading
- Power-on hours
- Verify errors
- Non medium errors
- Protocol errors
- Power transitions
- Background media scan
- Read/Write error recovery

Note

- The values in the self-test report are in hexadecimal number format. You must convert the values to decimal number format.
- You can view the drive-specific details like ID, vendor in the section **Diagnostic Summary** at the end of the self-test report.

Sample Diagnostic File Report Format

The below sample displays the format of a sample diagnostic file report for SATA drives.

```
------------------------------------------------
            DRIVE DIAGNOSTIC REPORT
------------------------------------------------
    DIAG TIME STAMP := Thu Feb 24 04:43:01 2022

------------------------------------------------------------------------
  READ IDENTIFY DEVICE :0xec : 512 Bytes
------------------------------------------------------------------------
Vendor  Id         :  ATA
Product Id         :  INTEL SSDSC2KG960G8K
Firmware revision  :  XCV1CS04
Unit serial number :  BTYG817308KB960CGN
------------------------------------------------------------------------
  READ SMART ATTRIBUTES :0xd0 : 512 Bytes
------------------------------------------------------------------------
Self test status                       : 0 ( Self test completed without error )
```

```
Short self test rec poll time           : 1 (mins)
Extended self test rec poll time        : 2 (mins)
Conveyance self test rec poll time      : 2 (mins)
Offline data collection capability      : 121
                        Abort/restart offline by host not supported
                       Offline read scanning supported
                       Short and extended self-test supported
                       Conveyance self-test supported
                       Selective self-test supported

Offline data collection status         : 2 ( Offline data collection activity was completed
 without error )
Total time Offline data collection      : 2 (secs)
Smart capability                        : 3 ( Smart save enabled, Smart attribute autosave
 enabled )
Error log capability                    : 1 ( Error logging supported )
------------------------------------------------------------------------
  READ SMART THRESHOLDS :0xd1 : 512 Bytes
------------------------------------------------------------------------
------------------------------------------------------------------------
                     SMART ATTRIBUTES SUMMARY
------------------------------------------------------------------------
ID#               ATTRIBUTE_NAME                FLAGS   VALUE    WORST  THRESH  RAW_VALUE
-------------------------------------------------------------------------------------------
5         Reallocate Sector Count               0x32    100      100    0       0
9         Power On Hours                        0x32    100      100    0       4318
12        Power Cycle Count                     0x32    100      100    0       1756
171       Program Fail Count                    0x32    100      100    0       0
172       Erase Fail Count                      0x32    100      100    0       0
184       End To End Data Path Error Count      0x33    100      100    90      0
187       Uncorrectable Error Count             0x32    100      100    0       0
194       Operating Temperature                 0x22    100      100    0       36
199       CRC Error Count                       0x3e    100      100    0       0
232       Reserved Capacity Consumed            0x33    100      100    10      0
233       Percentage Life Left                  0x32    98       98     0       98
233       Wear Status In Days                   0x32    98       98     0       1764
-------------------------------------------------------
                DIAGNOSTIC SUMMARY
-------------------------------------------------------
 Date of drive diag test  : Thu Feb 24 04:43:01 2022

 DST result (PASS/FAIL)   : PASS: Self test completed without error
 Drive slot id            : 102
 Drive Interface type     : SATA
 Drive Media type         : SSD
 Vendor                   : ATA
 Mfg Part Number          : INTEL SSDSC2KG960G8K
 Serial Number            : BTYG817308KB960CGN
 Firmware revision        : XCV1CS04
-------------------------------------------------------
```

The below sample displays the format of a sample diagnostic file report for SAS drives.

```
-------------------------------------------------
            DRIVE DIAGNOSTIC REPORT
-------------------------------------------------
    DIAG TIME STAMP := Tue Apr 12 14:43:54 2022

-------------------------------------------------
  INQUIRY EPVD0 PAGE:0x0 ( EVPD0 PAGE:0h) : 96 Bytes
-------------------------------------------------
Vendor  Id         : TOSHIBA
Product Id         : AL14SXB60EN
Firmware revision  : 5703
Unit serial number : X060A05HFJVF
```

```
-------------------------------------------------
 INQUIRY EPVD1 PAGE:0x0 ( SUPPORTED EPVD1 PAGES ) : 19 Bytes
-------------------------------------------------
Page 0x0
Page 0x80
Page 0x83
Page 0x86
Page 0x8a
Page 0x90
Page 0x91
Page 0xb1
-------------------------------------------------
  INQUIRY EPVD1 PAGE:0x83 : 76 Bytes
-------------------------------------------------
LUN(World Wide ID)                        := 0x5000039a780a1fad
Target Port Identifier(World Wide ID)     := 0x5000039a780a1fae
Relative Port Identifier                  := 0x1
Target Device Name(World Wide ID)         := 0x5000039a780a1fac
Target Device Name(World Wide ID) in ASCII := 5000039A780A1FAC
-------------------------------------------------
  INQUIRY EPVD1 PAGE:0x8a : 18 Bytes
-------------------------------------------------
Standby Z                        := 0x1
Standby Y                        := 0x1
Idle    A                        := 0x1
Idle    B                        := 0x1
Idle    C                        := 0x1
Stopped condition recovery time  := 0x3a98
Standby Z condition recovery time := 0x3a98
Standby Y condition recovery time := 0xfa0
Idle A condition recovery time   := 0x64
Idle B condition recovery time   := 0x4b0
Idle C condition recovery time   := 0xfa0
-------------------------------------------------
  INQUIRY EPVD1 PAGE:0xb1 : 64 Bytes
-------------------------------------------------
Medium rotation rate := 0x3a98
Nominal form factor  := 0x3
-----------------------------------------------------
  LOG SENSE PAGE:0x0 ( SUPPORTED PAGES) : 18 Bytes
-----------------------------------------------------
Page 0x0
Page 0x1
Page 0x2
Page 0x3
Page 0x5
Page 0x6
Page 0xd
Page 0xe
Page 0xf
Page 0x10
Page 0x15
Page 0x18
Page 0x1a
Page 0x2f
-----------------------------------------------------
 LOG SENSE PAGE:0x10 ( SELF TEST RESULTS ) : 404 Bytes
-----------------------------------------------------
Parameter code            : 0x1
General parameter data    : 0x3
Parameter len             : 0x10
Self test result          : 0x0 : Self test completed without error
Function code             : 0x1
Extended segment number   : 0x0 : No extended segment failures
```

```
First failure LBA          : 0xffffffffffffffff
Sense key                  : 0x0
Add Sense Code             : 0x0
Add Sense Code Qual        : 0x0
Vendor data                : 0x0
Timestamp( Power on hours) : 0x123e
------------------------------------------------------------
  LOG SENSE PAGE:0x2f ( SMART STATUS ) : 12 Bytes
------------------------------------------------------------
SMART sense code byte             := 0x0
SMART sense qualifier             := 0x0
Most recent temperature reading   := 0x1f
Vendor HDA temperature trip point := 0x0
------------------------------------------------------------
  LOG SENSE PAGE:0x2 ( WRITE ERROR COUNTERS ) : 88 Bytes
------------------------------------------------------------
errs_recovered_without_delay  := 0x10004
errs_recovered_with_delay     := 0x2000400000000
total_errors_recovered        := 0x1c8cbeba000006
times_recovery_invoked        := 0x0
total_bytes_written           := 0x0
count_hard_errors             := 0x0
------------------------------------------------------------
  LOG SENSE PAGE:0x3 ( READ ERROR COUNTERS ) : 88 Bytes
------------------------------------------------------------
errs_recovered_without_delay  := 0x10004
errs_recovered_with_delay     := 0x2000400000000
total_errors_recovered        := 0x6f0de26344000006
times_recovery_invoked        := 0x0
total_bytes_read              := 0x0
count_hard_errors             := 0x0
------------------------------------------------------------
  LOG SENSE PAGE:0x5 ( VERIFY ERROR COUNTERS ) : 88 Bytes
------------------------------------------------------------
errs_recovered_without_delay  := 0x10004
errs_recovered_with_delay     := 0x2000400000000
total_errors_recovered        := 0x6
times_recovery_invoked        := 0x0
total_bytes_verified          := 0x0
count_hard_errors             := 0x0
------------------------------------------------------------
  LOG SENSE PAGE:0x6 ( NON-MEDIUM ERROR COUNTERS ) : 16 Bytes
------------------------------------------------------------
error_count        := 0x4000000000
------------------------------------------------
  LOG SENSE PAGE:0xd ( TEMPERATURE INFO ) : 16 Bytes
------------------------------------------------
Temperature(celsius)     := 0x1f
Ref Temperature(celsius) := 0x41
------------------------------------------------
  LOG SENSE PAGE:0xe ( START STOP CYCLE INFO  ) : 56 Bytes
------------------------------------------------
Year of Manufacture                              := 2020
Week of Manufacture                              := 41
Accounting date year                             :=
Accounting date week                             :=
Specified cycle count over device lifetime       := c350
Accumulated start stop cycles                    := 46
Specified load unload count over device lifetime := 927c0
Accumulated load unload cycles                   := a84
------------------------------------------------
  LOG SENSE PAGE:0x1a ( POWER TRANSITION INFO ) : 52 Bytes
------------------------------------------------
Accumulated transitions to active state    := 5a83
```

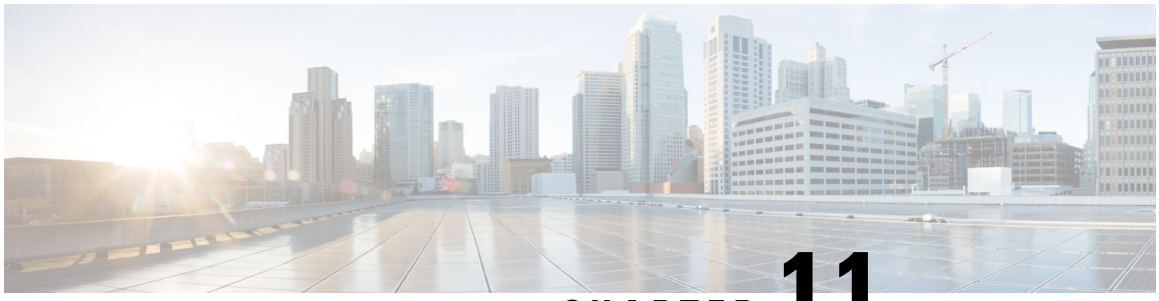
```
Accumulated transitions to idle A          := 5a47
Accumulated transitions to idle B          := a3e
Accumulated transitions to idle C          := 0
Accumulated transitions to standby Z       := 0
Accumulated transitions to standby Y       := 0
-------------------------------------------------
  LOG SENSE PAGE:0x15 ( BMS TEST RESULTS ) : 503 Bytes
-------------------------------------------------
 Power on mins                     := 0x446a3
 BMS status                        := 8 (BMS suspended until BMS interval timer expires)
 BMS num_bg_scans_performed        := 203
 BMS medium_scan_progress          := 0
 BMS num_bg_medium_scans_performed := 0

-----------------------------------------------------------
  MODE SENSE PAGE:0x0 ( VENDOR UNIQUE PARAMS ) : 14 Bytes
-----------------------------------------------------------
Merge Glist into Plist(MRG)              : 0x0
Report Recovered Non Data Errors(RRNDE)  : 0x0
Veggie mode(VGMDE)                       : 0x0
Command Aging Enable(CAEN)               : 0x0
Format Degraded Disable(FDD)             : 0x0
Overall Command Timer(OCT)               : 0x0
AV ERP Mode(AVERP)                       : 0x0
Ignore Reassigned LBA(IGRA)              : 0x0
First Format Enable(FFMT)                : 0x0
Disable Restore Reassign Target(DRRT)    : 0x0
Format Certification(FCERT)              : 0x0
Overall Command Timer(low byte)          : 0x8
Temperature Threshold                    : 0xdd
Command Aging Limit(Hi byte)             : 0x2f
Command Aging Limit(Low byte)            : 0xb0
Read reporting threshold                 : 0x0
Write reporting threshold                : 0x0
-------------------------------------------------------------------------
  MODE SENSE PAGE:0x1 ( READ/WRITE ERROR RECOVERY PARAMS) : 10 Bytes
-------------------------------------------------------------------------
Automatic Write Reallocation Enabled(AWRE)   : 0x0
Automatic Read Reallocation Enabled(ARRE)    : 0x0
Transfer Block (TB)                          : 0x0
Read Continous(RC)                           : 0x0
Enable Early Recovery(EER)                   : 0x0
Post Error(PER)                              : 0x0
Data Teriminate on Error(DTE)                : 0x0
Disable Correction (DCR)                     : 0x0
Read Retry Count                             : 0x10
Write Retry Count                            : 0x45
Read Retry Count                             : 0x10
Recovery Time Limit                          : 0x0
-----------------------------------------------------------
  MODE SENSE PAGE:0x3 ( FORMAT DEVICE PARAMS) : 22 Bytes
-----------------------------------------------------------
Tracks per Zone                       : 0x1000
Alternate sectors per Zone            : 0x0
Alternate Tracks per Zone             : 0x800
Alternate Tracks per Logical Unit     : 0xdd45
Sectors Per Track                     : 0xb02f
Data Bytes per Physical Sector        : 0x0
Interleave                            : 0x2
Track Skew Factor                     : 0x1683
Cylinder Skew Factor                  : 0xdc00
Support Soft Sector Formatting(SSEC)  : 0x0
Removable Fixed Disk(RMB)             : 0x0
Hard Sector Formatting(HSEC)          : 0x0
```

```
SURF                                  : 0x0
-----------------------------------------------------------------------
  MODE SENSE PAGE:0x7 ( VERIFY ERROR RECOVERY PARAMS) : 10 Bytes
-----------------------------------------------------------------------
Early Error Recovery    (EER)  : 0x0
Data Terminate on Error (DTE)  : 0x0
PER                            : 0x0
DCR                            : 0x0
Verify Retry Count             : 0x10
Verify Recovery Time Limit     : 0x0
-------------------------------------------------------------
  MODE SENSE PAGE:0x8 ( CACHING PARAMS ) : 18 Bytes
-------------------------------------------------------------
Initiator Control (IC)                  : 0x0
Abort Pre-fetch(ABPF)                   : 0x0
Caching Analysis Permitted(CAP)         : 0x0
Discontinuity(DISC)                     : 0x0
Size Enable(SIZE)                       : 0x0
Write Cache Enable(WCE)                 : 0x0
Multiplication Factor(MF)               : 0x0
Read Cache Disable(RCD)                 : 0x0
Disable Read Ahead(DRA)                 : 0x0
Force Sequential Write(FSW)             : 0x0
Logical Block Cache Segment Size(LBCSS) : 0x0
Write Retention Priority                : 0x0
Demand Read Retention Priority          : 0x1
Disable Prefetch Transfer Len           : 0x0
Minimum Pre-fetch                       : 0x800
Maximum Pre-fetch                       : 0xdd45
Maximum Pre-fetch Celing                : 0xb02f
Number of Cache Segments                : 0x0
Cache Segment Size                      : 0x2
Non Cache Segment Size                  : 0x12
-----------------------------------------------------------------------
  MODE SENSE PAGE:0xa ( CONTROL MODE PAGE PARAMS ) : 10 Bytes
-----------------------------------------------------------------------
Descriptor Sense Data (D_SENSE)           := 0x0
Disable Protection Info Check (DPICZ)     := 0x0
Queue Error Management(QERR)              := 0x0
Disable Queuing(DQUE)                     := 0x0
Application Tag Owner(ATO)                := 0x0
Application Tag Mode Page Enabled(ATMPE)  := 0x0
Reject Write Without Protection(RWWP)     := 0x0
Queue Algorithm Modifier                  := 0x1
Busy Timeout Period                       := 0xdd45
Extended Self Test Completion time        := 0x0
-------------------------------------------------------------
  MODE SENSE PAGE:0x1a ( POWER CONTROL ) : 38 Bytes
-------------------------------------------------------------
Standby_Y                 : 0x0
Standby_Z                 : 0x0
Idle_A                    : 0x0
Idle_B                    : 0x0
Idle_C                    : 0x0
Idle A Condition Timer    : 0x8000000
Idle B Condition Timer    : 0x20000
Idle C Condition Timer    : 0x640269a
Standy Y Condition Timer  : 0x14000000
Standy Z Condition Timer  : 0xb02fdd45
PM BG Predence            : 0x0
-----------------------------------------------------------------------
  MODE SENSE PAGE:0x1c ( INFORMATIONAL EXCEPTIONS CONTROL ) : 10 Bytes
-----------------------------------------------------------------------
Performance(PERF)                 : 0x0
```

```
Enable Background Function(EBF)    : 0x0
Enable Warning ASC(EWASC)           : 0x0
Disable Exception Control(DEXCPT)   : 0x0
TEST                                : 0x0
Enable Background Error(EBACKERR)   : 0x0
Log Errors(LOGERR)                  : 0x0
Method of Reporting                 : 0x0
Interval Timer                      : 0x8000000
Report Count                        : 0xdd45
-------------------------------------------------------------------------
                     SMART ATTRIBUTES SUMMARY
-------------------------------------------------------------------------
-----------------------------------------------------
               DIAGNOSTIC SUMMARY
-----------------------------------------------------
 Date of drive diag test  : Tue Apr 12 14:43:54 2022

 DST result (PASS/FAIL)   : PASS: Self test completed without error
 Drive slot id            : 1
 Drive Interface type     : SAS
 Drive Media type         : HDD
 Vendor                   : TOSHIBA
 Mfg Part Number          : AL14SXB60EN
 Serial Number            : X060A05HFJVF
 Firmware revision        : 5703
 Build date               :
 Mfg date                 : 2020/10
-----------------------------------------------------
```



CHAPTER 11

Configuring Communication Services

This chapter includes the following sections:

Enabling or Disabling TLS v1.2

Beginning with release 4.2(2a), Cisco IMC supports disabling TLS v1.2 and also customize the cipher values for both v1.2 and v1.3.

Before you begin

If **CC** (Common Criteria) under **Security Configuration** is enabled, you cannot disable TLS v1.2. Ensure that **CC** is disabled before you disable TLS v1.2.

Enabling or disabling TLS v1.2, restarts vKVM, Webserver, XML API, and Redfish API sessions.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	
Step 2	Server# **scope tls-config**	Enters the TLS configuration mode.
Step 3	Server/tls-config # **set tlsv2Enabled** *yes|no*	Enter **y** to confirm. Enables or Disables TLS v1.2.
Step 4	Server/tls-config* # **Commit**	Saves the changes.
Step 5	Server/tls-config # **set tlsv2CipherMode** *Custom|High|Low|Medium*	Selecting **High**, **Low**, or **Medium** automatically provides preset cipher values.

	Command or Action	Purpose
Step 6	(Optional) Server/tls-config # **set tlsv2CipherMode Custom** *Cipher_Value*	Enter a valid cipher value for **Custom** cipher mode. **Note** Refer https://www.openssl.org/docs/man1.0.2/man1/ciphers.html for OpenSSL equivalent cipher name for a specific cipher to be provided in custom cipher. If the cipher value entered is invalid or unsupported, then while saving the configuration, Cisco IMC automatically changes the **TLS v1.2 Cipher Mode** value to **High** and saves the configuration. You may see the following status: `TLS v1.2 Custom Cipher Status: Error: Configuring an invalid or unsupported TLS v1.2 Cipher List-'Cipher_Name'. Setting TLS v1.2 Cipher Mode to High.`
Step 7	Server/tls-config* # **Commit**	Saves the changes.

Example

Following example shows how to enable TLS v1.2 and set cipher mode to high:

```
Server# scope cimc
Server /cimc # scope tls-config
Server /cimc/tls-config # set tlsv2Enabled yes
Server /cimc/tls-config* # commit
Server /cimc/tls-config # set tlsv2CipherMode high
Server /cimc/tls-config* # commit
```

Following example shows how to enable TLS v1.2 and set cipher mode to custom:

```
server# scope cimc
server /cimc # scope tls-config
server /cimc/tls-config # set tlsv2CipherMode Custom
server /cimc/tls-config *# set tlsv2CipherList ECDHE-RSA-AES256-GCM-SHA384
server /cimc/tls-config *# commit
```

Enabling TLS Static Key Cipher

Perform this procedure to enable TLS static key cipher for Cisco UCS servers. TLS static key cipher is disabled by default.

Note You can enable this feature only through Cisco IMC CLI interface.

Static key cipher option is not applicable when **TLS v1.2 Cipher Mode** is set to **High** or **Custom**.

Static key cipher, if enabled, switches to NA automatically when **TLS v1.2 Cipher Mode** changes from **Medium**/**Low** to **High**/**Custom**.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /chassis # **scope tls-config**	Enters the TLS configuration mode.
Step 3	Server /chassis/tls-config # **show detail**	Displays the **TLS Static Cipher Enabled** status: `TLS Configuration : TLS Static Cipher Enabled: no`
Step 4	Server /chassis/tls-config # **set static-cipher-enabled yes**	Enables TLS cipher.
Step 5	Server /chassis/tls-config # **commit**	Following warning is displayed. `Warning: This will enable static ciphers in TLS. KVM, Webserver, XMLAPI and Redfish sessions will be disconnected. Do you wish to continue? [[Y]es/[N]o]`
Step 6	Type **y** and press **Enter**.	Commits the transaction to the system configuration.

Example

This example shows how to enable TLS static key cipher:

```
Server# scope cimc
Server /cimc # scope tls-config
Server /cimc/tls-config # show detail
TLS Configuration :
    TLS Static Cipher Enabled: no
Server /cimc/tls-config #
Server /cimc/tls-config # set static-cipher-enabled yes
Server /cimc/tls-config *# commit
Warning: This will enable static ciphers in TLS.
         KVM, Webserver, XMLAPI and Redfish sessions will be disconnected.
Do you wish to continue? [[Y]es/[N]o] y
Server /cimc/tls-config # show detail
TLS Configuration :
    TLS Static Cipher Enabled: yes
```

Configuring HTTP

Beginning with release 4.1(2b), Cisco IMC supports separate HTTPS and HTTP communication services. You can disable only HTTP services using this functionality.

This functionality is supported only on the following servers:

- Cisco UCS C220 M5
- Cisco UCS C240 M5
- Cisco UCS C480 M5
- Cisco UCS C480 ML M5
- Cisco UCS C240 SD M5
- Cisco UCS C125 M5
- Cisco UCS S3260 M4/M5

Note If **Redirect HTTP to HTTPS Enabled** was disabled in any release earlier than 4.1(2b), then after upgrading to release 4.1(2b) or later, **HTTP Enabled** value is set to **Disabled** by the system.

Before you begin

You must log in as a user with admin privileges to configure HTTP.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope http**	Enters the HTTP command mode.
Step 2	Server /http # **set https-enabled** {**yes** | **no**}	Enables the HTTPS services or disables both HTTPS and HTTP services on Cisco IMC.
Step 3	Server /http # **set http-enabled** {**yes** | **no**}	Enables or disables HTTP services on the Cisco IMC.
Step 4	Server /http # **set http-port** *number*	Sets the port to use for HTTP communication. The default is 80.
Step 5	Server /http # **set https-port** *number*	Sets the port to use for HTTPS communication. The default is 443.
Step 6	Server /http # **set http-redirect** {**yes** | **no**}	**Note** This option is applicable only when HTTP is enabled. Enables or disables the redirection of an HTTP request to HTTPS.

	Command or Action	Purpose
Step 7	Server /http # **set timeout** *seconds*	Sets the number of seconds to wait between HTTP requests before the Cisco IMC times out and terminates the session. Enter an integer between 60 and 10,800. The default is 1,800 seconds.
Step 8	Server /http # **commit**	Commits the transaction to the system configuration.

Example

This example configures HTTP for the Cisco IMC:

```
Server# scope http
Server /http # set https-enabled yes
Server /http # set http-enabled yes
Server /http *# set http-port 80
Server /http *# set https-port 443
Server /http *# set http-redirect yes
Server /http *# set timeout 1800
Server /http *# commit
Server /http # show
HTTP Port  HTTPS Port Timeout  Active Sessions HTTPS Enabled HTTP Redirected  HT
                               TP Enabled
---------- ---------- -------- --------------- ------- ---------------- --------
                               --------
80         443        1800     0               yes     yes              yes
Server /http #
```

Configuring SSH

Before you begin

You must log in as a user with admin privileges to configure SSH.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ssh**	Enters the SSH command mode.
Step 2	Server /ssh # **set enabled** {**yes** | **no**}	Enables or disables SSH on the Cisco IMC.
Step 3	Server /ssh # **set ssh-port** *number*	Sets the port to use for secure shell access. The default is 22.
Step 4	Server /ssh # **set timeout** *seconds*	Sets the number of seconds to wait before the system considers an SSH request to have timed out.

	Command or Action	Purpose
		Enter an integer between 60 and 10,800. The default is 300 seconds.
Step 5	Server /ssh # **commit**	Commits the transaction to the system configuration.
Step 6	Server /ssh # **show** [**detail**]	(Optional) Displays the SSH configuration.

Example

This example configures SSH for the Cisco IMC:

```
Server# scope ssh
Server /ssh # set enabled yes
Server /ssh *# set ssh-port 22
Server /ssh *# set timeout 600
Server /ssh *# commit
Server /ssh # show
SSH Port   Timeout  Active Sessions Enabled
---------- -------- --------------- -------
22         600      1               yes

Server /ssh #
```

Configuring XML API

XML API for Cisco IMC

The Cisco Cisco IMC XML application programming interface (API) is a programmatic interface to Cisco IMC for a C-Series Rack-Mount Server. The API accepts XML documents through HTTP or HTTPS.

For detailed information about the XML API, see *Cisco UCS Rack-Mount Servers Cisco IMC XML API Programmer's Guide*.

Enabling XML API

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope xmlapi**	Enters XML API command mode.
Step 2	Server /xmlapi # **set enabled** {**yes** | **no**}	Enables or disables XML API control of Cisco IMC.

	Command or Action	Purpose
Step 3	Server /xmlapi # **commit**	Commits the transaction to the system configuration.

Example

This example enables XML API control of Cisco IMC and commits the transaction:

```
Server# scope xmlapi
Server /xmlapi # set enabled yes
Server /xmlapi *# commit
Server /xmlapi #  show detail
XMLAPI Settings:
    Enabled: yes
    Active Sessions: 0
    Max Sessions: 4

Server /xmlapi #
```

Configuring IPMI

IPMI Over LAN

Intelligent Platform Management Interface (IPMI) defines the protocols for interfacing with a service processor embedded in a server platform. This service processor is called a Baseboard Management Controller (BMC) and resides on the server motherboard. The BMC links to a main processor and other on-board elements using a simple serial bus.

During normal operations, IPMI lets a server operating system obtain information about system health and control system hardware. For example, IPMI enables the monitoring of sensors, such as temperature, fan speeds and voltages, for proactive problem detection. If server temperature rises above specified levels, the server operating system can direct the BMC to increase fan speed or reduce processor speed to address the problem.

Configuring IPMI over LAN

Configure IPMI over LAN when you want to manage the Cisco IMC with IPMI messages.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope ipmi**	Enters the IPMI command mode.
Step 2	Server /ipmi # **set enabled** {**yes** | **no**}	Enables or disables IPMI access on this server.

	Command or Action	Purpose
Step 3	Server /ipmi # **set privilege-level** {**readonly** | **user** | **admin**}	Specifies the highest privilege level that can be assigned to an IPMI session on this server. This can be: • **readonly** — IPMI users can view information but cannot make any changes. If you select this option, IPMI users with the "Administrator", "Operator", or "User" user roles can only create read-only IPMI sessions, regardless of their other IPMI privileges. • **user** — IPMI users can perform some functions but cannot perform administrative tasks. If you select this option, IPMI users with the "Administrator" or "Operator" user role can create user and read-only sessions on this server. • **admin** — IPMI users can perform all available actions. If you select this option, IPMI users with the "Administrator" user role can create admin, user, and read-only sessions on this server.
Step 4	Server /ipmi # **set encryption-key** *key*	Sets the IPMI encryption key to use for IPMI communications. The key value must be 40 hexadecimal numbers.
Step 5	Server /ipmi # **commit**	Commits the transaction to the system configuration.
Step 6	Server /ipmi # **randomise-key**	Sets the IPMI encryption key to a random value. **Note** You can perform the Step 6 action instead of Steps 4 and 5.
Step 7	At the prompt, enter **y** to randomize the encryption key.	Sets the IPMI encryption key to a random value.

Example

This example configures IPMI over LAN for the Cisco IMC:

```
Server# scope ipmi
Server /ipmi # set enabled yes
Server /ipmi *# set privilege-level admin
Server /ipmi *# set encryption-key abcdef01234567890abcdef01234567890abcdef
Server /ipmi *# commit
Server /ipmi *# show
Enabled Encryption Key                          Privilege Level Limit
```

```
------- ---------------------------------------- ---------------------
yes     ABCDEF01234567890ABCDEF01234567890ABCDEF admin

Server /ipmi # randomise-key
This operation will change the IPMI Encryption Key to a random value
Continue?[y|N]y
Setting IPMI Encryption Key to a random value...

Server /ipmi # show
Enabled Encryption Key                           Privilege Level Limit
------- ---------------------------------------- ---------------------
yes     abcdef01234567890abcdef01234567890abcdef admin

Server /ipmi #
```

Configuring SNMP

SNMP

The Cisco UCS C-Series Rack-Mount Servers support the Simple Network Management Protocol (SNMP) for viewing server configuration and status and for sending fault and alert information by SNMP traps. For information on Management Information Base (MIB) files supported by Cisco IMC, see the *MIB Quick Reference for Cisco UCS* at this URL: http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/sw/mib/b-series/b_UCS_MIBRef.html.

Beginning with release 4.1(3b), Cisco IMC introduces enhanced authentication protocol for SNMP v3 version. SNMP v3 users cannot be added with **DES** security protocol.

Cisco IMC GUI displays a warning when you select an existing v3 version with unsupported security level, authentication type, or privacy type. You may select and modify the user details.

Configuring SNMP Properties

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope snmp**	Enters SNMP command mode.
Step 2	Server /snmp # **set enabled** {**yes** | **no**}	Enables or disables SNMP. **Note** SNMP must be enabled and saved before additional SNMP configuration commands are accepted.
Step 3	Server /snmp # **commit**	Commits the transaction to the system configuration.

	Command or Action	Purpose
Step 4	Server /snmp # **set enable-serial-num** {**yes** | **no**}	Prefixes the traps with the serial number of the server.
Step 5	Server /snmp # **set snmp-port** *port number*	Sets the port number on which the SNMP agent runs. You can choose a number within the range 1 to 65535. The default port number is 161. **Note** The port numbers that are reserved for system calls, such as 22,23,80,123,443,623,389,636,3268,3269 and 2068, cannot be used as an SNMP port.
Step 6	Server /snmp # **set community-str** *community*	Specifies the default SNMP v1 or v2c community name that Cisco IMC includes on any trap messages it sends to the SNMP host. The name can be up to 18 characters.
Step 7	Server /snmp # **set community-access**	This can be one of the following : Disabled, Limited, or Full.
Step 8	Server /snmp # **set trap-community-str**	Specifies the SNMP community group to which trap information should be sent. The name can be up to 18 characters
Step 9	Server /snmp # **set sys-contact** *contact*	Specifies the system contact person responsible for the SNMP implementation. The contact information can be up to 254 characters, such as an email address or a name and telephone number. To enter a value that contains spaces, you must enclose the entry with quotation marks.
Step 10	Server /snmp # **set sys-location** *location*	Specifies the location of the host on which the SNMP agent (server) runs. The location information can be up to 254 characters. To enter a value that contains spaces, you must enclose the entry with quotation marks.
Step 11	Server /snmp # **commit**	Commits the transaction to the system configuration.

Example

This example configures the SNMP properties and commits the transaction:

```
Server# scope snmp
Server /snmp # set enabled yes
Server /snmp *# commit
Server /snmp *# set enable-serial-num yes
Server /snmp *# set snmp-port 20000
```

```
Server /snmp *# set community-str cimcpublic
Server /snmp *# set community-access Full
Server /snmp *# set trap-community-str public
Server /snmp *# set sys-contact "User Name <username@example.com> +1-408-555-1212"
Server /snmp *# set sys-location "San Jose, California"
Server /snmp *# commit
Server /snmp #  show detail
SNMP Settings:
    SNMP Port: 20000
    System Contact: User Name <username@example.com> +1-408-555-1212
    System Location: San Jose, California
    SNMP Community: cimcpublic
    SNMP Trap Community: public
    SNMP Community access: Full
    Enabled: yes
    Serial Number Enabled: yes

Server /snmp #
```

What to do next

Configure SNMP trap settings as described in Configuring SNMP Trap Settings, on page 319.

Configuring SNMP Trap Settings

Before you begin

- You must log in with admin privileges to perform this task.
- SNMP must be enabled and saved before trap settings can be configured.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope snmp**	Enters the SNMP command mode.
Step 2	Server /snmp # **scope trap-destinations** *number*	Enters the SNMP trap destination command mode for the specified destination. Four SNMP trap destinations are available. The destination *number* is an integer between 1 and 15.
Step 3	Server /snmp/trap-destinations # **set enabled** {**yes** | **no**}	Enables or disables the SNMP trap destination.
Step 4	Server /snmp/trap-destinations # **set version** { | **2** | **3**}	Specify the desired SNMP version of the trap message. **Note** SNMPv3 traps will be delivered only to locations where the SNMPv3 user and key values are configured correctly.

	Command or Action	Purpose
Step 5	Server /snmp/trap-destinations # **set type** {**trap** | **inform**}	Specifies whether SNMP notification messages are sent as simple traps or as inform requests requiring acknowledgment by the receiver. **Note** The inform option can be chosen only for V2 users.
Step 6	Server /snmp/trap-destinations # **set user** *user*	**Note** While Configuring SNMP v3 version, you cannot use SNMP users with Encryption Method set as **DES**.
Step 7	Server /snmp/trap-destination # **set trap-addr** *trap destination address*	Specifies the trap destination address to which the trap information is sent. You can set an IPv4 or IPv6 address or a domain name as the trap destination. **Note** When IPv6 is enabled, the SNMP Trap destination source address can either be the SLAAC IPv6 address (if available) or a user assigned IPv6 address. Both these are valid SNMP IPv6 destination addresses that uniquely identify the server.
Step 8	Server /snmp/trap-destinations # **set trap-port** *trap destination port*	Sets the port number the server uses to communicate with the trap destination. You can choose a number within the range 1 to 65535.
Step 9	Server /snmp/trap-destination # **commit**	Commits the transaction to the system configuration.

Example

This example configures general SNMP trap settings and trap destination number 1 and commits the transaction:

```
Server# scope snmp
Server /snmp # Scope trap-destinations 1
Server /snmp/trap-destination *# set enabled yes
Server /snmp/trap-destination *#  set version 2
Server /snmp/trap-destination *# set type inform
Server /snmp/trap-destination *# set user user1
Server /snmp/trap-destination *# set trap-addr www.cisco.com
Server /snmp/trap-destination *# set trap-port 10000
Server /snmp/trap-destination *# commit
Server /snmp/trap-destination # show detail
Trap Destination 1:
    Enabled: yes
    SNMP version: 2
    Trap type: inform
```

```
    SNMP user: user1
    Trap Address: www.cisco.com
    Trap Port: 10000
    Delete Trap: no
Server /snmp/trap-destination #
```

Sending a Test SNMP Trap Message

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope snmp**	Enters the SNMP command mode.
Step 2	Server /snmp # **send-test-trap**	Sends an SNMP test trap to the configured SNMP trap destination that are enabled. **Note** The trap must be configured and enabled in order to send a test message.

Example

This example sends a test message to all the enabled SNMP trap destinations:

```
Server# scope snmp
Server /snmp #  send-test-trap
SNMP Test Trap sent to the destination.
Server /snmp #
```

Configuring SNMPv3 Users

Before you begin

- You must log in as a user with admin privileges to perform this task.
- SNMP must be enabled and saved before these configuration commands are accepted.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope snmp**	Enters the SNMP command mode.
Step 2	Server /snmp # **scope v3users** *number*	Enters the SNMPv3 users command mode for the specified user number.

	Command or Action	Purpose
Step 3	Server /snmp/v3users # **set v3add** {**yes** | **no**}	Adds or deletes an SNMPv3 user. This can be one of the following: • **yes**—This user is enabled as an SNMPv3 user and is allowed to access the SNMP OID tree. **Note** The security name and security level must also be configured at this time or the user addition will fail. • **no**—This user configuration is deleted.
Step 4	Server /snmp/v3users # **set v3security-name** *security-name*	Enter an SNMP username for this user.
Step 5	Server /snmp/v3users # **set v3security-level** {**noauthnopriv** | **authnopriv** | **authpriv**}	Select a security level for this user. This can be one of the following: • **noauthnopriv**—The user does not require an authorization or privacy password. • **authnopriv**—The user requires an authorization password but not a privacy password. If you select this option, you must configure an authentication key. • **authpriv**—The user requires both an authorization password and a privacy password. If you select this option, you must configure an authentication key and a private encryption key. **Note** For a v3 version, only authnopriv and authpriv security levels are available.
Step 6	Server /snmp/v3users # **set v3proto** {**MD5** | **SHA**}	**Note** For a v3 version, only SHA authentication methods are available. Select an authentication protocol for this user.
Step 7	Server /snmp/v3users # **set v3auth-key** *auth-key*	Enter an authorization password for this user.
Step 8	Server /snmp/v3users # **set v3priv-proto** {**DES** | **AES**}	**Note** For a v3 version, only AES option is available. Select an encryption protocol for this user.

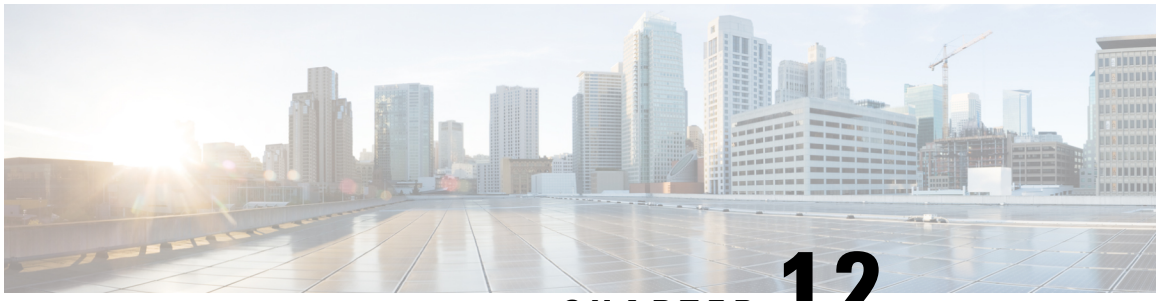
	Command or Action	Purpose
Step 9	Server /snmp/v3users # **set v3priv-auth-key** *priv-auth-key*	Enter a private encryption key (privacy password) for this user.
Step 10	Server /snmp/v3users # **commit**	Commits the transaction to the system configuration.

Example

This example configures SNMPv3 user number 2 and commits the transaction:

```
Server# scope snmp
Server /snmp # scope v3users 2
Server /snmp/v3users # set v3add yes
Server /snmp/v3users *# set v3security-name ucsSNMPV3user
Server /snmp/v3users *# set v3security-level authpriv
Server /snmp/v3users *# set v3proto SHA
Server /snmp/v3users *# set v3auth-key
Please enter v3auth-key:ex4mp1ek3y
Please confirm v3auth-key:ex4mp1ek3y
Server /snmp/v3users *# set v3priv-proto AES
Server /snmp/v3users *# set v3priv-auth-key
Please enter v3priv-auth-key:!1@2#3$4%5^6&7*8
Please confirm v3priv-auth-key:!1@2#3$4%5^6&7*8
Server /snmp/v3users *# commit
Settings are being applied ... allow a few minutes for the process to complete
Server /snmp/v3users # show detail
User 2:
    Add User: yes
    Security Name: ucsSNMPV3user
    Security Level: authpriv
    Auth Type: SHA
    Auth Key: ******
    Encryption: AES
    Private Key: ******

Server /snmp/v3users #
```



CHAPTER 12

Managing Certificates and Server Security

This chapter includes the following sections:

Managing the Server Certificate

Managing the Server Certificate

You can generate a certificate signing request (CSR) to obtain a new certificate, and you can upload the new certificate to Cisco IMC to replace the current server certificate. The server certificate may be signed either by a public Certificate Authority (CA), such as Verisign, or by your own certificate authority. The generated certificate key length is 2048 bits.

Note Before performing any of the following tasks in this chapter, ensure that the Cisco IMC time is set to the current time.

Procedure

Step 1 Generate the CSR from Cisco IMC.

Step 2 Submit the CSR file to a certificate authority that will issue and sign your certificate. If your organization generates its own self-signed certificates, you can use the CSR file to generate a self-signed certificate.

Step 3 Upload the new certificate to Cisco IMC.

Note The uploaded certificate must be created from a CSR generated by Cisco IMC. Do not upload a certificate that was not created by this method.

Generating a Certificate Signing Request

You can either generate a self-signed certificate manually using the **generate-csr** command, or automatically when you change the hostname. For information on changing the hostname and auto generation of the self-signed certificate, see the **Configuring Common Properties** section.

To manually generate a certificate signing request, follow these steps:

Before you begin

- You must log in as a user with admin privileges to configure certificates.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope certificate**	Enters the certificate command mode.
Step 2	Server /certificate # **generate-csr**	Launches a dialog for the generation of a certificate signing request (CSR).

You will be prompted to enter the following information for the certificate signing request:

Name	Description
Common Name field	The fully qualified name of the Cisco IMC. By default the CN of the servers appears in CXXX-YYYYYY format, where XXX is the model number and YYYYYY is the serial number of the server. When you upgrade to latest version, CN is retained as is.
Organization Name field	The organization requesting the certificate.
Organization Unit field	The organizational unit.
Locality field	The city or town in which the company requesting the certificate is headquartered.
State Name field	The state or province in which the company requesting the certificate is headquartered.
Country Code drop-down list	The country in which the company resides.
Email field	The email contact at the company.

After you have entered the requested information, the system will generate and display a certificate signing request in the console output. A CSR file will not be created, but you can copy the CSR information from the console output and paste the information into a text file.

Example

This example generates a certificate signing request:

```
Server# scope certificate
Server /certificate # generate-csr
Common Name (CN): test.example.com
Organization Name (O): Example, Inc.
Organization Unit (OU): Test Department
Locality (L): San Jose
StateName (S): CA
Country Code (CC): US
Email: user@example.com
Continue to generate CSR?[y|N]y


-----BEGIN CERTIFICATE REQUEST-----
MIIB/zCCAWgCAQAwgZkxCzAJBgNVBAYTAlVTMQswCQYDVQQIEwJDQTEVMBMGA1UE
BxMMU2FuIEpvc2UsIENBMRUwEwYDVQQKEwxFeGFtcGxlIEluYy4xEzARBgNVBAsT
ClRlc3QgR3JvdXAxGTAXBgNVBAMTEHRlc3QuZXhhbXBsZS5jb20xHzAdBgkqhkiG
9w0BCQEWEHVzZXJAZXhhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
AoGBAMZw4nTepNIDhVzb0j7Z2Je4xAG56zmSHRMQeOGHemdh66u2/XAoLx7YCcYU
ZgAMivyCsKgb/6CjQtsofvzxmC/eAehuK3/SINv7wd6Vv2pBt6ZpXgD4VBNKONDl
GMbkPayVlQjbG4MD2dx2+H8EH3LMtdZrgKvPxPTE+bF5wZVNAgMBAAGgJTAjBgkq
hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcmQwDQYJKoZIhvcNAQEFBQAD
gYEAG61CaJoJaVMhzCl903O6Mg51zq1zXcz75+VFj2I6rH9asckCld3mkOVx5gJU
Ptt5CVQpNgNLdvbDPSsXretysOhqHmp9+CLv8FDuy1CDYfuaLtvlWvfhevskV0j6
mK3Ku+YiORnv6DhxrOoqau8r/hyI/L43l7IPN1HhOi3oha4=
-----END CERTIFICATE REQUEST-----

Copy everything from "-----BEGIN ..."  to "END CERTIFICATE REQUEST-----",
paste to a file, send to your chosen CA for signing,
and finally upload the signed certificate via upload command.
              ---OR---
Continue to self sign CSR and overwrite the current certificate?
All HTTPS and SSH sessions will be disconnected. [y|N]N
```

What to do next

Perform one of the following tasks:

- If you do not want to obtain a certificate from a public certificate authority, and if your organization does not operate its own certificate authority, you can allow Cisco IMC to internally generate a self-signed certificate from the CSR and upload it immediately to the server. Type **y** after the final prompt in the example to perform this action.
- If your organization operates its own certificate server for generating self-signed certificates, copy the command output from "-----BEGIN ..." to "END CERTIFICATE REQUEST-----" and paste to a file named csr.txt. Input the CSR file to your certificate server to generate a self-signed certificate.
- If you will obtain a certificate from a public certificate authority, copy the command output from "-----BEGIN ..." to "END CERTIFICATE REQUEST-----" and paste to a file named csr.txt. Submit the CSR file to the certificate authority to obtain a signed certificate.
- Ensure that the certificate is of type **Server**.

If you did not use the first option, in which Cisco IMC internally generates and uploads a self-signed certificate, you must upload the new certificate using the **upload** command in certificate command mode.

Creating an Untrusted CA-Signed Certificate

As an alternative to using a public Certificate Authority (CA) to generate and sign a server certificate, you can operate your own CA and sign your own certificates. This section shows commands for creating a CA and generating a server certificate using the OpenSSL certificate server running on Linux. For detailed information about OpenSSL, see http://www.openssl.org.

Note These commands are to be entered on a Linux server with the OpenSSL package, not in the Cisco IMC.

Before you begin

- Obtain and install a certificate server software package on a server within your organization.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

	Command or Action	Purpose
Step 1	**openssl genrsa -out** *CA_keyfilename keysize* **Example:** `# openssl genrsa -out ca.key 2048`	This command generates an RSA private key that will be used by the CA. **Note** To allow the CA to access the key without user input, do not use the -des3 option for this command. The specified file name contains an RSA key of the specified key size.
Step 2	**openssl req -new -x509 -days** *numdays* **-key** *CA_keyfilename* **-out** *CA_certfilename* **Example:** `# openssl req -new -x509 -days 365 -key ca.key -out ca.crt`	This command generates a new self-signed certificate for the CA using the specified key. The certificate is valid for the specified period. The command prompts the user for additional certificate information. The certificate server is an active CA.
Step 3	**echo "nsCertType = server" > openssl.conf** **Example:** `# echo "nsCertType = server" > openssl.conf`	This command adds a line to the OpenSSL configuration file to designate the certificate as a server-only certificate. This designation is a defense against a man-in-the-middle attack, in which an authorized client attempts to impersonate the server. The OpenSSL configuration file openssl.conf contains the statement "nsCertType = server".
Step 4	**openssl x509 -req -days** *numdays* **-in** *CSR_filename* **-CA** *CA_certfilename* **-set_serial 04 -CAkey** *CA_keyfilename* **-out** *server_certfilename* **-extfile openssl.conf**	This command directs the CA to use your CSR file to generate a server certificate. Your server certificate is contained in the output file.

	Command or Action	Purpose
	Example: `# openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 04 -CAkey ca.key -out myserver05.crt -extfile openssl.conf`	
Step 5	**openssl x509 -noout -text -purpose -in <cert file>** **Example:** `openssl x509 -noout -text -purpose -in <cert file>`	Verifies if the generated certificate is of type **Server**. **Note** If the values of the fields **Server SSL** and **Netscape SSL** server are not yes, ensure that openssl.conf is configured to generate certificates of type server.
Step 6	(Optional) If the generated certificate does not have the correct validity dates, ensure the Cisco IMC time is set to the current time, and regenerate the certificate by repeating steps 1 through 5.	Certificate with the correct validity dates is created.

Example

This example shows how to create a CA and to generate a server certificate signed by the new CA. These commands are entered on a Linux server running OpenSSL.

```
# /usr/bin/openssl genrsa -out ca.key 2048
Generating RSA private key, 2048 bit long modulus
.............++++++
.....++++++
e is 65537 (0x10001)
# /usr/bin/openssl req -new -x509 -days 365 -key ca.key -out ca.crt
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [GB]:US
State or Province Name (full name) [Berkshire]:California
Locality Name (eg, city) [Newbury]:San Jose
Organization Name (eg, company) [My Company Ltd]:Example Incorporated
Organizational Unit Name (eg, section) []:Unit A
Common Name (eg, your name or your server's hostname) []:example.com
Email Address []:admin@example.com
# echo "nsCertType = server" > openssl.conf
# /usr/bin/openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 01
-CAkey ca.key -out server.crt -extfile openssl.conf
Signature ok
subject=/C=US/ST=California/L=San Jose/O=Example Inc./OU=Unit
A/CN=example.com/emailAddress=john@example.com
Getting CA Private Key
#
```

What to do next

Upload the new certificate to the Cisco IMC.

Uploading a Server Certificate

Before you begin

- You must log in as a user with admin privileges to upload a certificate.
- The certificate to be uploaded must be available as readable text. During the upload procedure, you will copy the certificate text and paste it into the CLI.
- Ensure that the generated certificate is of type **Server**.
- The following certificate formats are supported:
  - .crt
  - .cer
  - .pem

Note You must first generate a CSR using the Cisco IMC certificate management CSR generation procedure, and you must use that CSR to obtain the certificate for uploading. Do not upload a certificate that was not obtained by this method.

Note All current HTTPS and SSH sessions are disconnected when the new server certificate is uploaded.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope certificate**	Enters the certificate command mode.
Step 2	Server /certificate # **upload**	Launches a dialog for entering and uploading the new server certificate.

Copy the certificate text, paste it into the console when prompted, and type CTRL+D to upload the certificate.

Example

This example uploads a new certificate to the server:

```
Server# scope certificate
Server /certificate # upload
Please paste your certificate here, when finished, press CTRL+D.
-----BEGIN CERTIFICATE-----
MIIB/zCCAWgCAQAwgZkxCzAJBgNVBAYTAlVTMQswCQYDVQQIEwJDQTEVMBMGA1UE
```

```
BxMMU2FuIEpvc2UsIENBMRUwEwYDVQQKEwxFeGFtcGxlIEluYy4xEzARBgNVBAsT
ClRlc3QgR3JvdXAxGTAXBgNVBAMTEHRlc3QuZXhhbXBsZS5jb20xHzAdBgkqhkiG
9w0BCQEWEHVzZXJAZXhhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
AoGBAMZw4nTepNIDhVzb0j7Z2Je4xAG56zmSHRMQeOGHemdh66u2/XAoLx7YCcYU
ZgAMivyCsKgb/6CjQtsofvzxmC/eAehuK3/SINv7wd6Vv2pBt6ZpXgD4VBNKONDl
GMbkPayVlQjbG4MD2dx2+H8EH3LMtdZrgKvPxPTE+bF5wZVNAgMBAAGgJTAjBgkq
hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcmQwDQYJKoZIhvcNAQEFBQAD
gYEAG61CaJoJaVMhzCl903O6Mg51zq1zXcz75+VFj2I6rH9asckCld3mkOVx5gJU
Ptt5CVQpNgNLdvbDPSsXretysOhqHmp9+CLv8FDuy1CDYfuaLtvlWvfhevskV0j6
mK3Ku+YiORnv6DhxrOoqau8r/hyI/L43l7IPN1HhOi3oha4=
-----END CERTIFICATE-----
<CTRL+D>
```

Managing the External Certificate

Uploading an External Certificate

Before you begin

- You must log in as a user with admin privileges.
- The certificate file to be uploaded must reside on a locally accessible file system.
- The following certificate formats are supported:
  - .crt
  - .cer
  - .pem

Procedure

Step 1 Server# **scope certificate**

Enters Cisco IMC certificate command mode.

Step 2 Server /certificate # **upload-remote-external-certificate** *remote-protocol server_address path certificate_filename*

Specify the protocol to connect to the remote server. It can be of the following types:

- TFTP
- FTP
- SFTP
- SCP
- HTTP

Note If you enter the protocol as FTP, SCP or SFTP, you will be prompted to enter your username and password.

Along with the remote protocol, enter the filepath from where you want to upload the external certificate. After validating your remote server username and password, uploads the external certificate from the remote server.

Step 3 (Optional) Server /certificate #**upload-paste-external-certificate**

This is an additional option to upload the external certificate.

At the prompt, paste the content of the certificate and press CTRL+D.

Example

- This example uploads an external certificate from a remote server:

```
Server # scope certificate
Server /certificate # upload-remote-external-certificate scp 10.10.10.10
/home/user-xyz/ext-certif.cert
Server (RSA) key fingerprint is dd:b5:2b:07:ad:c0:30:b2:d5:6a:6a:78:80:85:93:b0
Do you wish to continue? [y/N]y
Username: user-xyz
Password:
External Certificate uploaded successfully
Server /certificate #
```

- This example uploads an external certificate using paste option:

```
Server # scope certificate
Server /certificate # upload-paste-external-certificate
Please paste your certificate here, when finished, press CTRL+D.
-----BEGIN CERTIFICATE-----
MIID8zCCAtugAwIBAgIBBDANBgkqhkiG9w0BAQwFADCBsDELMAkGA1UEBhMCSU4x
EjAQBgNVBAgMCUthcm5hdGFrYTESMBAGA1UEBwwJQmFuZ2Fsb3JlMSQwIgYDVQQK
DBtDaXNjbyBTeXN0ZW1zIEluZGlhIFB2dCBMdGQxGDAWBgNVBAsMD1VDUy1SYWNr
LVNlcnZlcjEWMBQGA1UEAwwNQ2lzY28gU3lzdGVtczEhMB8GCSqGSIb3DQEJARYS
c3JpdmF0c3NAY2lzY28uY29tMB4XDTIwMDExMzA4MTM1NVoXDTIxMDExMjA4MTM1
NVowgbExCzAJBgNVBAYTAklOMRIwEAYDVQQIEwlLYXJuYXRha2ExEjAQBgNVBAcT
CUJlbmdhbHVydTEkMCIGA1UEChMbQ2lzY28gU3lzdGVtcyBJbmRpYSBQdnQgTHRk
MRgwFgYDVQQLEw9VQ1MtUmFjay1TZXJ2ZXIxFjAUBgNVBAMTDUNpc2NvIFN5YXRl
bXMxIjAgBgkqhkiG9w0BCQEWE3NyaXZhdHNzQGNpc2NvLmNvbm0wggEiMA0GCSqG
SIb3DQEBAQUAA4IBDwAwggEKAoIBAQC6fcG9QISg6t1fi6U3+czmek2LvfhAxSGd
r2g7uMssgdTrBh59TEgZl5azal5zWaZm/1iO69D6/iabyoli8+MiQAtANnKxqWM3
STeih+3U2jOf39lIlZrAMpd4Ag/OtK5OcUtwUHM52ixm/UU61geVPZ5mJpPkzq3T
JNcv6TR90K8v0nEILm1lgoA96y64I9YN3ufSE4gm9VOS/sFughmAyYErsgvgoJpn
SQZUYxwdueBm4XV48QY7Mc7neUVYCNo7TcfBX7DC/N0BHv3hlKhGCCQ+5if63uOh
ja8ahdBoIPJqI0h70a92yBK5lv4dxSHexccw2D40kar4CzfVSqx9AgMBAAGjFTAT
MBEGCWCGSAGG+EIBAQQEAwIGQDANBgkqhkiG9w0BAQwFAAOCAQEAXdVTJevqNyI9
DEVibfjGXiKnJ2gEuYr8MdhpDeff/WrsLk7lxhOomVrDZ3iyCX99tNoCIvtOMgNs
jOu9OEjNtBulOlgwdQ9ugwp/JToohbD+2JHRK/MgrFpZmewH1oKKDNpOdayR6u9m
SNfvMNBgvxg+cMcbkif0pJU3XHlniPF6UVgj/LJDyBSGrULpnyDwTOq2UEF6g9Dc
6gOgRGYNHn7MRzigPJtyjbJsbxgPQ9C46I3Me9N2sJNaSLSVQhOxW7KonPI6USRs
e2iEAYaaCvThGE4HTwOMF9dJ24inU+SKTci1AFq2+V4I3P9v+aH5ao1H9T/p/AUP
ho6MuZ+wWg==
-----END CERTIFICATE-----
External Certificate pasted successfully.
Server /certificate #
```

What to do next

You must upload an external private key and then activate the external certificate.

Uploading an External Private Key

Before you begin

- You must log in as a user with admin privileges to upload an external private key.

Note
- Cisco IMC supports external private key size of 2048 bits and 4096 bits in Cisco UCS C-Series M4 servers.
- Cisco IMC supports external private key size of 2048 bits, 4096 bits and 8192 bits in Cisco UCS C-Series M5 servers.

Procedure

Step 1 Server# **scope certificate**

Enters Cisco IMC certificate command mode.

Step 2 Server /certificate # **upload-remote-external-private-key** *remote-protocol server_address path key_filename*

Specify the protocol to connect to the remote server. It can be one of the following:

- SFTP
- SCP

Along with the remote protocol, enter the filepath from where you want to upload the private key. After validating your remote server username and password, uploads the private key from the remote server.

Step 3 (Optional) Server /certificate #**upload-paste-external-private-key**

This is an additional option to upload the private key.

At the prompt, paste the content of the private key and press `CTRL+D`.

Note The maximum file size supported for upload:
- Up to 8 KB in Cisco UCS C-Series M5 servers
- Up to 4 KB in Cisco UCS C-Series M4 servers

Example

- This example uploads an external private key from a remote server:

```
Server # scope certificate
Server /certificate # upload-remote-external-private-key scp 10.10.10.10
/home/user-xyz/ext-pvt-key.pem
Server (RSA) key fingerprint is dd:b5:2b:07:ad:c0:30:b2:d5:6a:6a:78:80:85:93:b0
Do you wish to continue? [y/N]y
Username: user-xyz
Password:
External Private Key uploaded successfully
Server /certificate #
```

- This example uploads an external private key using paste option:

```
Server # scope certificate
Server /certificate # upload-paste-external-private-key
Please paste your private key here, when finished, press CTRL+D.
-----BEGIN RSA PRIVATE KEY-----
MIIEoQIBAAKCAQEAun3BvUCEoOrdX4ulN/nM5npNi734QMUhna9oO7jLLIHU6wYe
fUxIGZeWs2pec1mmZv9YjuvQ+v4mm8qJYvPjIkALQDZysaljN0k3ooft1Nozn9/Z
SJWawDKXeAIPzrSuTnFLcFBzOdosZv1FOtYHlT2eZiaT5M6t0yTXL+k0fdCvL9Jx
CC5tZYKAPesuuCPWDd7n0hOIJvVTkv7BboIZgMmBK7IL4KCaZ0kGVGMcHbngZuF1
ePEGOzHO53lFWAjaO03HwV+wwvzdAR794ZSoRggkPuYn+t7joY2vGoXQaCDyaiNI
e9GvdsgSuZb+HcUh3sXHMNg+NJGq+As31UqsfQIDAQABAoH/MSv3aW8ZiVRkCk1H
wvqajCqzR6VPT8SqmGknkpem+pVBDrcOUvtKB3Vwxt3FCaUZuw6YyxZig8t/YpSE
pRKpUN6SGNxCYZXIE0u635/3lafy9LSRFhJcO1EbnwjsIhSB4Sz+Nx7/QsHD82PU
XS8R0MfufACv/iSAsKuGEZvru0BWexD1ycojGTDRhGqWZGzsN6ncsbhQ0kItC0Pv
Ycx+9NeKfGwO+P9NwyWwaKW9M4nOyx3/MviMx9QRbNjgxjrdTj+A0aBUEzgdeZOf
WCJ/LlSbHmJ46HYZOILL4KDBbow/c7a1c2JcFWn01m33qNCRWdkb5H+1UZA+el7g
XnxDAoGBALzBdW26GGIZjj42Ayr9PAXFsO8n0MonqVHRlRTvxeuLOvHYdD9HzgkH
CFXA0IGmNk/1RuwEArx6U6ezSP6z7za9B63MskE7t3Vs28/OJg14KptRftGKUIbZ
NRf1o3J7VUf9mYk9u3pc/PJ8oVweFoml/SwRTDvZyUn5WRLq7zJ3AoGBAPztx24M
qj0Gcbqa7U5pUM+9bD9eGPxrGranFlDp79eobG+9kva286clp0Yr5XrNsQpx42Q6
RJLBVEwrB03D7X9UIOaAgyiaDbDMbIeAcRqOC9qpLDUXrpMVrdvVhtcPrKS8VAp4
hOle6zYKMShMXDExhH3EHaQ7aVOQRpt5GoGrAoGBAKBX1uE3TK9I9kRyrY4/QFXG
8d62++4+ct9GIlZ+uKq2w4PeVCHNZYDVsIboHDeGcmzJ901WutxRLe8vpbp4L6VY
PsWtNV+k0tu1daS5gim/ArKeMBTgYjerHCcWS5pcmr1k+KBVCIWRqG504L3X8V1M
3BwrNY9CGnP0lW40lK1RAoGASikuIIZ2JA6Pqjdi/WrD1yWjZ7EfgmOlIYk8cd0m
BgXMRbdAMDbUml3f/iNA1hEZqAZctjafhKhLH0o+if641GzGeM+VpYIGIaDO8awn
fbHIqASSgb6/4UCqCZtCPizKYkMWITvVPNgn/2BdqYM6RPJP9tBaIJ2K9IWJLm0D
6KECgYB9rmj/8YW7Rz1Isfg7JhK32p7LC+5xSSbpxQc8s/3PftZ5uQnsXXHoZJ0H
cfA4mbj4nttyFwX+kuUpQdG/ZhoJ/SDqE5lvzVM4stMRKFEJq8ksld+KGGzLFEkj
OotvpQor5dHHU46IIu9tv5ctrJImMjSM7wro26kW2EE3UzZMYw==
-----END RSA PRIVATE KEY-----
External Private Key pasted successfully.
Server /certificate #
```

What to do next

You must activate the external certificate.

Activating the External Certificate

- You must log in as a user with admin privileges.
- You can activate the external certificate only after the certificate and private key are uploaded.
- Activating the external certificate replaces the existing certificate and disconnects any active HTTPS or SSH sessions.

Procedure

Step 1 Server# **scope certificate**

Enters Cisco IMC certificate command mode.

Step 2 Server /certificate # **activate-external-certificate**

Activates the uploaded external certificate.

Example

This example activates the uploaded certificate:

```
Server # scope certificate
Server /certificate # activate-external-certificate
This operation will overwrite the current certificate with the uploaded external certificate.
All HTTPS and SSH sessions will be disconnected.
Continue?[y|N]y
A system reboot has been initiated.
Server /certificate #
```

SPDM Security - MCTP SPDM

SPDM Security

Cisco M6 Servers might contain mutable components that could provide vectors for attack against a device itself or use of a device to attack another device within the system. To defend against these attacks, SPDM (Security Protocol and Data Model) specification defines messages, data objects, and sequences for performing message exchanges between devices over a variety of transport and physical media. It orchestrates message exchanges between management controllers and end-point devices over Management Component Transport Protocol (MCTP).

Message exchanges include authentication of hardware identities accessing the controller. The SPDM enables access to low-level security capabilities and operations by specifying a managed level for device authentication and certificate management. This feature is supported on Cisco UCS C220 and 240 M6 Servers, in Cisco IMC, Release 4.2(1a).

Endpoint certificates and authorites (Root CA) certificates are listed on all user interfaces on the server. You can also upload the content of one or more external device certificates into Cisco IMC. Using a SPDM policy allows you to change or delete external Root CA certificate or settings as desired. You can also delete or replace the root CA certificate when no longer needed.

A SPDM security policy allows you to specify any one of the three security level settings, as listed below:

- Full Security:

  This is the highest MCTP security setting. When you select this setting, a fault is generated when any endpoint authentication failure is detected. A fault will also be generated if any of the endpoints do not support endpoint authentication.

- Partial Security:

  When you select this setting, a fault is generated when any endpoint authentication failure is detected. There will NOT be a fault generated when the endpoint doesn't support endpoint authentication. This is chosen as the default setting.

- No Security

  When you select this setting, no fault will be generated for any failure (endpoint measurement).

Configuring and Viewing the MCTP SPDM Fault Alert Setting

You can configure the MCTP SPDM fault alert setting.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis# **scope mctp**	Enters the MCTP SPDM security command mode.
Step 3	Server /chassis/mctp# **set fault-alert-setting** *Partial | Full | Disabled*	Configures the MCTP SPDM **fault-alert-setting** with the chosen value. This can be one of the following: • **Full** - If you select this option, then a fault is generated when there is any endpoint authentication failure. If you select this option, then a fault is generated when the endpoints do not support endpoint authentication. • **Partial** - The default option. If you select this option, then a fault is generated when there is any endpoint authentication failure. If you select this option, no fault is generated when the endpoints do not support endpoint authentication. • **Disabled** - If you select this option, no fault is generated for endpoint authentication failure.
Step 4	Server /chassis/mctp# **show detail**	Displays the configured MCTP SPDM fault alert setting.
Step 5	(Optional) Server /chassis/mctp# **exit**	Returns to the chassis command mode.
Step 6	(Optional) Server /chassis# **exit**	Returns to the server command mode.

	Command or Action	Purpose
Step 7	(Optional) Server# **scope fault**	Enters the fault command mode.
Step 8	(Optional) Server /chassis/fault# **show fault-entries**	Displays a log of all the faults. **Note** If the device attestation fails, a fault is generated. Run the steps 5 to 8 to view the relevant fault.

Example

This example configures the **fault-alert-setting** to **full**.

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp # set fault-alert-setting full
Server /chassis/mctp # show detail
Fault Alert Setting: Full
```

Uploading SPDM Root CA Certificates

You can upload the SPDM Root CA certificate by remotely uploading the Root CA certificate to the server. Optionally, you can also upload by pasting the certificate details (`.pem` format only).

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis# **scope mctp**	Enters the MCTP SPDM security command mode.
Step 3	Server /chassis/mctp# **upload-remote-external-certificate** *protocol server_address path/certificate_filename*	Specify the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** If you enter the protocol as FTP, SCP or SFTP, you will be prompted to enter your username and password. Along with the remote protocol, enter the filepath from where you want to upload the

	Command or Action	Purpose
		SPDM Root CA certificate. After validating your remote server username and password, uploads the SPDM Root CA certificate from the remote server.
Step 4	(Optional) Server /chassis/mctp# **show status**	Displays the certificate upload status.
Step 5	(Optional) Server /chassis/mctp# **upload-paste-external-certificate**	This is an additional option to upload the SPDM Root CA certificate (`.pem` format only). At the prompt, paste the content of the certificate and press `CTRL+D`.

Example

- This example uploads an SPDM Root CA certificate from a remote server:

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp# upload-remote-external-certificate scp 10.10.10.10
/home/user-xyz/ext-certif.cert
Server (RSA) key fingerprint is dd:b5:2b:07:ad:c0:30:b2:d5:6a:6a:78:80:85:93:b0
Do you wish to continue? [y/N]y
Username: user-xyz
Password:
External Certificate uploaded successfully
Server /chassis/mctp #
```

- This example uploads an SPDM Root certificate using paste option (`.pem` format only):

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp# upload-paste-external-certificate
Please paste your certificate here, when finished, press CTRL+D.
-----BEGIN CERTIFICATE-----
MIIDfDCCAmSgAwIBAgIQGKy1av1pthU6Y2yv2vrEoTANBgkqhkiG9w0BAQUFADBY
MQswCQYDVQQGEwJVUzEWMBQGA1UEChMNR2VvVHJ1c3QgSW5jLjExMC8GA1UEAxMo
R2VvVHJ1c3QgUHJpbWFyeSBDZXJ0aWZpY2F0aW9uIEF1dGhvcml0eTAeFw0wNjEx
MjcwMDAwMDBaFw0zNjA3MTYyMzU5NTlaMFgxCzAJBgNVBAYTAlVTMRYwFAYDVQQK
Ew1HZW9UcnVzdCBJbmMuMTEwLwYDVQQDEyhHZW9UcnVzdCBQcmltYXJ5IENlcnRp
ZmljYXRpb24gQXV0aG9yaXR5MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKC
mO9Y+pyEtzavwt+s0vQQBnBxNQIDAQABo0IwQDAPBgNVHRMBAf8EBTADAQH/MA4G
A1UdDwEB/wQEAwIBBjAdBgNVHQ4EFgQULNVQQZcVi/CPNmFbSvtr2ZnJM5IwDQYJ
6CePbJC/kRYkRj5KTs4rFtULUh38H2eiAkUxT87z+gOneZ1TatnaYzr4gNfTmeGl
4b7UVXGYNTq+k+qurUKykG/g/CFNNWMziUnWm07Kx+dOCQD32sfvmWKZd7aVIl6K
oKv0uHiYyjgZmclynnjNS6yvGaBzEi38wkG6gZHaFloxt/m0cYASSJlyc1pZU8Fj
UjPtp8nSOQJw+uCxQmYpqptR7TBUIhRf2asdweSU8Pj1K/fqynhG1riR/aYNKxoU
AT6A8EKglQdebc3MS6RFjasS6LPeWuWgfOgPIh1a6Vk=
-----END CERTIFICATE-----
External Certificate pasted successfully.
Server /chassis/mctp#
```

- This example shows the certificate upload progress and status:

```
Server# /chassis/mctp # show status
MCTP External Certificate Upload Status: NONE
MCTP External Certificate Upload Progress: 0
```

Viewing SPDM Authentication Status and SPDM Certificate Chain

You can view the SPDM authentication status and the SPDM certificate chain for a particular slot.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis# **scope mctp**	Enters the MCTP SPDM security command mode.
Step 3	Server /chassis/mctp# **spdm-status**	Displays the SPDM status.
Step 4	Server /chassis/mctp# **spdm-cert-chain** *Slot-ID*	Displays the SPDM certificate chain for a particular slot.

Example

This example displays the SPDM status, when in progress and on successful completion.

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp # spdm-status
Overall SPDM Status : in progress
Server /chassis/mctp # spdm-cert-chain MRAID
Certificate Chain Information
Error :  Failed to get cert chain due to on-going handshake ( Please try after some time)
Server /chassis/mctp # spdm-status
Overall SPDM Status : success
Slot ID         Status                    Name
------------------------------------------------------------------
MRAID           success                   N/A
Server /chassis/mctp # spdm-cert-chain MRAID
Certificate Chain Information
Slot ID                        :  MRAID
-------------------------------------
Depth                          :  0
Subject Country Code (C)       :  US
Subject State (ST)             :  Colorado
Subject City (L)               :  Colorado Springs
Subject Organization (O)       :  Broadcom Inc.
Subject Organization Unit(OU)  :  NA
Subject Common Name (CN)       :  Aero Device
Issuer Country Code (C)        :  US
Issuer State (ST)              :  Colorado
Issuer City (L)                :  NA
Issuer Organization (O)        :  Broadcom Inc.
Issuer Organization Unit(OU)   :  DCSG
Issuer Common Name (CN)        :  Aero Model
Valid From                     :  Oct 23 01:01:28 2019 GMT
Valid To                       :  Mar 10 01:01:28 2047 GMT
-------------------------------------------------------
Depth                          :  1
Subject Country Code (C)       :  US
Subject State (ST)             :  Colorado
Subject City (L)               :  Colorado Springs
Subject Organization (O)       :  Broadcom Inc.
```

```
Subject Organization Unit(OU) :  NA
Subject Common Name (CN)      :  Aero Model
Issuer Country Code (C)       :  US
Issuer State (ST)             :  Colorado
Issuer City (L)               :  Colorado Springs
Issuer Organization (O)       :  Broadcom Inc.
Issuer Organization Unit(OU)  :  NA
Issuer Common Name (CN)       :  NA
Valid From                    :  Oct 23 00:36:24 2019 GMT
Valid To                      :  Aug  3 00:36:24 2126 GMT
-------------------------------------------------------
```

Viewing the List of Certificates and Certificate Details

You can view the list of SPDM Root CA certificates that have been uploaded.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis# **scope mctp**	Enters the MCTP SPDM security command mode.
Step 3	Server /chassis/mctp# **cert-list**	Lists all the certificates.
Step 4	Server /chassis/mctp# **cert-details** *Certificate-ID*	Lists the details of the SPDM Root CA certificate with the certificate ID **1**

The following example shows the certificate ID, common name, issuer organization, and validity of two Broadcom certificates.

Example

The example below lists all the SDPM Root CA certificates.

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp# cert-list


Certificate ID          Common Name              Issuer Organization (O)          Valid To
--------------  ------------------------------ ------------------------------
------------------------
1101                    Broadcom                       Broadcom              Apr 8 10:36:14
 2021 GMT
1109                    Broadcom1                      Broadcom              Apr 8 10:36:15
 2021 GMT
```

The example below lists all the details of the SPDM Root CA certificate with the certificate ID **1**.

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp# cert-details 1
```

```
Certificate Information
Subject Country Code (C)      :  US
Subject State (ST)            :  Colorado
Subject City (L)              :  Colorado Springs
Subject Organization (O)      :  Broadcom Inc.
Subject Organization Unit(OU) :  NA
Subject Common Name (CN)      :  NA
Issuer Country Code (C)       :  US
Issuer State (ST)             :  Colorado
Issuer City (L)               :  Colorado Springs
Issuer Organization (O)       :  Broadcom Inc.
Issuer Organization Unit(OU)  :  NA
Issuer Common Name (CN)       :  NA
Valid From                    :  Oct 23 00:25:13 2019 GMT
Valid To                      :  Apr 29 00:25:13 2129 GMT
```

Deleting Certificates

You can delete any of the certificates that you have uploaded.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis# **scope mctp**	Enters the MCTP SPDM security command mode.
Step 3	Server /chassis/mctp# **delete-certificate** *Certificate-id*	Successfully deletes the uploaded SPDM Root CA Certificate with the certificate id **1**. If the certificate id corresponds to any internal certificate, the following message is displayed: `The Certificate ID corresponds to Internal certificate. Can’t delete Internal certificates.`

Example

This example deletes any of the chosen uploaded certificates.

```
Server# scope chassis
Server /chassis # scope mctp
Server /chassis/mctp # delete-certificate
Please provide Certificate ID to delete certificate
Server /chassis/mctp # delete-certificate 1
Successfully deleted the user uploaded MCTP Certificate
Server /chassis/mctp # delete-certificate 11
The Certificate ID corresponds to Internal certificate. Can’t delete Internal certificates.
```

Key Management Interoperability Protocol

Key Management Interoperability Protocol (KMIP) is a communication protocol that defines message formats to handle keys or classified data on a key management server. KMIP is an open standard and is supported by several vendors. Key management involves multiple interoperable implementations, so a KMIP client works effectively with any KMIP server.

Self-Encrypting Drives(SEDs) contain hardware that encrypts incoming data and decrypts outgoing data in realtime. A drive or media encryption key controls this function. However, the drives need to be locked in order to maintain security. A security key identifier and a security key (key encryption key) help achieve this goal. The key identifier provides a unique ID to the drive.

Different keys have different usage requirements. Currently, the responsibility of managing and tracking local keys lies primarily with the user, which could result in human error. The user needs to remember the different keys and their functions, which could prove to be a challenge. KMIP addresses this area of concern to manage the keys effectively without human involvement.

Enabling or Disabling KMIP

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server/kmip# **set enabled** {**yes** | **no**}	Enables or disables KMIP.
Step 3	Server/kmip*# **commit**	Commits the transaction to the system configuration.
Step 4	(Optional) Server/kmip # **show detail**	Displays the KMIP status.

Example

This example enables KMIP:

```
Server # scope kmip
Server /kmip # set enabled yes
Server /kmip *# commit
Server /kmip # show detail
  Enabled: yes
Server /kmip #
```

Creating a Client Private Key and Client Certificate for KMIP Configuration

As an alternative to using a public Certificate Authority (CA) to generate and sign a server certificate, you can operate your own CA and sign your own certificates. This section shows commands for creating a CA and generating a server certificate using the OpenSSL certificate server running on Linux. For detailed information about OpenSSL, see http://www.openssl.org.

Note These commands are to be entered on a Linux server with the OpenSSL package, not in the Cisco IMC.

Before you begin

- Obtain and install a certificate server software package on a server within your organization.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

	Command or Action	Purpose
Step 1	**openssl genrsa -out** *Client_Privatekeyfilename keysize* **Example:** `# openssl genrsa -out client_private.pem 2048`	This command generates a client private key that will be used to generate the client certificate. The specified file name contains an RSA key of the specified key size.
Step 2	**openssl req -new -x509 -days** *numdays* **-key** *Client_Privatekeyfilename* **-out** *Client_certfilename* **Example:** `# openssl req -new -x509 -key client_private.pem -out client.pem -days 365`	This command generates a new self-signed client certificate using the client private key obtained from the previous step. The certificate is valid for the specified period. The command prompts the user for additional certificate information. A new self-signed client certificate is created.
Step 3	Obtain the KMIP root CA certificate from the KMIP server.	Refer to the KMIP vendor documentation for details on obtaining the root CA certificate.

What to do next

Upload the new certificate to the Cisco IMC.

Downloading a KMIP Client Certificate

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server/kmip # **set enabled yes**	Enables KMIP.
Step 3	Server/kmip*# **commit**	Commits the transaction to the system configuration.
Step 4	Server/kmip # **scope kmip-client-certificate**	Enters the KMIP client certificate command mode.
Step 5	Server /kmip/kmip-client-certificate # **download-client-certificate** *remote-protocol IP Address KMIP client certificate file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 6	At the confirmation prompt, enter **y**.	This begins the download of the KMIP client certificate.
Step 7	(Optional) Server /kmip/kmip-client-certificate # **paste-client-certificate**	At the prompt, paste the content of the signed certificate and press **CTRL+D**.

	Command or Action	Purpose
		Note You can either use the remote server method from the previous steps or use the paste option to download the client certificate.

Example

This example downloads the KMIP client certificate:

```
Server # scope kmip
Server /kmip # set enabled yes
Server /kmip *# commit
Server /kmip # scope kmip-client-certificate
Server /kmip/kmip-client-certificate # show detail
    KMIP client certificate Available: 1
    Download client certificate Status: COMPLETED
    Export client certificate Status: NONE
Server /kmip/kmip-client-certificate #  download-client-certificate tftp 10.10.10.10
KmipCertificates/
svbu-xx-blr-dn1-13_ClientCert.pem
  You are going to overwrite the KMIP client certificate.
  Are you sure you want to proceed and overwrite the KMIP client certificate? [y|N]y
KMIP client certificate downloaded successfully

You can  either use the remote server method from the previous steps or use the paste option
 to download the client certificate.

Server /kmip/kmip-client-certificate # paste-client-certificate
Please paste your certificate here, when finished, press CTRL+D.
----BEGIN CERTIFICATE-----
MIIDTzCCAjegAwIBAgIQXuWPdBbyTb5M7/FT8aAjZTANBgkqhkiG9w0BAQUFADA6
MRMwEQYKCZImiZPyLGQBGRYDY29tMRMwEQYKCZImiZPyLGQBGRYDbmV3MQ4wDAYD
VQQDEwVuZXdDQTAeFw0xNTAzMTIxMTM5MTZaFw0yMDAzMTIxMTQ5MTVaMDoxEzAR
BgoJkiaJk/IsZAEZFgNjb20xEzARBgoJkiaJk/IsZAEZFgNuZXcxDjAMBgNVBAMT
BW5ld0NBMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAuPSAwHtk0IbM
Cd5tYdCa498bfX5Nfdgnq5zE+cGIOqv0dAkucofC/Y0+m7hne9H12aQ9SqTOK1+L
5IT3PVCczhasI7L7jAa+Oe5AOYw7Nsugw5Bd23n42BTVMMp7xsgr1mVfFoHXbBkQ
wiT9DieyImSyGiq5n0/8Iooc0iN5WPMVcHO2ysz76jR8p07xRqgYNCl6cbKAhWfZ
oYIwjhpZv0+SXEs8sEJZKDUhWIfOIpnDL7MoZYgl/kymgs/0hsW4L338jy303c7T
TwnG2/7BOMK0YFkEhqcjlkamGP7MKB2T9e/Cug6VkvFSkkim8M1eHx1gEnQxRtAG
YGp1n55iHQIDAQABo1EwTzALBgNVHQ8EBAMCAYYwDwYDVR0TAQH/BAUwAwEB/zAd
BgNVHQ4EFgQUl2F3U7cggzCuvRWliZWg91n5lccwEAYJKwYBBAGCNxUBBAMCAQAw
DQYJKoZIhvcNAQEFBQADggEBAJXoJJDDB3QH0q8VY8G/oC1SkAwyOE1dH0NdxFES
tNqQMTaRB2Sb2L/ZzAtfIaZ0Xab9Ig4MqNIMBbHDCwlzhD5gX42GPYWhA/GjRj3O
Q5KcRaEFomxp+twRrJ25ScVSczKJaRonWqKDVL9TwoSuDar3ObiS9ZC0KuBBf0vu
dzrJEYY/1zz7WVPZVyevhba3VSt4LW75URTqOKBSuKO+fvGyyNHWvMPFEIEnJAKt
7QmhO2fiWhD8CxaPFIByqkvrJ96no6oBxdEcjm9n1MttF/UJcpypSPH+46mRn5Az
SzgCBftYNjBPLcwbZGJkF/GpPwjd0TclMM08UOdqiTxR7Ts=
-----END CERTIFICATE-----
  You are going to overwrite the KMIP Client Certificate.
  Are you sure you want to proceed and overwrite the KMIP Client Certificate? [y|N]
y
Server /kmip/kmip-client-certificate #
```

Exporting a KMIP Client Certificate

Before you begin

- You must log in as a user with admin privileges to perform this task.
- You should have downloaded KMIP client certificate before you can export it.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server /kmip # **scope kmip-client-certificate**	Enters the KMIP client certificate command mode.
Step 3	Server /kmip/kmip-client-certificate # **export-client-certificate** *remote-protocol IP Adderss KMIP root CA Certificate file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. Initiates the export of the certificate.

	Command or Action	Purpose
Step 4	(Optional) Server /kmip/kmip-client-certificate # **show detail**	Displays the status of the certificate export.

Example

This example exports the KMIP client certificate:

```
Server # scope kmip
Server /kmip # scope kmip-client-certificate
Server /kmip/kmip-client-certificate #  export-client-certificate ftp 10.10.10.10
/TFTP_DIR/KmipCertificates
/svbu-xx-blr-dn1-13_ClientCert.pem_exported_ftp
Username: username
Password:
KMIP Client Certificate exported successfully
Server /kmip/kmip-client-certificate # show detail
    KMIP Client Certificate Available: 1
    Download KMIP Client Certificate Status: COMPLETED
    Export KMIP Client Certificate Status: COMPLETED
Server /kmip/kmip-client-certificate #
```

Deleting a KMIP Client Certificate

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server# /kmip **scope kmip-client-certificate**	Enters the KMIP client certificate binding command mode.
Step 3	Server /kmip/kmip-client-certificate # **delete-client-certificate**	Confirmation prompt appears.
Step 4	At the confirmation prompt, enter **y**.	This deletes the KMIP client certificate.

Example

This example deletes the KMIP client certificate:

```
Server # scope kmip
Server /kmip # scope kmip-client-certificate
Server /kmip/kmip-client-certificate # delete-client-certificate
  You are going to delete the KMIP Client Certificate.
  Are you sure you want to proceed and delete the KMIP Client Certificate? [y|N]y
 KMIP Client Certificate deleted successfully.
```

Downloading a KMIP Root CA Certificate

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server/kmip # **set enabled yes**	Enables KMIP.
Step 3	Server/kmip * # **commit**	Commits the transaction to the system configuration.
Step 4	Server /kmip # **scope kmip-root-ca-certificate**	Enters the KMIP root CA certificate command mode.
Step 5	Server /kmip/kmip-root-ca-certificate # **download-root-ca-certificate** *remote-protocol IP Address KMIP CA Certificate file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.

	Command or Action	Purpose
Step 6	At the confirmation prompt, enter **y**.	This begins the download of the KMIP root CA certificate.
Step 7	(Optional) Server /kmip/kmip-root-ca-certificate # **paste-root-ca-certificate**	At the prompt, paste the content of the root CA certificate and press **CTRL+D**. **Note** You can either use the remote server method from the previous steps or use the paste option to download the root CA certificate.

Example

This example downloads the KMIP root CA certificate:

```
Server # scope kmip
Server /kmip # set enabled yes
Server /kmip *# commit
Server /kmip # scope kmip-root-ca-certificate
Server /kmip/kmip-root-ca-certificate # show detail
    KMIP Root CA Certificate Available: 1
    Download Root CA Certificate Status: COMPLETED
    Export Root CA Certificate Status: NONE
Server /kmip/kmip-root-ca-certificate # download-root-ca-certificate tftp 10.10.10.10
KmipCertificates/
svbu-xx-blr-dn1-13_ServerCert.pem
  You are going to overwrite the KMIP Root CA Certificate.
  Are you sure you want to proceed and overwrite the KMIP Root CA Certificate? [y|N]y
KMIP Root CA Certificate downloaded successfully

You can  either use the remote server method from the previous steps or use the paste option
 to download the client certificate.

Server /kmip/kmip-root-ca-certificate # paste-root-ca-certificate
Please paste your certificate here, when finished, press CTRL+D.
----BEGIN CERTIFICATE-----
MIIDTzCCAjegAwIBAgIQXuWPdBbyTb5M7/FT8aAjZTANBgkqhkiG9w0BAQUFADA6
MRMwEQYKCZImiZPyLGQBGRYDY29tMRMwEQYKCZImiZPyLGQBGRYDbmV3MQ4wDAYD
VQQDEwVuZXdDQTAeFw0xNTAzMTIxMTM5MTZaFw0yMDAzMTIxMTQ5MTVaMDoxEzAR
BgoJkiaJk/IsZAEZFgNjb20xEzARBgoJkiaJk/IsZAEZFgNuZXcxDjAMBgNVBAMT
BW5ld0NBMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAuPSAwHtk0IbM
Cd5tYdCa498bfX5Nfdgnq5zE+cGIOqv0dAkucofC/Y0+m7hne9H12aQ9SqTOK1+L
5IT3PVCczhasI7L7jAa+Oe5AOYw7Nsugw5Bd23n42BTVMMp7xsgr1mVfFoHXbBkQ
wiT9DieyImSyGiq5n0/8Iooc0iN5WPMVcHO2ysz76jR8p07xRqgYNCl6cbKAhWfZ
oYIwjhpZv0+SXEs8sEJZKDUhWIfOIpnDL7MoZYgl/kymgs/0hsW4L338jy303c7T
TwnG2/7BOMK0YFkEhqcjlkamGP7MKB2T9e/Cug6VkvFSkkim8M1eHx1gEnQxRtAG
YGp1n55iHQIDAQABo1EwTzALBgNVHQ8EBAMCAYYwDwYDVR0TAQH/BAUwAwEB/zAd
BgNVHQ4EFgQUl2F3U7cggzCuvRWliZWg91n5lccwEAYJKwYBBAGCNxUBBAMCAQAw
DQYJKoZIhvcNAQEFBQADggEBAJXoJJDDB3QH0q8VY8G/oC1SkAwyOE1dH0NdxFES
tNqQMTaRB2Sb2L/ZzAtfIaZ0Xab9Ig4MqNIMBbHDCwlzhD5gX42GPYWhA/GjRj3O
Q5KcRaEFomxp+twRrJ25ScVSczKJaRonWqKDVL9TwoSuDar3ObiS9ZC0KuBBf0vu
dzrJEYY/1zz7WVPZVyevhba3VSt4LW75URTqOKBSuKO+fvGyyNHWvMPFEIEnJAKt
7QmhO2fiWhD8CxaPFIByqkvrJ96no6oBxdEcjm9n1MttF/UJcpypSPH+46mRn5Az
SzgCBftYNjBPLcwbZGJkF/GpPwjd0TclMM08UOdqiTxR7Ts=
-----END CERTIFICATE-----
  You are going to overwrite the KMIP Root CA Certificate.
  Are you sure you want to proceed and overwrite the KMIP Root CA Certificate? [y|N]
```

```
y
Server /kmip/kmip-root-ca-certificate #
```

Exporting a KMIP Root CA Certificate

Before you begin

- You must log in as a user with admin privileges to perform this task.
- You should have downloaded KMIP root CA certificate before you can export it.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope kmip**	Enters the KMIP command mode.
Step 2	Server /kmip # **scope kmip-root-ca-certificate**	Enters the KMIP root CA certificate command mode.
Step 3	Server /kmip/kmip-root-ca-certificate # **export-root-ca-certificate** *remote-protocol IP Adderss KMIP root CA Certificate file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP

	Command or Action	Purpose
		Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. Initiates the export of the certificate.
Step 4	(Optional) Server /kmip/kmip-root-ca-certificate # **show detail**	Displays the status of the certificate export.

Example

This example exports the KMIP root CA certificate:

```
Server # scope kmip
Server /kmip # scope kmip-root-ca-certificate
Server /kmip/kmip-root-ca-certificate #  export-root-ca-certificate tftp 10.10.10.10
KmipCertificates/
svbu-xx-blr-dn1-13_ServerCert.pem_exported_tftp
KMIP Root CA Certificate exported successfully
Server /kmip/kmip-root-ca-certificate # show detail
    KMIP Root CA Certificate Available: 1
    Download Root CA Certificate Status: COMPLETED
    Export Root CA Certificate Status: COMPLETED
Server /kmip/kmip-root-ca-certificate #
```

Deleting a KMIP Root CA Certificate

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server# /kmip **scope kmip-root-ca-certificate**	Enters the KMIP root CA certificate binding command mode.
Step 3	Server /kmip/kmip-root-ca-certificate # **delete-root-ca-certificate**	Confirmation prompt appears.
Step 4	At the confirmation prompt, enter **y**.	This deletes the KMIP root CA certificate.

Example

This example deletes the KMIP root CA certificate:

```
Server # scope kmip
Server /kmip # scope kmip-root-ca-certificate
Server /kmip/kmip-root-ca-certificate # delete-root-ca-certificate
  You are going to delete the KMIP root CA certificate.
  Are you sure you want to proceed and delete the KMIP root CA certificate? [y|N]y
 KMIP root CA certificate deleted successfully.
```

Downloading a KMIP Client Private Key

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server/kmip# **set enabled yes**	Enables KMIP.
Step 3	Server/kmip*# **commit**	Commits the transaction to the system configuration.
Step 4	Server/kmip # **scope kmip-client-private-key**	Enters the KMIP client private key command mode.
Step 5	Server /kmip/kmip-client-private-key # **download-client-pvt-key** *remote-protocol IP Address KMIP client private key file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP

	Command or Action	Purpose
		• HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 6	At the confirmation prompt, enter **y**.	This begins the download of the KMIP client private key.
Step 7	(Optional) Server /kmip/kmip-client-private-key # **paste-client-pvt-key**	At the prompt, paste the content of the private key and press **CTRL+D**. **Note** You can either use the remote server method from the previous steps or use the paste option to download the client private key.

Example

This example downloads the KMIP client private key:

```
Server # scope kmip
Server /kmip # set enabled yes
Server /kmip *# commit
Server /kmip # scope kmip-client-private-key
Server /kmip/kmip-client-private-key # show detail
    KMIP Client Private Key Available: 1
    Download Client Private Key Status: COMPLETED
    Export Client Private Key Status: NONE
Server /kmip/kmip-client-private-key #  download-client-pvt-key tftp 10.10.10.10
KmipCertificates/
svbu-xx-blr-dn1-13_ClientPvtKey.pem
  You are going to overwrite the KMIP Client Private Key.
```

```
  Are you sure you want to proceed and overwrite the KMIP Client Private Key? [y|N]y
KMIP Client Private Key downloaded successfully

You can  either use the remote server method from the previous steps or use the paste option
 to download the client certificate.

Server /kmip/kmip-client-private-key # paste-client-pvt-key
Please paste your client private here, when finished, press CTRL+D.
----BEGIN CERTIFICATE-----
MIIDTzCCAjegAwIBAgIQXuWPdBbyTb5M7/FT8aAjZTANBgkqhkiG9w0BAQUFADA6
MRMwEQYKCZImiZPyLGQBGRYDY29tMRMwEQYKCZImiZPyLGQBGRYDbmV3MQ4wDAYD
VQQDEwVuZXdDQTAeFw0xNTAzMTIxMTM5MTZaFw0yMDAzMTIxMTQ5MTVaMDoxEzAR
BgoJkiaJk/IsZAEZFgNjb20xEzARBgoJkiaJk/IsZAEZFgNuZXcxDjAMBgNVBAMT
BW5ld0NBMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAuPSAwHtk0IbM
Cd5tYdCa498bfX5Nfdgnq5zE+cGIOqv0dAkucofC/Y0+m7hne9H12aQ9SqTOK1+L
5IT3PVCczhasI7L7jAa+Oe5AOYw7Nsugw5Bd23n42BTVMMp7xsgr1mVfFoHXbBkQ
wiT9DieyImSyGiq5n0/8Iooc0iN5WPMVcHO2ysz76jR8p07xRqgYNCl6cbKAhWfZ
oYIwjhpZv0+SXEs8sEJZKDUhWIfOIpnDL7MoZYgl/kymgs/0hsW4L338jy303c7T
TwnG2/7BOMK0YFkEhqcjlkamGP7MKB2T9e/Cug6VkvFSkkim8M1eHx1gEnQxRtAG
YGp1n55iHQIDAQABo1EwTzALBgNVHQ8EBAMCAYYwDwYDVR0TAQH/BAUwAwEB/zAd
BgNVHQ4EFgQUl2F3U7cggzCuvRWliZWg91n5lccwEAYJKwYBBAGCNxUBBAMCAQAw
DQYJKoZIhvcNAQEFBQADggEBAJXoJJDDB3QH0q8VY8G/oC1SkAwyOE1dH0NdxFES
tNqQMTaRB2Sb2L/ZzAtfIaZ0Xab9Ig4MqNIMBbHDCwlzhD5gX42GPYWhA/GjRj3O
Q5KcRaEFomxp+twRrJ25ScVSczKJaRonWqKDVL9TwoSuDar3ObiS9ZC0KuBBf0vu
dzrJEYY/1zz7WVPZVyevhba3VSt4LW75URTqOKBSuKO+fvGyyNHWvMPFEIEnJAKt
7QmhO2fiWhD8CxaPFIByqkvrJ96no6oBxdEcjm9n1MttF/UJcpypSPH+46mRn5Az
SzgCBftYNjBPLcwbZGJkF/GpPwjd0TclMM08UOdqiTxR7Ts=
-----END CERTIFICATE-----
  You are going to overwrite the KMIP client private key.
  Are you sure you want to proceed and overwrite the KMIP Client Private Key? [y|N]
y
Server /kmip/kmip-client-private-key #
```

Exporting KMIP Client Private Key

Before you begin

- You must log in as a user with admin privileges to perform this task.
- You should have downloaded KMIP client private key before you can export it.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server /kmip # **scope kmip-client-private-key**	Enters the KMIP client private key command mode.
Step 3	Server /kmip/kmip-client-private-key # **export-client-pvt-key** *remote-protocol IP Adderss KMIP root CA Certificate file*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP

	Command or Action	Purpose
		• SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. Initiates the export of the certificate.
Step 4	(Optional) Server /kmip/kmip-client-private-key # **show detail**	Displays the status of the certificate export.

Example

This example exports the KMIP client private key:

```
Server # scope kmip
Server /kmip # scope kmip-client-private-key
Server /kmip/kmip-client-private-key #  export-client-pvt-key tftp 10.10.10.10
KmipCertificates
/svbu-xx-blr-dn1-13_ClientPvtKey.pem_exported_tftp
KMIP Client Private Key exported successfully
Server /kmip/kmip-client-private-key # show detail
    KMIP Client Private Key Available: 1
    Download Client Private Key Status: COMPLETED
    Export Client Private Key Status: COMPLETED
Server /kmip/kmip-client-private-key #
```

Deleting a KMIP Client Private Key

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server# /kmip **scope kmip-client-private-key**	Enters the KMIP client private key binding command mode.
Step 3	Server /kmip/kmip-client-private-key # **delete-client-pvt-key**	Confirmation prompt appears.
Step 4	At the confirmation prompt, enter **y**.	This deletes the KMIP client private key.

Example

This example deletes the KMIP client private key:

```
Server # scope kmip
Server /kmip # scope kmip-client-private-key
Server /kmip/kmip-client-private-key # delete-client-pvt-key
  You are going to delete the KMIP client private key.
  Are you sure you want to proceed and delete the KMIP client private key? [y|N]y
 KMIP client private key deleted successfully.
```

Configuring KMIP Server Login Credentials

This procedure shows you how to configure the login credentials for the KMIP server and make the KMIP server login credentials mandatory for message authentication.

Before you begin

You must log in as a user with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope kmip**	Enters the KMIP command mode.
Step 2	Server /kmip # **scope kmip-login**	Enters the KMIP login command mode.
Step 3	Server/kmip/kmip-login # **set login** *username*	Sets the KMIP server user name.
Step 4	Server/kmip/kmip-login * # **set password**	Enter the password at the prompt and enter the same password again at the confirm password prompt. This sets the KMIP server password.

	Command or Action	Purpose
Step 5	Server/kmip/kmip-login * # **set use-kmip-cred** {**yes** | **no**}	Decides whether the KMIP server login credentials should be mandatory for message authentication.
Step 6	Server/kmip/kmip-login * # **commit**	Commits the transaction to the system configuration.
Step 7	(Optional) Server/kmip/kmip-login # **restore**	Restores the KMIP settings to defaults.

Example

This example shows how to configure the KMIP server credentials:

```
Server /kmip # scope kmip-login
Server /kmip/kmip-login # set login username
Server /kmip/kmip-login *# set password
Please enter password:
Please confirm password:
Server /kmip/kmip-login *# set use-kmip-cred yes
Server /kmip/kmip-login *# commit
Server /kmip/kmip-login # show detail
    Use KMIP Login: yes
    Login name to KMIP server: username
    Password to KMIP server: ******

You can restore the KMIP server credentials to default settings by preforming the following
 step:

Server /kmip/kmip-login # restore
Are you sure you want to restore KMIP settings to defaults?
Please enter 'yes' to confirm: yes
Restored factory-default configuration.
Server /kmip/kmip-login # show detail
    Use KMIP Login: no
    Login name to KMIP server:
    Password to KMIP server: ******
Server /kmip/kmip-login #
```

Configuring KMIP Server Properties

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope kmip**	Enters the KMIP command mode.
Step 2	Server /kmip # **scope kmip-server** *server ID*	Enters the chosen KMIP server command mode.
Step 3	Server /kmip/kmip-server # **set** *kmip-port*	Sets the KMIP port.

	Command or Action	Purpose
Step 4	Server /kmip/kmip-server *# **set** *kmip-server*	Sets the KMIP server ID.
Step 5	Server /kmip/kmip-server # **set** *kmip-timeout*	Sets the KMIP server timeout.
Step 6	Server /kmip/kmip-server # **commit**	Commits the transaction to system configuration.
Step 7	(Optional) Server /kmip/kmip-server # **show detail**	Displays the KMIP server details.

Example

This example tests the KMIP server connection:

```
Server # scope kmip
Server /kmip # scope kmip-server 1
Server /kmip/kmip-server # set kmip-port  5696
Server /kmip/kmip-server * # set kmip-server  kmipserver.com
Server /kmip/kmip-server * # set kmip-timeout  10
Server /kmip/kmip-server * # commit
Server /kmip/kmip-server # show detail
Server number 1:
    Server domain name or IP address: kmipserver.com
    Port: 5696
    Timeout: 10
Server /kmip/kmip-server #
```

FIPS 140-2 Compliance in Cisco IMC

The Federal Information Processing Standard (FIPS) Publication 140-2, (FIPS PUB 140-2), is a U.S. government computer security standard used to approve cryptographic modules. Prior to the 3.1(3) release, the Rack Cisco IMC is not FIPS compliant as per NIST guideline. It does not follow FIPS 140-2 approved cryptographic algorithms and modules. With this release, all CIMC services will use the Cisco FIPS Object Module (FOM), which provides the FIPS 140-2 compliant cryptographic module.

The Cisco FIPS Object Module is a software library that provides cryptographic services to a vast array of Cisco's networking and collaboration products. The module provides FIPS 140 validated cryptographic algorithms and KDF functionality for services such as IPSec (IKE), SRTP, SSH, TLS, and SNMP.

Enabling Security Configuration

Before you begin

You must log in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope security-configuration**	Enters the security configuration command mode.
Step 3	Server /chassis/security-configuration # **set fips enabled** or **disabled**	If you choose enabled, it enables FIPS.
Step 4	Server /chassis/security-configuration* # **commit**	Enter **y** at the warning prompt to enable FIPS and commit the transaction to the system. **Note** When you switch the FIPS mode, it restarts the SSH, KVM, SNMP, webserver, XMLAPI, and redfish services.

	Command or Action	Purpose
		Note

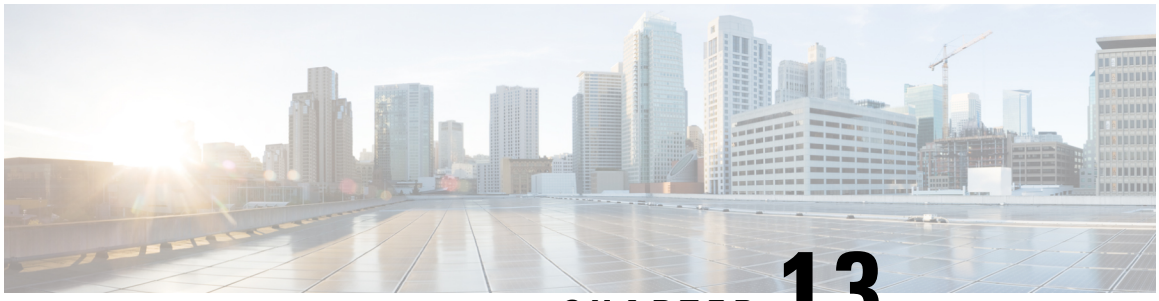
	Command or Action	Purpose
		When you enable FIPS, or both FIPS and CC, the following SNMP configuration changes occur: • The community string configuration for the SNMPv2 protocols, and the SNMPv3 users configured with **noAuthNoPriv** or **authNoPriv** security-level option are disabled. • The traps configured for SNMPv2 or SNMPv3 users with the **noAuthNoPriv** security-level option are disabled. • The **MD5** and **DES** Authentication type and Privacy type are disabled. **Note** DES privacy type is not applicable for release 4.1(3b) or later. However, if DES was configured in an earlier release before you upgraded to release 4.1(3b) or later, then you may see DES privacy type, which is disabled if FIPS is enabled. **Note** Both **MD5** and **DES** Authentication type and Privacy type are not supported in

	Command or Action	Purpose
		Cisco UCS M6 C-Series servers. • It also ensures only FIPS-compliant ciphers in SSH, webserver, and KVM connections.
Step 5	Server /chassis/security-configuration # **set cc enabled** or **disabled**	**Note** FIPS must be in enabled state to enable CC. If you choose enabled, it enables CC.
Step 6	Server /chassis/security-configuration* # **commit**	Enter **y** at the warning prompt to enable FIPS and commit the transaction to the system. **Note** When you switch the FIPS mode, it restarts the SSH, KVM, SNMP, webserver, XMLAPI, and redfish services. **Note** When you enable FIPS, or both FIPS and CC, the following SNMP configuration changes occur: • The community string configuration for the SNMPv2 protocols, and the SNMPv3 users configured with **noAuthNoPriv** or **authNoPriv** security-level option are disabled. • The traps configured for SNMPv2 or SNMPv3 users with the **noAuthNoPriv** security-level option are disabled. • The **MD5** and **DES** Authentication type and Privacy type are disabled. • It also ensures only FIPS-compliant ciphers in SSH, webserver, and KVM connections.

Example

This example shows how to view the controller information:

```
Server# scope cimc
Server /cimc # scope security-configuration
Server /cimc/security-configuration # set fips enabled
Enabling FIPS would
1. Disables support for SNMP V2 and V3 with No 'Auth/Priv' security level.
2. Disables support for 'MD5/DES' crypto algorithms in SNMP 'Auth/Priv' keys.
3. Ensures use of only FIPS-compliant ciphers in SSH, webserver and KVM connections.
Server /cimc/security-configuration* # commit
Server/cimc/security-configuration # set cc enabled
Enabling Common Criteria
Server /cimc/security-configuration* # commit
Warning: changing "fips" or "CC" will restart SSH, KVM, SNMP, webserver, XMLAPI and redfish
 services.
Do you wish to continue? [y/N] y
Server /cimc/security-configuration #
```



CHAPTER 13

Configuring Platform Event Filters

This chapter includes the following sections:

Platform Event Filters

A platform event filter (PEF) can trigger an action. For each PEF, you can choose the action to be taken (or take no action) when a platform event occurs.

Configuring Platform Event Filters

You can configure actions and alerts for the following platform event filters:

ID	Platform Event Filter
1	Temperature Critical Assert Filter
2	Voltage Critical Assert Filter
3	Current Assert Filter
4	Fan Critical Assert Filter
5	Processor Assert Filter
6	Power Supply Critical Assert Filter
7	Memory Critical Assert Filter

Procedure

	Command or Action	Purpose
Step 1	Server# **scope fault**	Enters the fault command mode.

	Command or Action	Purpose
Step 2	Server /fault # **scope pef** *id*	Enters the platform event filter command mode for the specified event. See the Platform Event Filter table for event ID numbers.
Step 3	Server /fault/pef # **set action** {**none** | **reboot** | **power-cycle** | **power-off**}	Selects the desired system action when this event occurs. The action can be one of the following: • **none** —No system action is taken. • **reboot** —The server is rebooted. • **power-cycle** —The server is power cycled. • **power-off** —The server is powered off.
Step 4	Server /fault/pef # **commit**	Commits the transaction to the system configuration.

Example

This example configures the platform event alert for an event:

```
Server# scope fault
Server /fault # scope pef 5
Server /fault/pef # set action reboot
Server /fault/pef *# commit
Server /fault/pef # show
Platform Event Filter Event                       Action
-------------------- ---------------------------- -----------
5                    Processor Assert Filter         reboot

Server /fault/pef #
```

Resetting Event Platform Filters

Procedure

	Command or Action	Purpose
Step 1	Server# **scope fault**	Enters the fault command mode.
Step 2	Server /fault # **set platform-event-enabled yes**	Enables platform event alerts.
Step 3	Server /fault # **commit**	Commits the transaction to the system configuration.
Step 4	Server /fault # **reset-event-filters**	Resets the platform event filters.

	Command or Action	Purpose
Step 5	Server /fault # **show pef**	Displays the latest platform event filters.

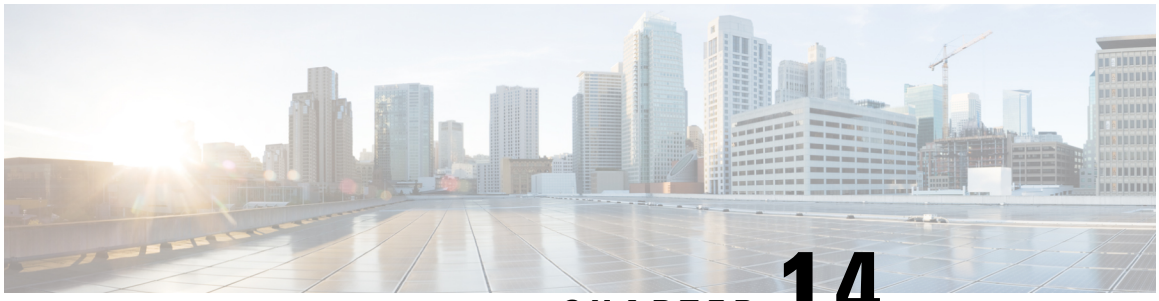
Example

The following example enables platform event alerts:

```
Server# scope fault
Server /fault # set platform-event-enabled yes
Server /fault *# commit
Server /fault # show
Platform Event Enabled
----------------------
   yes

Server /fault # reset-event-filters
Server /fault # show pef
Platform Event Filter   Event                              Action
---------------------- ---------------------------------- -----------
1                      Temperature Critical Assert Filter  none
2                      Voltage Critical Assert Filter      none
3                      Current Assert Filter               none
4                      Fan Critical Assert Filter          none
5                      Processor Assert Filter             none
6                      Power Supply Critical Assert Filter none
7                      Memory Critical Assert Filter       none

Server /fault #
```



CHAPTER 14

Cisco IMC Firmware Management

This chapter includes the following sections:

Overview of Firmware

C-Series servers use Cisco-certified firmware that is specific to the C-Series server model that you are using. You can download new releases of the firmware for all supported server models from Cisco.com.

⚠

Caution When you install the new BIOS firmware, it must be from the same software release as the Cisco IMC firmware that is running on the server. Do not install the new BIOS firmware until after you have activated the matching Cisco IMC firmware or the server will not boot.

To avoid potential problems, we strongly recommend that you use the Cisco Host Upgrade Utility (HUU), which upgrades the BIOS, Cisco IMC, and other firmware to compatible levels. For detailed information about this utility, see the *Cisco Host Upgrade Utility Guide* for the version of the HUU that goes with the Cisco IMC software release that you want to install. The HUU guides are available at the following URL: http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html.

If you want to update the firmware manually, you must update the Cisco IMC firmware first. The Cisco IMC firmware update process is divided into the following stages to minimize the amount of time that the server is offline:

- Installation—During this stage, Cisco IMC installs the selected Cisco IMC firmware in the nonactive, or backup, slot on the server.
- Activation—During this stage, Cisco IMC sets the nonactive firmware version as active, causing a disruption in service. When the server reboots, the firmware in the new active slot becomes the running version.

After you activate the Cisco IMC firmware, you can update the BIOS firmware. You must power off server during the entire BIOS update process, so the process is not divided into stages. Instead, you only need to enter one command and Cisco IMC installs and updates the BIOS firmware as quickly as possible. After the Cisco IMC finishes rebooting, the server can be powered on and returned to service.

Note

- You can either upgrade an older firmware version to a newer one, or downgrade a newer firmware version to an older one.
- This procedure only applies to the Cisco UCS C-Series server running on Stand-Alone mode. Contact Cisco Technical Assistance Center to upgrade firmware for UCS C-Series running on Cisco UCS Manager integrated mode.

Cisco IMC in a secure mode ensures that all the firmware images prior to loading and execution are digitally signed and are verified for authenticity and integrity to protect the device from running tampered software.

Obtaining Firmware from Cisco

Procedure

Step 1 Navigate to http://www.cisco.com.

Step 2 If you are not already logged in, click **Log In** at the top right-hand edge of the page and log in using your Cisco.com credentials.

Step 3 In the menu bar at the top, click **Support**.

Step 4 Click **All Downloads** in the roll down menu.

Step 5 If your server model is listed in the **Recently Used Products** list, click the server name. Otherwise, do the following:

a) In the left-hand box, click **Products**.
b) In the center box, click **Unified Computing and Servers**.
c) In the right-hand box, click **Cisco UCS C-Series Rack-Mount Standalone Server Software**.
d) In the right-hand box, click the server model whose software you want to download.

Step 6 Click the **Unified Computing System (UCS) Server Firmware** link.

Step 7 (Optional) Select a prior release from the menu bar on the left-hand side of the page.

Step 8 Click the **Download** button associated with the Cisco Host Upgrade Utility ISO for the selected release.

Step 9 Click **Accept License Agreement**.

Step 10 Save the ISO file to a local drive.

We recommend you upgrade the Cisco IMC and BIOS firmware on your server using this ISO file, which contains the Cisco Host Upgrade Utility. For detailed information about this utility, see the *Cisco Host Upgrade Utility Guide* for the version of the HUU that goes with the Cisco IMC software release that you want to install. The HUU guides are available at the following URL: http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html.

Step 11 (Optional) If you plan to install the firmware from a remote server, copy the BIOS installation CAP file and the Cisco IMC installation BIN file to the remote server you want to use.

The remote server can be one of the following:

- TFTP
- FTP
- SFTP
- SCP
- HTTP

The server must have read permission for the destination folder on the remote server.

Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type.

If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint.

The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.

What to do next

Use the Cisco Host Upgrade Utility to upgrade all firmware on the server or manually install the Cisco IMC firmware on the server.

Introduction to Cisco IMC Secure Boot

About Cisco IMC Secure Mode

Note Cisco IMC secure boot mode is enabled by default only on some Cisco UCS C-Series servers.

You can update Cisco IMC to the latest version using Host Upgrade Utility (HUU), web UI, or CLI. If you use HUU to upgrade Cisco IMC, you are prompted to enable secure boot mode. If you choose **Yes**, the system enters a secure mode and install the firmware twice. If you choose **No**, it enters a nonsecure mode. If you use

either the web UI or CLI to upgrade Cisco IMC, you must upgrade to version 2.0(x). After you boot the system with version 2.0(x), it boots in a nonsecure mode by default. You must enable secure mode. when you enable secure mode, you are automatically reinstalling the firmware. In the web UI, the secure mode option is available as a checkbox within the Cisco IMC firmware update page. In the CLI, you can enable the secure mode by using the **update-secure** command.

During the first upgrade to Cisco IMC version 2.0, a warning message might display stating that some of the features and applications are not installed correctly and a second upgrade is required. We recommend that you perform the second upgrade with or without the secure boot option enabled to correctly install the Cisco IMC firmware version 2.0(x) in a secure mode. After the installation is complete, you must activate the image. After you boot your system with the secure boot option enabled, Cisco IMC remains in secure mode and you cannot disable it later on. If you do not activate the image and reinstall any other firmware images, Cisco IMC may become unresponsive.

Warning After you install the firmware with the secure boot migration, you must activate the image before performing any other regular server-based tasks. If you do not activate this image, and if you reinstall any other firmware images, Cisco IMC might become unresponsive.

The secure boot is enabled only when the firmware installation is complete and you have activated the image.

Note When Cisco IMC is in a secure mode, it means the following:

- Only signed Cisco IMC firmware images can be installed and booted on the device.
- Secure Cisco IMC mode cannot be disabled later on.
- Any Cisco IMC versions can be upgraded to the latest version directly.
- Cisco IMC firmware versions cannot be installed or booted prior to version 1.5(3x).
- Cisco IMC version 2.0 cannot be downgraded to version 1.4(x), 1.5, 1.5(2x), or 1.5(1), 1.5(2) or to any nonsecure firmware version.

Supported Cisco IMC Version When Downgrading from the Latest Version

The following table lists the Cisco IMC versions in a secure mode that can be downgraded to prior versions.

From Cisco IMC Version	To Cisco IMC Version	Possibility
2.0(x)	Prior to 1.5(1)	Not possible
2.0(x)	1.5(3x) or later	Possible
2.0(x)	Prior to 1.5(3x)	Not possible

Note When the Cisco IMC verison you are using is in a nonsecure mode, you can downgrade Cisco IMC to any prior version.

Note If you use HUU to downgrade Cisco IMC versions prior to 1.5(4), you must first downgrade Cisco IMC and then downgrade other firmware. Activate the firmware and then downgrade the BIOS firmware.

Number of Updates Required for Cisco IMC Version 2.0(1)

Important This section is valid for Cisco IMC version 2.0(1) and prior releases.

Supported Cisco IMC Version When Upgrading to the Latest Version

The following table lists the number of updates required for Cisco IMC to correctly install all the applications of the latest version.

From Cisco IMC Version	To a Nonsecure Cisco IMC Version 2.0(x)	To a Secure Cisco IMC Version 2.0(x)
Prior to 1.5(2)	Double update	Double update
1.5(2)	Single update	Double update
1.5(3)	Single update	Double update
1.5(3x) or Later	Single update	Double update

Updating Cisco IMC in a Nonsecure Mode

Important This section is valid for Cisco IMC version 2.0(1) and prior releases.

You can upgrade Cisco IMC to the latest version in a nonsecure mode with all the latest feature and applications installed correctly. When you upgrade Cisco IMC to the latest version using the web UI or CLI, you might need to update the firmware twice manually depending upon the version you are using. See, Supported Cisco IMC Version when Upgrading to the Latest Version. If you use HUU to upgrade the Cisco IMC verison, it gets upgraded to the latest verison automatically.

Note If you are installing from a Cisco IMC version prior to 1.5(2x), the following message is displayed:

Warning "Some of the Cisco IMC firmware components are not installed properly! Please reinstall Cisco IMC firmware version 2.0(1) or higher to recover".

Note If you are in the middle of (HUU) update, we recommend that you reconnect any KVM current status of the update.

When Cisco IMC runs in a nonsecure mode, it implies the following:

- Any signed or unsigned Cisco firmware images can be installed on the device.
- Any Cisco IMC versions can be upgraded to the latest version directly.
- Cisco IMC firmware versions can be installed or booted to any prior versions.

Installing Cisco IMC Firmware

- If you are updating the Cisco IMC firmware through a front panel USB device, make sure that the Smart Access USB option has been enabled.
- If you start an update while an update is already in process, both updates will fail.

Before you begin

- Log in to the Cisco IMC as a user with admin privileges.
- Obtain the Cisco Host Upgrade Utility ISO file from Cisco.com and extract the firmware installation files as described in Obtaining Firmware from Cisco, on page 370.

Procedure

	Command or Action	Purpose
Step 1	server# **scope cimc**	Enters Cisco IMC command mode.
Step 2	server /cimc # **scope firmware**	Enters Cisco IMC firmware command mode.
Step 3	server /cimc /firmware # **update** *protocol IP Address path*	Specifies the protocol, IP address of the remote server, and the file path to the firmware file on the server. The protocol can be one of the following: • TFTP • FTP • SFTP • SCP

	Command or Action	Purpose
		• HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 4	server /cimc/firmware # **update usb** *path and firmware file name*	Updates the Cisco IMC firmware from the connected USB.
Step 5	(Optional) server /cimc/firmware # **update-secure** *protocol IP Address path*	Migrates to the Cisco IMC secure boot option. Migration implies the following: • You can install and boot only signed Cisco IMC firmware images on the server. • You cannot install and boot Cisco IMC firmware versions prior to 1.5(3x). • You cannot disable Secure Boot later on. **Important** This action is available for Cisco IMC 2.0(1) version only. For later versions, it is enabled by default.

	Command or Action	Purpose
		Warning After installing the firmware with the secure boot migration, you must activate the image before performing any other regular server-based tasks. If you do not activate this image, and if you reinstall any other firmware images, Cisco IMC might become unresponsive. For Cisco IMC version 2.0(1), the secure boot is enabled only when the firmware installation is complete and you have activated the image.
Step 6	(Optional) server /cimc /firmware # **show detail**	Displays the progress of the firmware update.

Example

This example shows how to update the Cisco IMC firmware and to migrate Cisco IMC from a nonsecure boot to secure boot for Cisco IMC version 2.0:

```
server# scope cimc
server /cimc # scope firmware
server /cimc /firmware # update ftp 192.0.20.34 //test/dnld-ucs-k9-bundle.1.0.2h.bin
Firmware update has started.
Please check the status using "show detail"
Server /cimc /firmware # update-secure tftp 1.1.1.1 /cimc-pkg.bin
Migrating to Cisco IMC Secure Boot option implies:
-You can install and boot only signed Cisco IMC firmware images on the server.
-You cannot install and boot Cisco IMC firmware versions prior than 1.5(3x).
-You cannot disable Secure Boot later on.

After installing the firmware with the Secure Boot migration, you must
activate the image before performing any other regular server-based tasks.
The Secure Boot option is enabled only when the firmware installation
is complete and you have activated the image.

Continue?[y|N]y
Update to Secure Boot selected, proceed with update.
Firmware update initialized.
Please check the status using "show detail".
server /cimc /firmware # show detail
Firmware Image Information:
    Update Stage: DOWNLOAD
    Update Progress: 5
    Current FW Version: 2.0(0.29)
    FW Image 1 Version: 2.0(0.28)
    FW Image 1 State: BACKUP INACTIVATED
    FW Image 2 Version: 2.0(0.29)
    FW Image 2 State: RUNNING ACTIVATED
    Boot-loader Version: 2.0(0.9).35
    Secure Boot: DISABLED

*+--------------------------------------------------------------------+
```

```
 + Some of the Cisco IMC firmware components are not installed properly! +
 + Please reinstall Cisco IMC firmware version 2.0 or higher to recover. +
 +-------------------------------------------------------------------------+
server /cimc /firmware #
```

This example shows how to update the Cisco IMC firmware:

What to do next

Activate the new firmware.

Activating Installed CIMC Firmware

Before you begin

Install the CIMC firmware on the server.

Important While the activation is in progress, do not:

- Reset, power off, or shut down the server.
- Reboot or reset CIMC.
- Activate any other firmware.
- Export technical support or configuration data.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope firmware**	Enters the firmware command mode.
Step 3	Server /cimc/firmware # **show detail**	Displays the available firmware images and status.
Step 4	Server /cimc/firmware # **activate** [**1** | **2**]	Activates the selected image. If no image number is specified, the server activates the currently inactive image.
Step 5	At the prompt, enter **y** to activate the selected firmware image.	The BMC reboots, terminating all CLI and GUI sessions until the reboot completes.
Step 6	(Optional) Log back into the CLI and repeat steps 1–3 to verify the activation.	

Example

This example activates firmware image 1 and then verifies the activation after the BMC reboots:

```
Server# scope cimc
Server /cimc # scope firmware
Server /cimc/firmware # show detail
Firmware Image Information:
    Update Stage: NONE
    Update Progress: 100
    Current FW Version: 1.3(3a)
    FW Image 1 Version: 1.4(3j)
    FW Image 1 State: BACKUP INACTIVATED
    FW Image 2 Version: 1.3(3a)
    FW Image 2 State: RUNNING ACTIVATED
    Boot-loader Version: 1.4(3.21).18

Server /cimc/firmware # activate 1
This operation will activate firmware 1 and reboot the BMC.
Continue?[y|N]y
.
.
 -- BMC reboot --
.
.
-- Log into CLI as Admin --

Server# scope cimc
Server /cimc # scope firmware
Server /cimc/firmware # show detail
Firmware Image Information:
    Update Stage: NONE
    Update Progress: 100
    Current FW Version: 1.4(3j)
    FW Image 1 Version: 1.4(3j)
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: 1.3(3a)
    FW Image 2 State: BACKUP INACTIVATED
    Boot-loader Version: 1.4(3.21).18
```

Installing BIOS Firmware

Note This procedure is not available on some servers. For other BIOS installation methods, see the *Cisco UCS C-Series Rack-Mount Server BIOS Upgrade Guide* available at the following URL: http://www.cisco.com/en/US/docs/unified_computing/ucs/c/sw/bios/b_Upgrading_BIOS_Firmware.html.

Before you begin

- Log in to the Cisco IMC as a user with admin privileges.
- Activate the Cisco IMC firmware that goes with the BIOS version you want to install, as described in Activating Installed CIMC Firmware, on page 377.

- Power off the server.

Note

- If you start an update while an update is already in process, both updates will fail.
- If you are updating the BIOS firmware through a front panel USB device, make sure that the Smart Access USB option has been enabled.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope firmware**	Enters the firmware command mode.
Step 3	Server /cimc/firmware # **show detail**	Displays the available firmware images and status.
Step 4	Make sure the firmware version shown in the **Current FW Version** field matches the BIOS firmware version you are installing.	**Important** If the Cisco IMC firmware version does not match, activate the Cisco IMC firmware before continuing with this procedure or the server will not boot. For details, see Activating Installed CIMC Firmware, on page 377.
Step 5	Server /cimc/firmware # **top**	Returns to the server root level.
Step 6	Server# **scope bios**	Enters the BIOS command mode.
Step 7	Server /bios # **update** *protocol IP Address path*	It specifies the following: • Protocol, it can be TFTP, FTP, SFTP, SCP, or HTTP.

	Command or Action	Purpose
		Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. • The IPv4 or IPv6 address or the host name of the remote server. • The file path to the BIOS firmware file on the remote server.
Step 8	Server /bios # **update usb** *path and firmware file name*	Updates the BIOS firmware from the connected USB.

Example

This example updates the BIOS firmware:

```
Server# scope bios
Server /bios# show detail
BIOS:
    BIOS Version: CxxMx.2.0.3.0.080720142114
    Backup BIOS Version: CxxMx.2.0.2.68.073120141827
    Boot Order: (none)
    Boot Override Priority:
    FW Update/Recovery Status: None, OK
    UEFI Secure Boot: disabled
    Configured Boot Mode: None
    Actual Boot Mode: Unknown
    Last Configured Boot Order Source: UNKNOWN
Server /bios # update ftp 10.10.10.10 //upgrade_bios_files/Cxx-BIOS-1-4-3j-0.CAP
```

```
 <CR>  Press Enter key
Firmware update has started.
Please check the status using "show detail"

For updating the BIOS using the front panel USB:

Server /bios # update usb CxxMx-BIOS-3-1-0-289.cap
 User Options:USB Path[Cxxmx-BIOS-3-1-0-289.cap]
<CR> Press Enter key
Firmware update has started.
Please check the status using "show detail"
Server /bios # show detail
BIOS:
BIOS Version: CxxMx.3.1.0.289.0530172308
Boot Order: (none)
FW Update Status: None, OK
UEFI Secure Boot: disabled
Configured Boot Mode: Legacy
Actual Boot Mode: Legacy
Last Configured Boot Order Source: BIOS
One time boot device: (none)
Server /bios #
```

Activating Installed BIOS Firmware

Note

- Starting with release 4.0(1), you can activate BIOS when the server is on. When you active the firmware while the server is on, activation will be in pending state and the firmware is activated after the next server reboot.
- **Activate BIOS Firmware** (**activate**) option is available only for some C-Series servers. For servers that do not have the this option, rebooting the server activates the installed BIOS firmware.

Before you begin

- Install the BIOS firmware on the server.

Important While the activation is in progress, do not:

- Reset, power off, or shut down the server.
- Reboot or reset Cisco IMC.
- Activate any other firmware.
- Export technical support or configuration data.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **show detail**	Displays the available firmware images and status.
Step 3	Server /bios # **activate**	Activates the currently inactive image.
Step 4	At the prompt, enter **y** to activate the selected firmware image.	

Example

This example activates firmware and then verifies the activation:

```
Server# scope bios
Server /bios # show detail
BIOS:
    BIOS Version: Cxxx.4.0.0.19.0528180450
    Backup BIOS Version: Cxxx.4.0.0.23.0612180433
    Boot Order: (none)
    FW Update Status: Done, OK
    UEFI Secure Boot: disabled
    Actual Boot Mode: Uefi
    Last Configured Boot Order Source: BIOS
    One time boot device: (none)
Server /bios # activateSystem is powered-on. This operation will activate backup BIOS version

"C125.4.0.0.23.0612180433" during next boot.
Continue?[y|N]y
Server# scope bios
Server /bios # show detail
BIOS:
    BIOS Version: Cxx.4.0.0.19.0528180450
    Backup BIOS Version: Cxxx.4.0.0.23.0612180433
    Boot Order: (none)
    FW Update Status: Done, Activation pending
    UEFI Secure Boot: disabled
    Actual Boot Mode: Uefi
    Last Configured Boot Order Source: BIOS
    One time boot device: (none)
Server /bios #
```

Canceling a Pending BIOS Activation

Before you begin

BIOS firmware must be in pending state.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **show detail**	Displays the available firmware images and status.
Step 3	Server /bios # **cancel-activate**	**Note** BIOS firmware must be in pending state. Cancel the BIOS activation that is pending.
Step 4	At the prompt, enter **y** to cancel activation.	

Example

This example cancels a pending BIOS firmware activation:

```
Server# scope bios
Server /bios # show detail
 BIOS:
    BIOS Version: Cxxx.4.0.0.19.0528180450
    Backup BIOS Version: Cxxx.4.0.0.23.0612180433
    Boot Order: (none)
    FW Update Status: Done, Activation pending
    UEFI Secure Boot: disabled
    Actual Boot Mode: Uefi
    Last Configured Boot Order Source: BIOS
    One time boot device: (none)
Server /bios # cancel-activate
This will cancel Pending BIOS activation[y|N]y
Server /bios # show detail
BIOS:
    BIOS Version: Cxxx.4.0.0.19.0528180450
    Backup BIOS Version: Cxxx.4.0.0.23.0612180433
    Boot Order: (none)
    FW Update Status: None, OK
    UEFI Secure Boot: disabled
    Actual Boot Mode: Uefi
    Last Configured Boot Order Source: BIOS
    One time boot device: (none)
Server /bios #
```

Installing VIC Firmware

Before you begin

- Log in as a user with admin privileges.
- If you are updating VIC firmware from a front panel USB device, make sure that the Smart USB option has been enabled and a valid VIC firmware is available in the USB device.
- If you start a new update when an update is already in process, both updates will fail.

Procedure

	Command or Action	Purpose
Step 1	server # **scope chassis**	Enters the chassis command mode
Step 2	server /chassis # **update-adapter-fw** *protocol remote server address image file path***activate|no-activate***PCI slot number*	The VIC firmware will be stored at the specified path and file name on a remote server at the specified IPv4 or IPv6 address or a hostname. The remote server could be one of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 3	server /chassis # **update-adapter-fw usb** *image file path* **activate|no-activate** *PCI slot number*	Provide the image file path in the USB device, and the VIC PCI slot number.
Step 4	(Optional) server /cimc # **show adapter detail**	Displays the progress of the firmware update.

Example

This example shows how to update the VIC firmware:

```
Server# scope chassis
Server /chassis # update-adapter-fw update ftp 10.10.10.10 cruzfw_new.bin activate MLOM
Adapter firmware update has started.
Please check the status using "show adapter detail".
You have chosen to automatically activate the new firmware
image.  Please restart your host after the update finish.
Server /chassis # show adapter detail
PCI Slot MLOM:
    Product Name: UCS VIC 1387
    Serial Number: FCH2102J8SU
    Product ID: UCSC-MLOM-C40Q-03
    Adapter Hardware Revision: 3
    Current FW Version: 4.1(3.143)
    VNTAG: Disabled
    FIP: Enabled
    LLDP: Enabled
    Configuration Pending: no
    Cisco IMC Management Enabled: yes
    VID: V03
    Vendor: Cisco Systems Inc
    Description:
    Bootloader Version: 4.1(2d)
    FW Image 1 Version: 4.1(3.143)
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: N/A
    FW Image 2 State: N/A
    FW Update Status: Update in progress
    FW Update Error: No error
    FW Update Stage: Erasing (12%)
    FW Update Overall Progress: 19%
Server /chassis #
```

Installing CMC Firmware from a Remote Server

Before you begin

- Log in to the Cisco IMC as a user with admin privileges.
- Obtain the Cisco Host Upgrade Utility ISO file from Cisco.com and extract the firmware installation files as described in Obtaining Firmware from Cisco, on page 370.
- This action is available only on some C-Series servers.

Note If you start an update while an update is already in process, both updates will fail.

Procedure

	Command or Action	Purpose
Step 1	server # **scope chassis**	Enters chassis command mode.

	Command or Action	Purpose
Step 2	server /chassis # **scope cmc** *1|2*	Enters CMC on the chosen SIOC controller command mode.
Step 3	server /chassis/cmc # **update** *protocol IP Address path*	Specifies the protocol, IP address of the remote server, and the file path to the firmware file on the server. The protocol can be one of the following: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 4	(Optional) server /chassis/cmc # **show detail**	Displays the progress of the firmware update.

Example

This example shows how to update the CMC firmware:

```
server # scope chassis
server /chassis # scope cmc 1
server /chassis/cmc # update  http 10.104.236.99 colusa_cmc.2.0.2a.img
CMC Firmware update initialized.
Please check the status using "show detail"
Server /chassis/cmc # show detail
```

```
Firmware Image Information:
    Name: CMC1
    Update Stage: DOWNLOAD
    Update Progress: 25
    Current FW Version: 2.0(2a)
    FW Image 1 Version: 2.0(2a)
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: 2.0(2a)
    FW Image 2 State: BACKUP INACTIVATED
server /chassis/cmc #
```

What to do next

Activate the new firmware.

Activating Installed CMC Firmware

Note CMCs are configured to have one in an active state while other acts as a backup, when you activate the backup CMC the previously active CMC changes to backup CMC activating the other.

Before you begin

Install the CMC firmware on the server.

Important While the activation is in progress, do not:

- Reset, power off, or shut down the server.
- Reboot or reset Cisco IMC.
- Activate any other firmware.
- Export technical support or configuration data.

- CMC-1 activation interrupts Cisco IMC network connectivity.

Procedure

	Command or Action	Purpose
Step 1	server # **scope chassis**	Enters chassis command mode.
Step 2	Server# **scope cmc***1*|*2*	Enters the CMC of the chosen SIOC slot command mode.
Step 3	Server /cmc # **activate**	Activates the selected image for the chosen CMC.

	Command or Action	Purpose
Step 4	At the prompt, enter **y** to activate the selected firmware image.	The CMC-1 reboots, terminating all CLI and GUI sessions until the reboot completes, but CMC-2 reboot will not affect any active sessions.

Example

This example activates CMC firmware on the SIOC slot 1:

```
Server # scope chassis
Server /chassis # scope cmc 1
Server /chassis/cmc #  activate
Warning: The CMC will be rebooted immediately to complete the activation.
The network may go down temporarily till CMC boots up again
Continue?[y|N]y
```

Installing SAS Expander Firmware from a Remote Server

Before you begin

- You must be logged in as admin to perform this action.
- Server must be powered on.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope sas-expander {1 | 2}**	Enters the SAS expander command mode.
Step 3	Server /chassis/sas-expander # **show detail**	Displays the available firmware images and status.
Step 4	Server /chassis/sas-expander # **update** *protocol IP_Address path*	It specifies the following: • Protocol, it can be TFTP, FTP, SFTP, SCP or HTTP.

	Command or Action	Purpose
		Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to. • The IPv4 or IPv6 address or the host name of the remote server. • The file path to the SAS expander firmware file on the remote server.

Example

This example updates the SAS expander firmware:

```
Server# scope chassis
Server /chassis # scope sas-expander 1
Server /chassis/sas-expander # show detail
Firmware Image Information:
    ID: 1
    Name: SASEXP1
    Update Stage: NONE
    Update Progress: 0
    Current FW Version: 65103900
    FW Image 1 Version: 65103900
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: 65103900
    FW Image 2 State: BACKUP INACTIVATED
Server /chassis/sas-expander # update ftp 192.0.20.34
//upgrade_sas_expander_files/sas-expander-2-0-12a.fw
 <CR>  Press Enter key
```

```
Firmware update has started.
Please check the status using "show detail"
Server /chassis/sas-expander #
```

Activating Installed SAS Expander Firmware

Before you begin

- You must be logged in as admin to perform this action.
- Install the firmware on the expander.
- Host must be powered on.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **scope sas-expander {1 | 2}**	Enters the SAS expander command mode.
Step 3	Server /chassis/sas-expander # **activate**	Activates the currently inactive image.
Step 4	At the prompt, enter **y** to activate the selected firmware image.	

Example

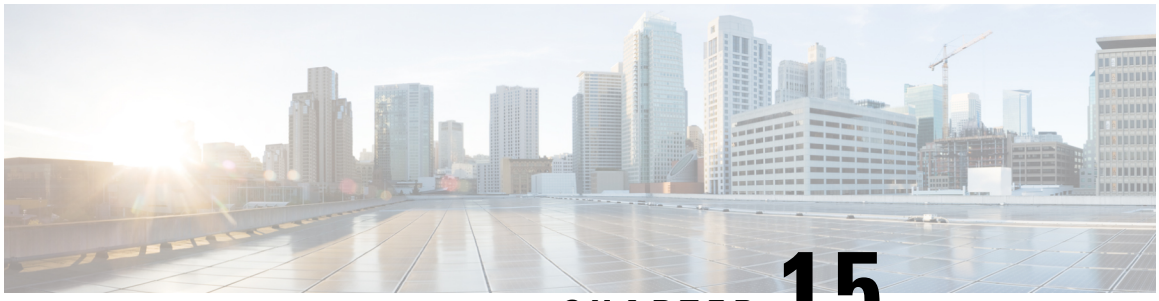
This example activates firmware and then verifies the activation:

```
Server# scope chassis
Server /chassis # scope sas-expander 1
Server /chassis/sas-expander # show detail
 ID: 1
    Name: SASEXP1
    Update Stage: NONE
    Update Progress: 0
    Current FW Version: 65103900
    FW Image 1 Version: 65103900
    FW Image 1 State: RUNNING INACTIVATED
    FW Image 2 Version: 65103900
    FW Image 2 State: BACKUP INACTIVATED

Server /chassis/sas-expander # activate
This operation will activate "65103900" after next host power off
Continue?[y|N] y

Server /chassis/sas-expander # show detail
ID: 1
    Name: SASEXP1
    Update Stage: NONE
    Update Progress: 0
    Current FW Version: 65103900
    FW Image 1 Version: 65103900
```

```
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: 65103900
    FW Image 2 State: BACKUP INACTIVATED
Server /chassis/sas-expander #
```



CHAPTER 15

Viewing Faults and Logs

This chapter includes the following sections:

Fault Summary

Viewing the Faults and Logs Summary

Procedure

	Command or Action	Purpose
Step 1	Server # **scope fault**	Enters fault command mode.
Step 2	Server # **show fault-entries**	Displays a log of all the faults.

Example

This example displays a summary of faults:

```
Server # scope fault
Server /fault # show fault-entries
Time                     Severity      Description
------------------------ ------------ -----------------
Sun Jun 27 04:00:52 2013  info         Storage Local disk 12 missing
Sat Jun 26 05:00:22 2013  warning      Power Supply redundancy is lost

Server /fault #
```

Fault History

Viewing the Fault History

Procedure

	Command or Action	Purpose
Step 1	Server # **scope fault**	Enters fault command mode.
Step 2	Server # **show fault-history**	Displays the faults' history.

Example

This example displays the faults' history:

```
Server # scope fault
Server /fault # show fault-history
Time                Severity  Source  Cause                 Description
------------------- --------- ------  --------------------
----------------------------------------
2014 Feb 6 23:24:49 error     %CIMC   PSU_REDUNDANCY-FAIL
"[F0743][major][psu-redundancy-fail].....
2014 Feb 6 23:24:49 error     %CIMC   EQUIPMENT_INOPERABLE
"[F0374][major][equipment-inoperable]...
2014 Feb 6 23:24:19 debug     %CIMC   2014 Feb 6 23        "24:19:7:%CIMC::: SEL INIT DONE"


Server /fault #
```

Cisco IMC Log

Viewing the Cisco IMC Log

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope log**	Enters the Cisco IMC log command mode.
Step 3	Server /cimc/log # **show entries** [**detail**]	Displays Cisco IMC events, including timestamp, the software module that logged the event, and a description of the event.

Example

This example displays the log of Cisco IMC events:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # show entries
Time                 Severity      Source           Description

------------------- ------------ --------------- ---------------------------------------

2012 Jan 30 05:20:45 Informational BMC:ciscoNET:961 " rpc_aim_callback_function_1_svc() -
result == SUCCESS, callbackData size: 600 "
2012 Jan 30 05:20:45 Informational BMC:ciscoNET:961 rpc_aim_callback_function_1_svc() -
returned from pFunctionCallback result:0
2012 Jan 30 05:20:45 Informational BMC:ciscoNET:961 " rpc_aim_callback_function_1_svc() -
szFunctionName:netGetCurrentIfConfig nSize:0 nMaxSize: 600 "
--More--

Server /cimc/log # show entries detail
Trace Log:
    Time: 2012 Jan 30 05:20:45
    Severity: Informational
    Source: BMC:ciscoNET:961
   Description: " rpc_aim_callback_function_1_svc() - result == SUCCESS, callbackData size:
 600 "
    Order: 0
Trace Log:
    Time: 2012 Jan 30 05:20:45
    Severity: Informational
    Source: BMC:ciscoNET:961
   Description: rpc_aim_callback_function_1_svc() - returned from pFunctionCallback result:0

    Order: 1
Trace Log:
    Time: 2012 Jan 30 05:20:45
    Severity: Informational
    Source: BMC:ciscoNET:961
   Description: " rpc_aim_callback_function_1_svc() - szFunctionName:netGetCurrentIfConfig
 nSize:0 nMaxSize: 600 "
    Order: 2
--More--

Server /cimc/log #
```

Clearing the Cisco IMC Log

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope log**	Enters the Cisco IMC log command mode.
Step 3	Server /cimc/log # **clear**	Clears the Cisco IMC log.

Example

The following example clears the log of Cisco IMC events:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # clear
```

Configuring the Cisco IMC Log Threshold

You can specify the lowest level of messages that will be included in the Cisco IMC log.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope log**	Enters the Cisco IMC log command mode.
Step 3	Server /cimc/log # **set local-syslog-severity** *level*	The severity *level* can be one of the following, in decreasing order of severity: • emergency • alert • critical • error • warning • notice • informational • debug **Note** Cisco IMC does not log any messages with a severity below the selected severity. For example, if you select **error**, then the Cisco IMC log will contain all messages with the severity Emergency, Alert, Critical, or Error. It will not show Warning, Notice, Informational, or Debug messages.
Step 4	Server /cimc/log # **commit**	Commits the transaction to the system configuration.

	Command or Action	Purpose
Step 5	(Optional) Server /cimc/log # **show local-syslog-severity**	Displays the configured severity level.

Example

This example shows how to configure the logging of messages with a minimum severity of Warning:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # set local-syslog-severity warning
Server /cimc/log *# commit
Server /cimc/log # show local-syslog-severity
    Local Syslog Severity: warning

Server /cimc/log #
```

Sending the Cisco IMC Log to a Remote Server

You can configure profiles for one or two remote syslog servers to receive Cisco IMC log entries.

Before you begin

- The remote syslog server must be configured to receive logs from a remote host.
- The remote syslog server must be configured to receive all types of logs, including authentication-related logs.
- The remote syslog server's firewall must be configured to allow syslog messages to reach the syslog server.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope log**	Enters the Cisco IMC log command mode.
Step 3	(Optional) Server /cimc/log # **set remote-syslog-severity** *level*	The severity *level* can be one of the following, in decreasing order of severity: • emergency • alert • critical • error • warning • notice

	Command or Action	Purpose
		• informational • debug **Note** Cisco IMC does not remotely log any messages with a severity below the selected severity. For example, if you select **error**, then the remote syslog server will receive all Cisco IMC log messages with the severity Emergency, Alert, Critical, or Error. It will not show Warning, Notice, Informational, or Debug messages.
Step 4	Server /cimc/log # **scope server** {**1** | **2**}	Selects one of the two remote syslog server profiles and enters the command mode for configuring the profile.
Step 5	Server /cimc/log/server # **set server-ip** *ipv4 or ipv6 address or domain name*	Specifies the remote syslog server address. **Note** You can set an IPv4 or IPv6 address or a domain name as the remote server address.
Step 6	Server /cimc/log/server # **set server-port** *port number*	Sets the destination port number of the remote syslog server.
Step 7	Server /cimc/log/server # **set enabled** {**yes** | **no**}	Enables the sending of Cisco IMC log entries to this syslog server.
Step 8	Server /cimc/log/server # **commit**	Commits the transaction to the system configuration.

Example

This example shows how to configure a remote syslog server profile and enable the sending of Cisco IMC log entries with a minimum severity level of Warning:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # set remote-syslog-severity warning
Server /cimc/log *# scope server 1
Server /cimc/log/server *# set server-ip www.abc.com
Server /cimc/log/server *# set server-port 514
Server /cimc/log/server *# set enabled yes
Server /cimc/log/server *# commit
Server /cimc/log/server # exit
Server /cimc/log # show server
Syslog Server 1:
    Syslog Server Address: www.abc.com
```

```
    Syslog Server Port: 514
    Enabled: yes

Server /cimc/log # show remote-syslog-severity
    Remote Syslog Severity: warning

Server /cimc/log #
```

Sending a Test Cisco IMC Log to a Remote Server

Before you begin

- The remote syslog server must be configured to receive logs from a remote host.
- The remote syslog server must be configured to receive all types of logs, including authentication-related logs.
- The remote syslog server's firewall must be configured to allow syslog messages to reach the syslog server.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope log**	Enters the Cisco IMC log command mode.
Step 3	Server /cimc/log # **send-test-syslog**	Sends a test Cisco IMC log to the configured remote servers.

Example

This example shows how to send a test Cisco IMC syslog to the configured remote servers:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # send-test-syslog

Syslog Test message will be sent to configured Syslog destinations.
If no Syslog destinations configured, this command will be silently ignored.
Syslog Test message has been requested.

Server /cimc/log #
```

Enabling the Logging of Invalid Usernames

Perform this procedure to enable logging of invalid usernames in case of failed logging attempts.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope log**	Enters the Cisco IMC log command mode.
Step 3	Server /cimc/log #**set log-username-on-auth-fail enabled**	Enables logging of invalid usernames.
Step 4	Server /cimc/log* #**commit**	Commits the transaction to the system configuration.

Example

This example displays how to enable logging invalid usernames:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # set log-username-on-auth-fail enabled
Server /cimc/log* #commit
Server /cimc/log
```

Uploading Remote Syslog Certificate

Before you begin

- You must log in as a user with admin privileges.
- The certificate file to be uploaded must reside on a locally accessible file system.
- The following certificate formats are supported:
  - .crt
  - .cer
  - .pem

Beginning with release 4.2(2a), you can upload a remote syslog certificate to Cisco UCS C-series servers. You can upload the certificate to one or two Cisco UCS C-series servers.

Procedure

Step 1 Server # **scope cimc**

Enters Cisco IMC command mode.

Step 2 Server /cimc # **scope log**

Enters Cisco IMC log command mode.

Step 3 Server /cimc/log # **scope server{1|2}**

Selects one of the two remote syslog server profiles and enters the command mode for uploading the remote syslog certificate and enabling secure remote syslog on the selected server.

Step 4 Server /cimc/log/server # **upload-certificate** *remote-protocol server_address path certificate_filename*

Specify the protocol to connect to the remote server. It can be of the following types:

- TFTP
- FTP
- SFTP
- SCP
- HTTP

Note If you enter the protocol as FTP, SCP or SFTP, you will be prompted to enter your username and password.

Along with the remote protocol, enter the filepath from where you want to upload the remote syslog certificate. After validating your remote server username and password, uploads the remote syslog certificate from the remote server.

Step 5 (Optional) Server /cimc/log/server # **paste-certificate**

This is an additional option to upload the remote syslog certificate.

At the prompt, paste the content of the certificate and press CTRL+D.

Step 6 Server /cimc/log/server # **setsecure-enabledyes**

Enables secure remote syslog on the server.

Step 7 Server /cimc/log/server # **commit**

Commits the transaction to the system configuration.

Example

- This example uploads a remote syslog certificate from a remote server and enables secure remote syslog on the selected server:

```
Server # scope cimc
Server /cimc # scope log
Server /cimc/log # scope server
Server /cimc/log/server # upload-certificate scp 10.10.10.10
/home/user-xyz/rem-sys-log-certif.cert
Server (RSA) key fingerprint is dd:b5:2b:07:ad:c0:30:b2:d5:6a:6a:78:80:85:93:b0
Do you wish to continue? [y/N]y
Username: user-xyz
Password:
Syslog Certificate uploaded successfully
Server /cimc/log/server # set secure-enabled yes
Server /cimc/log/server # commit
Server /cimc/log/server #
```

- This example uploads a remote syslog certificate using paste option:

```
Server # scope cimc
Server /cimc # scope log
Server /cimc/log # scope server
Server /cimc/log/server # paste-certificate
Please paste your certificate here, when finished, press CTRL+D.
-----BEGIN CERTIFICATE-----
MIIFUDCCBDigAwIBAgIKYRF49gAAAAAAAjANBgkqhkiG9w0BAQUFADBLMRMwEQYK
CZImiZPyLGQBGRYDY29tMRMwEQYKCZImiZPyLGQBGRYDbmV3MR8wHQYDVQQDExZu
ZXctV0lOLU9WQlNBNElFU0NBLUNBMB4XDTE3MDczMDIxNTA1NVoXDTE5MDczMDIy
MDA1NVowSzETMBEGCgmSJomT8ixkARkWA2NvbTETMBEGCgmSJomT8ixkARkWA25l
dzEfMB0GA1UEAxMWbmV3LVdJTi1PVkJTQTRJRUJDQS1DQTCCASIwDQYJKoZIhvcN
AQEBBQADggEPADCCAQoCggEBALd8c+hhJddfUH6XKqBvllZVtIAiHfCx+l7z9o7F
bELOWu0LDVSC9pC1zpJ9wykr6VqUsVhZTkqQan23+84X4lYBsd92shQp9bri2gKj
MGntmnXE6qP3b6Trw94j6JVyWXKImYEda/SFtx722orLap8Sdliurue62JGNfq56
vxXBT1SNUHOmgOdfTOeNjVyeh51jceOCdKTppBij4wuq+jJfkndhW7KKE7ubmyRv
xpRSkiVaqNypf8jv7uG8Kwx1Q8jbCr0wG4nAbPndwhkyJpgyA5zuCdMRU2cN47om
u0VfMzJeVu+HuAif25BqKn4cjwHGOnrWKZcfHtnpKEbbmv0CAwEAAaOCAjQwggIw
MBAGCSsGAQQBgjcVAQQDAgEAMB0GA1UdDgQWBBR2+YJQuCmHKCkBkqVim0/kvfzB
bTAZBgkrBgEEAYI3FAIEDB4KAFMAdQBiAEMAQTAOBgNVHQ8BAf8EBAMCAYYwDwYD
VR0TAQH/BAUwAwEB/zAfBgNVHSMEGDAWgBRo6OQnLNNVa71VtllYAVRPmw8LQjCB
2AYDVR0fBIHQMIHNMIHKoIHHoIHEhoHBbGRhcDovLy9DTj1uZXctV0lOLU9WQlNB
NElFU0NBLUNBLENOPVdJTi1PVkJTQTRJRVNDQSxDTj1DRFAsQ049UHVibGljJTIw
S2V5JTIwU2VydmljZXMsQ049U2VydmljZXMsQ049Q29uZmlndXJhdGlvbixEQz1u
ZXcsREM9Y29tP2NlcnRpZmljYXRlUmV2b2NhdGlvbkxpc3Q/YmFzZT9vYmplY3RD
bGFzcz1jUkxEaXN0cmlidXRpb25Qb2ludDCBxAYIKwYBBQUHAQEEgbcwgbQwgbEG
CCsGAQUFBzAChoGkbGRhcDovLy9DTj1uZXctV0lOLU9WQlNBNElFU0NBLUNBLENO
PUFJQSxDTj1QdWJsaWMlMjBLZXklMjBTZXJ2aWNlcyxDTj1TZXJ2aWNlcyxDTj1D
b25maWd1cmF0aW9uLERDPW5ldyxEQz1jb20/Y0FDZXJ0aWZpY2F0ZT9iYXNlP29i
amVjdENsYXNzPWNlcnRpZmljYXRpb25BdXRob3JpdHkwDQYJKoZIhvcNAQEFBQAD
ggEBAE8IWaRFEqrrwMHNaJunoomON2rdBWRNAMlJhKdIzi49J/9Yy9IlOGF+l0wR
Q5TeKFYIcWxBj5ltlYVWVdB+9YtTKsoEoq7/MeSg/c5KuprJhugqN3OU6zCqU4vq
rS1UHNnYkOJiSdOjkOdNeT9EG2YUqiDPr6CqIUcdU4+e36LdtQZW0TlIko+0z/be
bwIgtmxzkhlyDU711SuKmyz3uRrKq1CWhiIhSaOq4yYFQ0iw6TmFFKJGZ1KnjOrA
AwHhf8QvBBJhPMOwncWGL6DLFb7md2lE2YBu+zcVPGLdXYm0Xgk8lXsE22bRJYJU
gyHqA2enmHAmJequlUFoSH9apKU=
-----END CERTIFICATE-----
Syslog Certificate pasted successfully.
Server /cimc/log/server #
```

- This example displays that the remote syslog certificate exists on the server and secure remote sylog is enabled on the server:

```
Server # scope cimc
Server /cimc # scope log
Server /cimc/log # scope server
Server /cimc/log/server # show detail
    Syslog Server 1:
    Syslog Server Address: 10.10.10.10
    Syslog Server Port: 514
    Enabled: yes
    Secure Enabled: yes
    Syslog Server protocol: udp
    Certificate Exists: yes
Server /cimc/log/server #
```

Deleting Remote Syslog Certificate

Before you begin

You must log in as a user with admin privileges.

Procedure

Step 1 Server # **scope cimc**

Enters Cisco IMC command mode.

Step 2 Server /cimc # **scope log**

Enters Cisco IMC log command mode.

Step 3 Server /cimc/log # **scope server{1|2}**

Selects one of the two remote syslog server profiles and enters the command mode for deleting the remote syslog certificate on the selected server.

Step 4 Server /cimc/log/server # **show detail**

Displays the server details and confirms that the remote syslog certificate exists on the selected server.

Step 5 Server /cimc/log/server # **delete-client-certificate**

Enter `y` at the confirmation prompt to delete the remote syslog certificate from the selected server.

Step 6 Server /cimc/log/server # **show detail**

Displays the server details and confirms that the remote syslog certificate is not available on the selected server.

Example

- This example displays that the remote syslog certificate exists on the server:

```
Server # scope cimc
Server /cimc # scope log
Server /cimc/log # scope server
Server /cimc/log/server # show detail
Server /cimc/log/server # commit
    Syslog Server 1:
    Syslog Server Address: 10.10.10.10
    Syslog Server Port: 514
    Enabled: yes
    Secure Enabled: yes
    Syslog Server protocol: udp
    Certificate Exists: yes
Server /cimc/log/server #
```

- This example deletes the remote syslog certificate on the server:

```
Server # scope cimc
Server /cimc # scope log
Server /cimc/log # scope server
Server /cimc/log/server # show detail
    Syslog Server 1:
    Syslog Server Address: 10.10.10.10
    Syslog Server Port: 514
    Enabled: yes
    Secure Enabled: yes
    Syslog Server protocol: udp
```

```
    Certificate Exists: yes
Server /cimc/log/server # delete-client-certificate
You are going to delete the Syslog Certificate.
Are you sure you want to proceed and delete the Syslog Certificate? [y|N]y
Syslog Certificate deleted successfully
Server /cimc/log/server #
```

System Event Log

Viewing the System Event Log

Procedure

	Command or Action	Purpose
Step 1	Server# **scope sel**	Enters the system event log (SEL) command mode.
Step 2	Server /sel # **show entries** [**detail**]	For system events, displays timestamp, the severity of the event, and a description of the event. The **detail** keyword displays the information in a list format instead of a table format.

Example

This example displays the system event log:

```
Server# scope sel
Server /sel # show entries
Time                 Severity      Description
-------------------- ------------- ----------------------------------------
[System Boot]       Informational " LED_PSU_STATUS: Platform sensor, OFF event was asserted"

[System Boot]        Informational " LED_HLTH_STATUS: Platform sensor, GREEN was asserted"
[System Boot]        Normal        " PSU_REDUNDANCY: PS Redundancy sensor, Fully Redundant
was asserted"
[System Boot]        Normal        " PSU2 PSU2_STATUS: Power Supply sensor for PSU2, Power
Supply input lost (AC/DC) was deasserted"
[System Boot]        Informational " LED_PSU_STATUS: Platform sensor, ON event was asserted"

[System Boot]        Informational " LED_HLTH_STATUS: Platform sensor, AMBER was asserted"
[System Boot]        Critical      " PSU_REDUNDANCY: PS Redundancy sensor, Redundancy Lost
was asserted"
[System Boot]        Critical      " PSU2 PSU2_STATUS: Power Supply sensor for PSU2, Power
Supply input lost (AC/DC) was asserted"
[System Boot]        Normal        " HDD_01_STATUS: Drive Slot sensor, Drive Presence was
asserted"
[System Boot]        Critical      " HDD_01_STATUS: Drive Slot sensor, Drive Presence was
deasserted"
[System Boot]       Informational " DDR3_P2_D1_INFO: Memory sensor, OFF event was asserted"

2001-01-01 08:30:16 Warning       " PSU2 PSU2_VOUT: Voltage sensor for PSU2, failure event
```

```
 was deasserted"
2001-01-01 08:30:16 Critical     " PSU2 PSU2_VOUT: Voltage sensor for PSU2, non-recoverable
 event was deasserted"
2001-01-01 08:30:15 Informational " LED_PSU_STATUS: Platform sensor, ON event was asserted"

2001-01-01 08:30:15 Informational " LED_HLTH_STATUS: Platform sensor, AMBER was asserted"
2001-01-01 08:30:15 Informational " LED_HLTH_STATUS: Platform sensor, FAST BLINK event was
 asserted"
2001-01-01 08:30:14 Non-Recoverable " PSU2 PSU2_VOUT: Voltage sensor for PSU2, non-recoverable
 event was asserted"
2001-01-01 08:30:14 Critical      " PSU2 PSU2_VOUT: Voltage sensor for PSU2, failure event
 was asserted"
--More--
```

Clearing the System Event Log

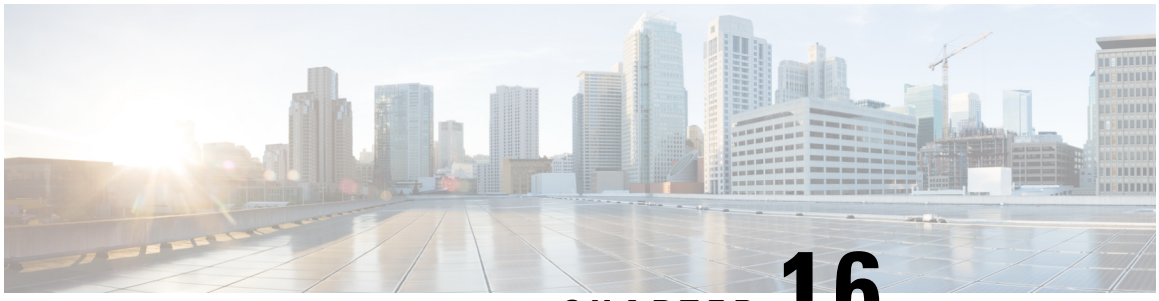
Procedure

	Command or Action	Purpose
Step 1	Server# **scope sel**	Enters the system event log command mode.
Step 2	Server /sel # **clear**	You are prompted to confirm the action. If you enter **y** at the prompt, the system event log is cleared.

Example

This example clears the system event log:

```
Server# scope sel
Server /sel # clear
This operation will clear the whole sel.
Continue?[y|N]y
```



CHAPTER 16

Server Utilities

This chapter includes the following sections:

Enabling Or Disabling Smart Access USB

When you enable the smart access USB feature, the front panel USB device disconnects from the host operating system and connects to Cisco IMC. After enabling the smart access USB feature, you can use the front panel USB device to export technical support data, import or export Cisco IMC configuration, or update Cisco IMC, BIOS, and VIC firmware.

The supported file systems for smart access USB are as follows:

- EXT2
- EXT3
- EXT 4
- FAT 32
- FAT 16
- DOS

Note Huge file support is not supported in BMC. For EXT 4 file system, huge file support has to be turned off.

Before you begin

You must be logged in with admin privileges to perform this task.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope smart-access-usb**	Enters the smart access USB command mode.
Step 3	Server /cimc/smart-access-usb # **set enabled** { *yes* | *no* }	**set enabled yes** enables smart access USB. **set enabled no** disables the smart access USB. When you enable the smart access usb feature, the front panel USB device disconnects from the host operating system. When you disable the smart access usb feature, the front panel USB device disconnects from CIMC.
Step 4	Server /cimc/smart-access-usb *# **commit**	Commits the transaction to the system.
Step 5	Server /cimc/smart-access-usb # **show detail**	Displays the properties of the smart access USB.

Example

This example shows how to enable smart access USB:

```
Server# scope cimc
Server /cimc # scope smart-access-usb
Server /cimc/smart-access-usb # set enabled yes
Enabling smart-access-usb feature will
disconnect front panel USB devices from
host operating system.
Do you wish to continue? [y/N] y
Server /cimc/smart-access-usb *# commit
Server /cimc/smart-access-usb # show detail
   Enabled: yes
   Storage Device attached: no
Server /cimc/smart-access-usb #
```

This example shows how to disable smart access USB:

```
Server# scope cimc
Server /cimc # scope smart-access-usb
Server /cimc/smart-access-usb # set enabled no
Disabling smart-access-usb feature will
disconnect front panel USB devices from CIMC.
Do you wish to continue? [y/N] y
Server /cimc/smart-access-usb *# commit
Server /cimc/smart-access-usb # show detail
   Enabled: no
```

```
   Storage Device attached: no
Server /cimc/smart-access-usb #
```

Exporting Technical Support Data

Perform this task when requested by the Cisco Technical Assistance Center (TAC). This utility creates a summary report containing configuration information, logs and diagnostic data that will help TAC in troubleshooting and resolving a technical issue.

Important If any firmware or BIOS updates are in progress, do not export the technical support data until those tasks are complete.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope tech-support**	Enters the tech-support command mode.
Step 3	Server /cimc/tech-support # **set remote-ip** *ip-address*	Specifies the IP address of the remote server on which the technical support data file should be stored.
Step 4	Server /cimc/tech-support # **set remote-path** *path/filename*	Specifies the file name in which the support data should be stored on the remote server. When you enter this name, include the relative path for the file from the top of the server tree to the desired location. **Tip** To have the system auto-generate the file name, enter the file name as **`default.tar.gz`**.
Step 5	Server /cimc/tech-support # **set remote-protocol** *protocol*	Specifies the protocol to connect to the remote server. It can be of the following types: • TFTP • FTP • SFTP • SCP • HTTP

	Command or Action	Purpose
		Note The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 6	Server /cimc/tech-support # **set remote-username** *name*	Specifies the user name on the remote server on which the technical support data file should be stored. This field does not apply if the protocol is TFTP or HTTP.
Step 7	Server /cimc/tech-support # **set remote-password** *password*	Specifies the password on the remote server on which the technical support data file should be stored. This field does not apply if the protocol is TFTP or HTTP.
Step 8	Server /cimc/tech-support # **commit**	Commits the transaction to the system configuration.
Step 9	Server /cimc/tech-support # **start**	Begins the transfer of the data file to the remote server.
Step 10	(Optional) Server /cimc/tech-support # **show detail**	Displays the progress of the transfer of the data file to the remote server.
Step 11	(Optional) Server /cimc/tech-support # **cancel**	Cancels the transfer of the data file to the remote server.

Example

This example creates a technical support data file and transfers the file to a TFTP server:

```
Server# scope cimc
Server /cimc # scope tech-support
Server /cimc/tech-support # set remote-ip 192.0.20.41
Server /cimc/tech-support* # set remote-protocol tftp
Server /cimc/tech-support *# set remote-path /user/user1/default.tar.gz
Server /cimc/tech-support *# commit
Server /cimc/tech-support # start
Tech Support upload started.

Server /cimc/tech-support # show detail

Tech Support:
  Server Address: 192.0.20.41
  Path: default.tar.gz
  Protocol: tftp
  Username:
  Password: *******
  Progress (%): 5
  Status: Collecting

Server /cimc/tech-support #
```

What to do next

Provide the generated report file to Cisco TAC.

Exporting Technical Support Data to Front Panel USB Device

Perform this task when requested by the Cisco Technical Assistance Center (TAC). This utility creates a summary report containing configuration information, logs and diagnostic data that will help TAC in troubleshooting and resolving a technical issue.

Important

- Make sure that the Smart USB option has been enabled and that the USB device is connected to the front panel.
- If any firmware or BIOS updates are in progress, do not export the technical support data until those tasks are complete.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope tech-support**	Enters the tech-support command mode.
Step 3	Server /cimc/tech-support # **scope fp-usb**	Enters the USB mode.
Step 4	Server /cimc/tech-support /fp-usb # **start** *filename*	Creates a technical support data file and transfers the file to a USB device. If you do not specify the file name, it will take a default file name.

Example

This example creates a technical support data file and transfers the file to a USB device connected to the front panel:

```
Server# scope cimc
Server /cimc # scope tech-support
Server /cimc/tech-support # scope fp-usb
Server /cimc/tech-support/fp-usb # start techsupportUSB.tar.gz
Tech Support collection started.

Server /cimc/tech-support/fp-usb # show detail

Tech Support:
  Path(on USB device): techsupportUSB.tar.gz
  Progress(%): 6
  Status: COLLECTING

Server /cimc/tech-support/fp-usb #
```

What to do next

Provide the generated report file to Cisco TAC.

Rebooting the Cisco IMC

On rare occasions, such as an issue with the current running firmware, troubleshooting a server may require you to reboot the Cisco IMC. This procedure is not part of the normal maintenance of a server. After you reboot the Cisco IMC, you are logged off and the Cisco IMC will be unavailable for a few minutes.

Note If you reboot the Cisco IMC while the server is performing power-on self test (POST) or is operating in the Extensible Firmware Interface (EFI) shell, the server will be powered down until the Cisco IMC reboot is complete.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **reboot**	The Cisco IMC reboots.

Example

This example reboots the Cisco IMC:

```
Server# scope cimc
Server /cimc # reboot
```

Clearing the BIOS CMOS

On rare occasions, troubleshooting a server may require you to clear the server's BIOS CMOS memory. This procedure is not part of the normal maintenance of a server.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the bios command mode.
Step 2	Server /bios # **clear-cmos**	After a prompt to confirm, clears the CMOS memory.

Example

This example clears the BIOS CMOS memory:

```
Server# scope bios
Server /bios # clear-cmos

This operation will clear the BIOS CMOS.
Note: Server should be in powered off state to clear CMOS.
Continue?[y|n] y

Server /bios #
```

Recovering from a Corrupted BIOS

Note This procedure is not available in some server models.

In addition to this procedure, there are three other methods for recovering from a corrupted BIOS:

- Use the Cisco Host Upgrade Utility (HUU). This is the recommended method.
- Use the Cisco IMC GUI interface.
- If your server model supports it, use the BIOS recovery function of the hardware jumper on the server motherboard. For instructions, see the Cisco UCS Server Installation and Service Guide for your server model.

Before you begin

- You must be logged in as admin to recover from a corrupted BIOS.

- Have the BIOS recovery ISO image ready. You will find the BIOS recovery ISO image under the Recovery folder of the firmware distribution package.
- Schedule some down time for the server because it will be power cycled at the end of the recovery procedure.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the bios command mode.
Step 2	Server# **recover**	Launches a dialog for loading the BIOS recovery image.

Example

This example shows how to recover from a corrupted BIOS:

```
Server# scope bios
Server /bios # recover
This operation will automatically power on the server to perform BIOS FW recovery.
Continue?[y|N]y
```

What to do next

Power cycle or reset the server.

Resetting the Cisco IMC to Factory Defaults

On rare occasions, such as an issue with the current running firmware, troubleshooting a server may require you to reset the Cisco IMC to the factory default. When this happens, all user-configurable settings are reset.

This procedure is not part of the normal server maintenance. After you reset the Cisco IMC, you are logged off and must log in again. You may also lose connectivity and may need to reconfigure the network settings.

When you upgrade from version 1.5(1) to version 1.5(2), the hostname in the Cisco IMC interface is retained as is. However, after upgrading to version 1.5(2), if you do a factory reset, the hostname changes to CXXX-YYYYYY format, where XXX is the model number and YYYYYY is the serial number of the server.

When you downgrade from version 1.5(2) to version 1.5(1), the hostname is retained as is. However, if you do a factory reset, the hostname changes to ucs-cxx-mx format.

Note If you reset Cisco IMC 1.5(x), 2.0, and 2.0(3) versions to factory defaults, **Shared LOM** mode is configured by default. For C3160 servers, if you reset Cisco IMC to factory defaults, **Dedicated** mode is configured to **Full** duplex with 100 Mbps speed by default.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **factory-default**	After a prompt to confirm, the Cisco IMC resets to factory defaults.

The Cisco IMC factory defaults include the following conditions:

- SSH is enabled for access to the Cisco IMC CLI. Telnet is disabled.
- HTTPS is enabled for access to the Cisco IMC GUI.
- A single user account exists (user name is **admin** , password is **password**).
- DHCP is enabled on the management port.
- The previous actual boot order is retained.
- KVM and vMedia are enabled.
- USB is enabled.
- SoL is disabled.

Example

This example resets the Cisco IMC to factory defaults:

```
Server# scope cimc
Server /cimc # factory-default
This operation will reset the CIMC configuration to factory default.
All your configuration will be lost.
Continue?[y|N]y
Server /cimc #
```

Exporting and Importing the Cisco IMC Configuration

To perform a backup of the Cisco IMC configuration, you take a snapshot of the system configuration and export the resulting Cisco IMC configuration file to a location on your network. The export operation saves information from the management plane only; it does not back up data on the servers. Sensitive configuration information such as user accounts and the server certificate are not exported.

You can restore an exported Cisco IMC configuration file to the same system or you can import it to another Cisco IMC system, provided that the software version of the importing system is the same as or is configuration-compatible with the software version of the exporting system. When you import a configuration file to another system as a configuration template, you must modify system-specific settings such as IP addresses and host names. An import operation modifies information on the management plane only.

The Cisco IMC configuration file is an XML text file whose structure and elements correspond to the Cisco IMC command modes.

When performing an export or import operation, consider these guidelines:

- You can perform an export or an import while the system is up and running. While an export operation has no impact on the server or network traffic, some modifications caused by an import operation, such as IP address changes, can disrupt traffic or cause a server reboot.
- You cannot execute an export and an import simultaneously.

You can perform an import or an export operation on the following features:

- Cisco IMC version

Note You can only export this information.

- Network settings
- Technical support
- Logging control for local and remote logs
- Power policies
- BIOS - BIOS Parameters

Note Precision boot is not supported.

- Communication services
- Remote presence
- User management - LDAP
- Event management
- SNMP

Exporting the Cisco IMC Configuration

Note
- If any firmware or BIOS updates are in progress, do not export the Cisco IMC configuration until those tasks are complete.
- If you are exporting Cisco IMC configuration to a front panel USB device, make sure that the Smart Access USB option has been enabled.
- For security reasons, this operation does not export user accounts or the server certificate.

Before you begin

Obtain the backup remote server IP address.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope import-export**	The configuration file is exported to the specified path and file name on the front panel USB device.
Step 3	Server /cimc/import-export # **export-config** *protocol ip-address path-and-filename*	The configuration file will be stored at the specified path and file name on a remote server at the specified IPv4 or IPv6 address or a hostname. The remote server could be one of the following types: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 4	Server /cimc/import-export # **export-config usb** *path-and-filename*	Exports the configuration data to the connected USB.
Step 5	Enter the Username, Password and Pass Phrase.	Sets the username, password and the pass phrase for the file being exported. Starts the backup operation.

To determine whether the export operation has completed successfully, use the **show detail** command. To abort the operation, type CTRL+C.

Example

This example shows how to back up the Cisco IMC configuration:

```
Server# scope cimc
Server /cimc # scope import-export
Server /cimc/import-export # export-config tftp 192.0.2.34 /ucs/backups/cimc5.xml
Username:pynj
Password:****
Passphrase:***
Export config started. Please check the status using "show detail".
Server /cimc/import-export # show detail
Import Export:
    Operation: EXPORT
    Status: COMPLETED
    Error Code: 100 (No Error)
    Diagnostic Message: NONE

Server /cimc/import-export #
```

Importing a Cisco IMC Configuration

Important

- If any firmware or BIOS updates are in progress, do not import the Cisco IMC configuration until those tasks are complete.
- If you are importing Cisco IMC configuration through a front panel USB device, make sure that the Smart Access USB option has been enabled.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope import-export**	Enters the import-export command mode.
Step 3	Server /cimc/import-export # **import-config** *protocol ip-address path-and-filename*	The configuration file at the specified path and file name on the remote server at the specified IPv4 or IPv6 address or a hostname will be imported. The remote server can be one of the following: • TFTP • FTP • SFTP • SCP

	Command or Action	Purpose
		• HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 4	Server /cimc/import-export # **import-config usb** *path and filename*	The configuration file is imported to the specified path and file name on the front panel USB device.
Step 5	Enter the Username, Password and Pass Phrase.	Sets the username, password and the pass phrase for the file being imported. Starts the import operation.

To determine whether the import operation has completed successfully, use the **show detail** command. To abort the operation, type CTRL+C.

Example

This example shows how to import a Cisco IMC configuration:

```
Server# scope cimc
Server /cimc # scope import-export
Server /cimc/import-export # import-config tftp 192.0.2.34 /ucs/backups/cimc5.xml
Username:pynj
Password:****
Passphrase:***
Import config started. Please check the status using "show detail".
Server /cimc/import-export # show detail
Import Export:
    Operation: Import
    Status: COMPLETED
    Error Code: 100 (No Error)
```

```
    Diagnostic Message: NONE
Server /cimc/import-export #
```

Adding Cisco IMC Banner

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **upload-banner**	A prompt to enter the banner displays.
Step 3	Enter the banner and press CTRL+D.	At the prompt, enter **y**. This results in a loss of the current session, when you log back on again, the new banner appears.
Step 4	(Optional) Server /chassis # **show-banner**	The banner that you have added displays.

Example

This example shows how to add the Cisco IMC banner:

```
Server # scope chassis
Server /chassis # upload-banner
Please paste your custom banner here, when finished, press enter and CTRL+D.
hello world
This will terminate all open SSH session to take an immediate action.
Do you wish to continue? [y/N] yy
Server /chassis # show-banner
hello world
Server /chassis #
```

Deleting Cisco IMC Banner

Procedure

	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **delete-banner**	At the prompt, enter **y**. This results in a loss of the current session, when you log back on again, the banner is deleted.
Step 3	(Optional) Server /chassis # **show-banner**	The banner that you have added displays.

Example

This example shows how to delete the Cisco IMC banner:

```
Server # scope chassis
Server /chassis # delete-banner
This will terminate all open SSH session to take an immediate action.
Do you wish to continue? [y/N] yy
Server /chassis # show-banner

Server /chassis #
```

Enabling Secure Adapter Update

Before you begin

You must log in as a user with admin privileges to perform this action.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope adapter-secure-update**	Enters the adapter-secure-update command mode.
Step 3	Server /cimc/adapter-secure-update # **enable-security-version-check** {**yes** | **no**}	Enter **yes** at the prompt. **Note** If you enter **no** at the prompt, secure adapter update is disabled.
Step 4	(Optional) Server /cimc/adapter-secure-update # **enable-security-version-check status**	Displays the secure update status.

Example

This example shows how to enable the secure adapter update:

```
Server# scope cimc
Server /cimc # scope adapter-secure-update
Server /cimc/adapter-secure-update # enable-security-version-check yes
Server /cimc/adapter-secure-update # enable-security-version-check status
enable-security-version-check: Enabled
Server /cimc/adapter-secure-update #
```

Updating and Activating the Device Connector Firmware

This feature is available only on some C-Series servers.

Before you begin

You must be logged in as admin to perform this action.

Procedure

	Command or Action	Purpose
Step 1	Server # **scope cimc**	Enters the Cisco IMC command mode.
Step 2	Server /cimc # **scope device-connector**	Enters the device connector command mode.
Step 3	Server /cimc/device-connector # **update-and-activate** *protocol IP Address path*	Specifies the protocol, IP address of the remote server, and the file path to the firmware file on the server. The protocol can be one of the following: • TFTP • FTP • SFTP • SCP • HTTP **Note** The Cisco UCS C-Series server now supports fingerprint confirmation of the server when you update firmware through a remote server. This option is available only if you choose SCP or SFTP as the remote server type. If you chose SCP or SFTP as the remote server type while performing this action, a prompt with the message Server (RSA) key fingerprint is <server_finger_print _ID> Do you wish to continue? Click y or n depending on the authenticity of the server fingerprint. The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.
Step 4	(Optional) Server /cimc/device-connector # **show detail**	Displays the status of the update.

Example

This example shows how to upgrade and activate the device connector firmware:

```
Server # scope cimc
Server /cimc # scope device-connector
Server /cimc/device-connector # update-and-activate tftp 10.10.10.10
c240-m5-cimc.4.0.1.227-cloud-connector.bin
Device connector firmware update initialized.
Please check the status using "show detail".
Server /cimc/device-connector # show detail
Device Connector Information:
    Update Stage: DOWNLOAD
    Update Progress: 5
    DC FW Version: 1.0.9-343
Server /cimc/device-connector # show detail
Device Connector Information:
    Update Stage: INSTALL
    Update Progress: 90
    DC FW Version:
Server /cimc/device-connector # show detail
Device Connector Information:
    Update Stage: NONE
    Update Progress: 100
Server /cimc/device-connector #
```

Recovering a PCIe Switch

When firmware on a switch is corrupt, you can use this option to recover the switch.

Before you begin

You must log in with admin privileges to perform this task.

Procedure

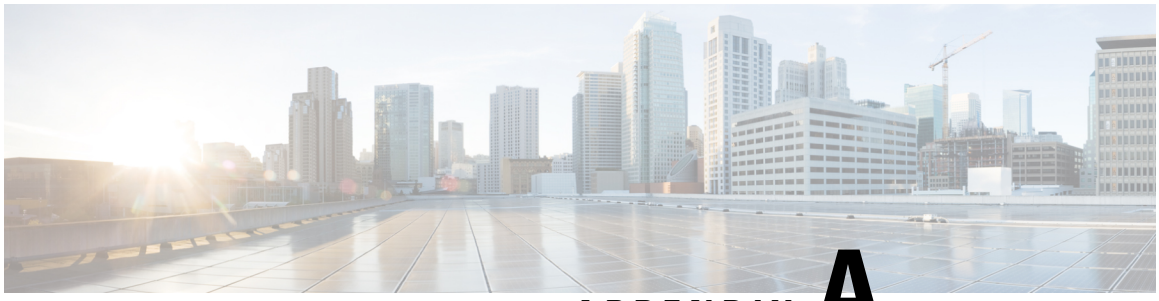
	Command or Action	Purpose
Step 1	Server # **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **show nvmeadapter**	Displays the NVMe adapters and the name of the PCIe switch.
Step 3	Server /chassis # **recover-pcie-switch** *PCIe Switch Name*	Enter **y** at the host reboot prompt. Recovers the selected PCIe Switch.

Example

This example shows how to recover a PCIe switch:

```
Server # scope chassis
Server /chassis # show nvmeadapter
PCI Slot
----------------------------
```

```
PCIe-Switch
Server /chassis/persistent-memory # recover-pcie-switch PCIe-Switch
Host will be powered on for this operation.
Continue?[y|N]y
Server /chassis #
```



APPENDIX A

BIOS Parameters by Server Model

C220 M6 and C240 M6 Servers

I/O Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 3: BIOS Parameters in I/O Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
MLOM OptionROM drop-down list **set PcieSlotMLOMOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the MLOM slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the MLOM slot.

Name	Description
MLOM Link Speed drop-down list **set PcieSlotMLOMLinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe MLOM slot. This can be one of the following: • **Disabled**—The maximum speed is not restricted. • **Auto**—System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed. • **GEN4**—16GT/s is the maximum speed allowed.
PCIe Slot*n* OptionROM drop-down list **set PcieSlot*n*OptionROM**	Whether the server can use the Option ROMs present in the PCIe card slot designated by *n*. This can be one of the following: • **Disabled**—Option ROM for slot *n* is not available. • **Enabled**—Option ROM for slot *n* is available.
PCIe Slot*n* Link Speed drop-down list **set PcieSlot*n*LinkSpeed**	System IO Controller *n* (SIOCn) add-on slot (designated by *n*) link speed. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**— The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.

Name	Description
Front NVME-*n* OptionROM drop-down list **set PcieSlotFrontNvme*n*OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe slot *n*. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot
Front NVME-*n* Link Speed drop-down list **set PcieSlotFrontNvme*n*LinkSpeed**	Link speed for NVMe front slot designated by slot *n*. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.
Rear NVME-*n* OptionROM drop-down list **set PcieSlotRearNvme*n*OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the rear SSD:NVMe slot *n*. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot

Name	Description
Rear NVME-*n* Link Speed drop-down list **set PcieSlotRearNvme*n*LinkSpeed**	Link speed for NVMe rear slot designated by slot *n*. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.
Legacy USB Support drop-down list **set UsbLegacySupport**	Whether the system supports legacy USB devices. This can be one of the following: • **Disabled**—USB devices are only available to EFI applications. • **Enabled**—Legacy USB support is always available. • **Auto**—Feature is is automatically assigned.
PCIe Slot MSTOR RAID OptionROM drop-down list **set PcieSlotMSTORRAIDOptionROM**	Whether the server can use the Option ROMs present in the PCIe MSTOR RAID. This can be one of the following: • **Disabled**—Option ROM is not available. • **Enabled**—Option ROM is available.
Intel VTD Coherency Support drop-down list **set CoherencySupport**	Whether the processor supports Intel VT-d Coherency. This can be one of the following: • **Disabled**—The processor does not support coherency. • **Enabled**—The processor uses VT-d Coherency as required.

Name	Description
Intel VT for Directed IO drop-down list **set IntelVTD**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions. **Note** If you change this option, you must power cycle the server before the setting takes effect.
VMD Enable drop-down list **set VMDenable**	Intel Volume Management Device (VMD) is for PCIe NVMe SSDs that provides hardware logic to manage and aggregate NVMe SSDs. This can be one the following: • **Enabled**— Enables benefits like robust surprise hot-plug, status LED management. • **Disabled**— Disables benefits like robust surprise hot-plug, status LED management. Default value: **Disabled**. Refer Intel® Virtual RAID on CPU User Guide and Intel® Virtual RAID on CPU (Intel® VROC) to configure VMD.
	Details of VMD supported and unsupported ports for Cisco UCS C480 M5 servers: Cisco UCS C480 NVMe SKU (32 drive NVME System) • DMI connected ports 7, 8, and 23 do not support VMD. • All other twenty nine ports support VMD. Cisco UCS C480 Non-NVMe SKU • DMI connected ports 1, 2, and 18 do not support VMD. • Ports 7, 8, 9, 10, 15, 16, 17, 23, 24 support VMD.

Name	Description
Intel VTD ATS support drop-down list **set ATS**	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: • **Disabled**—The processor does not support ATS. • **Enabled**—The processor uses VT-d ATS as required.
LOM Port *n* OptionROM drop-down list **set LomOpromControlPort0**	Whether Option ROM is available on the LOM port slot *n*. This can be one of the following: • **Disabled**—Option ROM is not available on LOM port 1. • **Enabled**—Option ROM is available on LOM port 1.
PCIe RAS Support drop-down list **set PCIeRASSupport**	Whether PCIe RAS Support is available on the PCIe slot. This can be one of the following: • **Disabled**—PCIe RAS is not available on the slot. • **Enabled**—PCIe RAS is available on port.
All Onboard LOM Ports drop-down list **set AllLomPortControl**	Whether Option ROM is available on all LOM ports. This can be one of the following: • **Disabled**—Option ROM is disabled on all the ports. • **Enabled**—Option ROM is enabled on all the ports.
USB Port Rear drop-down list **set UsbPortRear**	Whether the rear panel USB devices are enabled or disabled. This can be one of the following • **Disabled**— Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**— Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.

Name	Description
VGA Priority drop-down list **set VgaPriority**	Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following: • **OnBoard**—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port. • **OffBoard**—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port. • **OnBoardDisabled**—Priority is given to the PCIe Graphics adapter, and the onboard VGA device is disabled. The vKVM does not function when the onboard VGA is disabled.
IPV6 PXE Support drop-down list **set IPV6PXE**	Enables or disables IPv6 support for PXE. This can be one of the following • **disabled**—IPv6 PXE support is not available. • **enabled**—IPv6 PXE support is always available.
USB Port Internal drop-down list **set UsbPortInt**	Whether the internal USB devices are enabled or disabled. This can be one of the following • **Disabled**— Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**— Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.
PCIe PLL SSC drop-down list **set PciePllSsc**	Enable this feature to reduce EMI interference by down spreading clock 0.5%. Disable this feature to centralize the clock without spreading. This can be one of the following: • **auto**—EMI interference is auto adjusted. **Disabled**—EMI interference is auto adjusted. • **ZeroPointFive**—EMI interference is reduced by down spreading the clock 0.5%.

Name	Description
Network Stack drop-down list **set NetworkStack**	This option allows you to monitor IPv6 and IPv4. This can be one of the following • **disabled**—Network Stack support is not available. **Note** When disabled, the value set for **IPV4 PXE Support** does not impact the system. • **enabled**—Network Stack support is always available.
IPV4 PXE Support drop-down list **set IPV4PXE**	Enables or disables IPv4 support for PXE. This can be one of the following • **disabled**—IPv4 PXE support is not available. • **enabled**—IPv4 PXE support is always available.
External SSC enable drop-down list **set EnableClockSpreadSpec**	This option allows you to reduce the EMI of your motherboard by modulating the signals it generates so that the spikes are reduced to flatter curves. This can be one of the following: • **Disabled**—Clock Spread Spectrum support is not available. • **Enabled**—Clock Spread Spectrum support is always available.
IPV4 HTTP Support drop-down list **set IPV4HTTP**	Enables or disables IPv4 support for HTTP. This can be one of the following: • **disabled**—IPv4 HTTP support is not available. • **enabled**—IPv4 HTTP support is always available.
IIO eDPC Support drop-down list **set EdpEn**	eDPC allows a downstream link to be disabled after an uncorrectable error, making recovery possible in a controlled and robust manner. This can be one of the following: • Disabled—eDPC support is disabled. • On Fatal Error—eDPC is enabled only for fatal errors. • On Fatal and Non-Fatal Errors—eDPC is enabled for both fatal and non-fatal errors.

Name	Description
IPV6 HTTP Support drop-down list **set IPV6HTTP**	Enables or disables IPv6 support for HTTP. This can be one of the following: • **disabled**—IPv6 HTTP support is not available. • **enabled**—IPv6 HTTP support is always available.

Server Management Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 4: BIOS Parameters in Server Management Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
OS Boot Watchdog Timer Policy drop-down list **set OSBootWatchdogTimerPolicy**	What action the system takes if the watchdog timer expires. This can be one of the following: • **Power Off**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
FRB 2 Timer drop-down list **set FRB-2**	Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.

Name	Description
OS Watchdog Timer drop-down list **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the **OS Boot Watchdog Timer Timeout** field, the Cisco IMC logs an error and takes the action specified in the **OS Boot Watchdog Policy** field.
OS Watchdog Timer Timeout drop-down list **set OSBootWatchdogTimerTimeOut**	If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following: • **5 Minutes**—The OS watchdog timer expires 5 minutes after it begins to boot. • **10 Minutes**—The OS watchdog timer expires 10 minutes after it begins to boot. • **15 Minutes**—The OS watchdog timer expires 15 minutes after it begins to boot. • **20 Minutes**—The OS watchdog timer expires 20 minutes after it begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
Baud Rate drop-down list **set BaudRate**	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: • **9.6k**—A 9,600 Baud rate is used. • **19.2k**—A 19,200 Baud rate is used. • **38.4k**—A 38,400 Baud rate is used. • **57.6k**—A 57,600 Baud rate is used. • **115.2k**—A 115,200 Baud rate is used. This setting must match the setting on the remote terminal application.

Name	Description
Flow Control drop-down list **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **RTS/CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.
Console Redirection drop-down list **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the OS has booted, console redirection is irrelevant. This can be one of the following: • **COM 0**—Enables console redirection on serial port A during POST. • **COM 1**—Enables console redirection on serial port B during POST. • **Disabled**—No console redirection occurs during POST.
Terminal type drop-down list **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported VT100 video terminal and its character set are used. • **VT100-PLUS**—A supported VT100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used.

Name	Description
PCIe Slots CDN Control drop-down list **set PcieSlotsCdnEnable**	**Note** This option is available only on Cisco UCS C240 M6 servers equipped with Mellanox cards in slots 2 or 5. Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled • **Enabled**— CDN support is enabled for VIC cards.
CDN Control drop-down list **set cdnEnable**	Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled • **Enabled**— CDN support is enabled for VIC cards.
OptionROM Launch Optimization	When this option is **Enabled**, the OptionROMs only for the controllers present in the boot order policy will be launched. **Note** Some controllers such as Onboard storage controllers, Emulex FC adapters, and GPU controllers though not listed in the boot order policy will have the OptionROM launched. When this option is **Disabled**, all the OptionROMs will be launched. Default value: **Enabled**

Name	Description
Adaptive Memory Training	When this option is **Enabled**: The Memory training will not happen in every boot but the BIOS will use the saved memory training result in every re-boot. Some exceptions when memory training happens in every boot are: BIOS update, CMOS reset, CPU or Memory configuration change, SPD or run-time uncorrectable error or the last boot has occurred more than 24 hours before. When this option is **Disabled**, the Memory training happens in every boot. Default value: **Enabled**. **Note** To disable the Fast Boot option, the end user must set the following tokens as mentioned below: Adaptive Memory Training to **Disabled** BIOS Techlog level to **Normal** OptionROM Launch Optimization to **Disabled**.
BIOS Techlog Level	This option denotes the type of messages in **BIOS tech log** file. The log file can be one of the following types: • **Minimum** - Critical messages will be displayed in the log file. • **Normal** - Warning and loading messages will be displayed in the log file. • **Maximum** - Normal and information related messages will be displayed in the log file. Default value: **Minimum**. **Note** This option is mainly for internal debugging purposes.

Security Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 5: BIOS Parameters in Security Management Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
SHA-1 PCR Bank drop-down list **set SHA1PCRBank**	PCR bank available for OS when BIOS is performing measurements. • **Disabled**—SHA-1 PCR Bank is not available for BIOS. • **Enabled**—SHA-1 PCR Bank is available for BIOS.
Trusted Platform Module State drop-down list **set TPMControl**	Trusted Platform Module (TPM) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. This can be one of the following: • **Disabled**—The server does not use the TPM. • **Enabled**—The server uses the TPM. **Note** Contact your operating system vendor to make sure the operating system supports this feature.
DMA Control Opt-In Flag drop-down list	DMA Control Opt-In Flag - Enabling this token allows the operating system to enable Input Output Memory Management Unit (IOMMU) to prevent the DMA attacks from possible malicious devices. • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Name	Description
TPM Pending Operation drop-down list **set TPMPendingOperation**	Trusted Platform Module (TPM) Pending Operation option allows you to control the status of the pending operation. This can be one of the following: • None—No action. • TpmClear—Clears the pending operations.
SHA256 PCR Bank drop-down list **set SHA256PCRBank**	PCR bank available for OS when BIOS is performing measurements. • **Disabled**—SHA256 PCR Bank is not available for BIOS. • **Enabled**—SHA256 PCR Bank is available for BIOS.
Power on Password drop-down list **set PowerOnPassword**	This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
TPM Minimal Physical Presence drop-down list	This token allows you to apply recommended Microsoft default settings for TPM. • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Intel Trusted Execution Technology Support drop-down list **set TXTSupport**	Can be Enabled only when Trusted Platform Module (TPM) is Enabled. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Multikey Total Memory Encryption (MK-TME) drop-down list **set EnableMktme**	MK-TME allows you to have multiple encryption domains with one with own key. Different memory pages can be encrypted with different keys. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Name	Description
Total Memory Encryption (TME) drop-down list **set EnableTme**	Allows you to provide the capability to encrypt the entirety of the physical memory of a system. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SGX Factory Reset drop-down list **set SgxFactoryReset**	Allows the system to perform SGX factory reset on subsequent boot. This deletes all registration data. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SW Guard Extensions (SGX) drop-down list **set EnableSgx**	Allows you to enable Software Guard Extensions (SGX) feature. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SGX QoS drop-down list **set SgxQoS**	Allows you to enable SGX QoS. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SGX Pkg info In-Band Access drop-down list **set SgxPackageInfoInBandAccess**	Allows you to enable SGX Package Info In-Band Access. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SGX Write Enable drop-down list **set SgxLeWr**	Allows you to enable SGX Write feature. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Name	Description
Select Owner EPOCH input type drop-down list **set EpochUpdate**	Allows you to change the seed for the security key used for the locked memory region that is created. This can be one of the following: • **SGX Owner EPOCH activated**—Does not change the current input type. • **Change to New Random Owner EPOCHs**—Changes EPOCH to a system generated random number. • **Manual User Defined Owner EPOCHs**—Changes the EPOCH seed to a hexadecimal value that you enter.
SProcessor Epoch *n* field **set SgxEpoch0**	Allows you to define the SGX EPOCH owner value for the EPOCH number designated by *n*.
SGX Auto MP Registration Agent drop-down list **set SgxAutoRegistrationAgent**	Allows you to enable the registration authority service to store the platform keys. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SGX PUBKEY HASH*n* field **set SgxLePubKeyHash*n***	Allows you to set the Software Guard Extensions (SGX) value. This value can be set between: • SGX PUBKEY HASH0—Between 7-0 • SGX PUBKEY HASH1—Between 15-8 • SGX PUBKEY HASH2—Between 23-16 • SGX PUBKEY HASH3—Between 31-24
LIMIT CPU PA to 46 Bits drop-down list **set CpuPaLimit**	Enable this option for Intel® VT-d enabling boot to boot with 2019 OS. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Memory Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 6: BIOS Parameters in Memory Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Select Memory RAS configuration drop-down list **set SelectMemoryRAS**	Determines how the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: • **Maximum Performance**—System performance is optimized. • **ADDDC Sparing**—Adaptive virtual lockstep is an algorithm implemented in the hardware and firmware to support the ADDDC mode. When selected, the system performance is optimized till the algorithm is activated. The algorithm is activated in case of DRAM device failure. Once the algorithm is activated, the virtual lockstep regions are activated to map out the failed region during run-time dynamically, and the performance impact is restricted at a region level. • **Mirror Mode 1LM**—System reliability is optimized by using half the system memory as backup. • **Partial Mirror Mode 1LM**—Partial DIMM Mirroring creates a mirrored copy of a specific region of memory cells, rather than keeping the complete mirror copy. Partial Mirroring creates a mirrored region in memory map with the attributes of a partial mirror copy. Up to 50% of the total memory capacity can be mirrored, using up to 4 partial mirrors.
NUMA drop-down list **set NUMAOptimize**	Whether the BIOS supports Non-Uniform Memory Access (NUMA). This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Name	Description
Partial Cache Line Sparing drop-down list **set PartialCacheLineSparing**	Partial cache line sparing (PCLS) is an error-prevention mechanism in memory controllers. PCLS statically encodes the locations of the faulty nibbles of bits into a sparing directory along with the corresponding data content for replacement during memory accesses. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Select PPR Type drop-down list **set SelectPprType**	Cisco IMC supports **Hard-PPR**, which permanently remaps accesses from a designated faulty row to a designated spare row. This can be one of the following: • **Hard PPR**—Support is enabled. **Note** Hard PPR can be used only when **Memory RAS Configuration** is set to **ADDDC Sparing**. For other RAS selections, this setting should be set to **Disabled**. • **Disabled**—Support is disabled.
BME DMA Mitigation drop-down list **set BmeDmaMitigation**	Allows you to disable the PCI BME bit to mitigate the threat from an unauthorized external DMA. This can be one of the following: • **Disabled**—PCI BME bit is disabled in the BIOS. • **Enabled**—PCI BME bit is enabled in the BIOS.
Above 4G Decoding drop-down list **set MemoryMappedIOAbove4GB**	Enables or disables MMIO above 4GB or not. This can be one of the following: • **Disabled**—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **Enabled**—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. **Note** PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.

BIOS Parameters by Server Model

Name	Description
Partial Memory Mirror Mode drop-down list **set PartialMirrorModeConfig**	The partial memory size is either in percentage or in GB. This can be one of the following: • **Percentage**—The partial memory mirror is defined in percentage. • **Value in GB**—The partial memory mirror is defined in GB. • **Disabled**—Partial memory mirror is disabled.
DCPMM Firmware Downgrade drop-down list **set DCPMMFirmwareDowngrade**	Whether the BIOS supports downgrading the DCPMM firmware. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Partial Mirror*n* Size in GB field **set PartialMirrorValue1**	Size of the first partial *nth* memory mirror in GB. n = 1, 2, or 3 Enter an integer between 0 and 65535. **Note** The combined memory size of all the partial mirror should not exceed 50% of the physical memory size.
Partial Mirror percentage field **set PartialMirrorPercent**	Percentage of memory to mirror above 4GB. Enter an integer between 0 and 50.
Memory Size Limit in GB field **set MemorySizeLimit**	Use this option to reduce the size of the physical memory limit in GB. Enter an integer between 0 and 65535.
NVM Performance Setting drop-down list **set NvmdimmPerformConfig**	Enables you to configure NVM baseline performance settings depending on the workload behavior. • **BW Optimized** • **Latency Optimized** • **Balanced Profile**
CR QoS drop-down list **set CRQoS**	Enables you to select the CR QoS tuning. This can be one of the following: • **Mode 1**— • **Mode 2**— • **Mode 0**—**CR QoS** feature is disabled.

Name	Description
Snoopy mode for AD drop-down list **set SnoopyModeForAD**	Enables new AD specific feature to avoid directory updates to DDRT memory from non-NUMA optimized workloads. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
CR FastGo Config drop-down list **set CrfastgoConfig**	Enables you to select CR QoS configuration profiles. This can be one of the following: • **Enable Optimization** • **Disable Optimization** • **Auto**
Memory Refresh Rate drop-down list **set MemoryRefreshRate**	Enables you to increase or decrease memory refresh rate. Increasing the DRAM refresh rate reduces the maximum number of activates (hammers) that can occur before the next refresh. This can be one of the following: • **1X Refresh**—Refresh rate is at minimum. • **2X Refresh** —Refresh is 2X faster.
Snoopy mode for 2LM drop-down list **set SnoopyModeFor2LM**	Enables you to avoid directory updates to far-memory from non-NUMA optimized workloads. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Memory Thermal Throttling Mode drop-down list **set MemoryThermalThrottling**	This function is used for adjusting memory temperature. If memory temperature is excessively high after the function is enabled, the memory access rate is reduced and Baseboard Management Controller (BMC) adjusts the fan to cool down the memory to avoid any DIMM damage. This can be one of the following: • **Disabled**—Support is disabled. • **CLTT with PECI**—Enables Closed Loop Thermal Throttling with Platform Environment Control Interface.

Name	Description
Panic and High Watermark drop-down list **set PanicHighWatermark**	When set to low, the memory controller does not postpone refreshes while **Memory Refresh Rate** is set to **1X Refresh**. This can be one of the following: • **Low**—Refresh rate is set to low. • **High** —Refresh rate is set to high.
UMA drop-down list **set UmaBasedClustering**	Allows you to set UMA settings. This can be one of the following: • Disable(All2All) • Hemisphere(2-clusters)
Advanced Memory Test drop-down list **set AdvancedMemTest**	**Note** This feature is applicable only to Samsung, Hynix and Micron DIMMs. You can enable advance DIMM testing during BIOS POST using this feature. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
eADR Support drop-down list **set EadrSupport**	Extended asynchronous DRAM refresh (eADR) support helps avoid the waiting period of cache-flushing commands to move data stored in the CPU cache to persistent memory. This improves performance. This can be one of the following: • **Disabled** • **Enabled** • **Auto**
Volatile Memory Mode drop-down list **set VolMemoryMode**	Volatile Memory Mode setting is displayed when the BIOS supports Intel® Optane™ PMem. This can be one of the following: • **1LM**—This option can be used to set Intel® Optane™ PMem in App-Direct Mode. • **2LM**—This options allows 2LM to facilitate the DDR4 memory operating as cache.

Name	Description
Memory Bandwidth Boost drop-down list **set MemoryBandwidthBoost**	Intel® Memory Bandwidth Boost is a feature of the Intel® Optane™ persistent memory that provides a dynamic range of power and bandwidth when thermal headroom is available. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Power/Performance Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 7: BIOS Parameters in Power/Performance Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Adjacent Cache Line Prefetcher drop-down list **set AdjacentCacheLinePrefetch**	Whether the processor fetches cache lines in even or odd pairs instead of fetching just the required line. This can be one of the following: • **Disabled**—The processor only fetches the required line. • **Enabled**—The processor fetches both the required line and its paired line.
Hardware Prefetcher drop-down list **set HardwarePrefetch**	Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following: • **Disabled**—The hardware prefetcher is not used. • **Enabled**—The processor uses the hardware prefetcher when cache issues are detected.

Name	Description
DCU IP Prefetcher drop-down list **set DcuIpPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not preload any cache data. • **Enabled**—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.
DCU Streamer Prefetch drop-down list **set DcuStreamerPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • **Enabled**—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.
Virtual Numa drop-down list **set VirtualNuma**	Virtual NUMA (virtual non-uniform memory access) is a memory-access optimization method for VMware virtual machines (VMs), which helps prevent memory-bandwidth bottlenecks. This can be one of the following: • **Disabled**—Functionality is disabled. • **Enabled**—Functionality is enabled.

Name	Description
CPU Performance drop-down list **set CPUPerformance**	Sets the CPU performance profile for the options listed above. This can be one of the following: • **Enterprise**—All options are enabled. • **HPC**—All options are enabled. This setting is also known as high performance computing. • **Hight Throughput**—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • **Custom**—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured as well.
LLC Dead Line drop-down list **set LLCALLoc**	In CPU non-inclusive cache scheme, MLC evictions are filled into the LLC. When lines are evicted from the MLC, the core can flag them as **dead** (not likely to be read again). The LLC has the option to drop dead lines and not fill them in the LLC. If this feature is disabled, dead lines are always dropped and are never filled into the LLC. If this feature is enabled, the LLC can fill dead lines into the LLC if there is free space available. This can be one of the following: • **Disabled**—Feature is disabled. • **Enabled**—Feature is enabled. • **Auto**—CPU determines the LLC dead line allocation.
XPT Remote Prefetch drop-down list **set XPTRemotePrefetch**	This feature allows an LLC request to be duplicated and sent to an appropriate memory controller in a remote machine based on the recent LLC history to reduce latency. This can be one of the following: • **Disabled**—Feature is disabled. • **Enabled**—Feature is enabled. • **Auto**—CPU determines the functionality.

Name	Description
UPI Link Enablement drop-down list **set UPILinkEnablement**	Enables the minimum number of UPI links required by the processor. This can be one of the following: • **1** • **2** • **Auto**
Enhanced CPU Performance drop-down list **set EnhancedCPUPerformance**	**Note** Once you enable this functionality, you cannot enable **Enable Power Characterization** and **Power Capping**. Enhances CPU performance by adjusting server settings automatically. **Note** Enabling this functionality may increase power consumption. The server should meet the following requirements in order to use this functionality: • Server should not contain Barlow Pass DIMMs • DIMM module size present in the Cisco UCS C220 M6 server should be less than 64GB and in Cisco UCS C240 M6 server should be less than 256GB • No GPU cards are present in the server. This can be one of the following: • **Disabled**—The processor does not run with this functionality. • **Auto**—Allows Cisco IMC to adjust server settings to increase performance.
C1 Auto Demotion drop-down list **set C1AutoDemotion**	If enabled, CPU automatically demotes to C1 based on un-core auto-demote information. • **Disabled**—The processor does not run with this functionality. • **Enabled**—Functionality is enabled.

Name	Description
UPI Power Management drop-down list **set UPIPowerManagement**	UPI power management is used to conserve power on the server. This can be one of the following: • **Disabled**—The processor does not run with this functionality. • **Auto**—Functionality is enabled.
C1 Auto UnDemotion drop-down list **set C1AutoUnDemotion**	Select whether to enable processors to automatically undemote from C1. • **Disabled**—The processor does not run with this functionality. • **Enabled**—Functionality is enabled.

Processor Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 8: BIOS Parameters in Processor Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Extended APIC drop-down list **set LocalX2Apic**	Allows you to enable or disable extended APIC support. This can be one of the following: • Enabled—Enables APIC support. • Disabled—Disables APIC support.
Intel Virtualization Technology drop-down list **set IntelVT**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions.

Name	Description
Processor C6 Report drop-down list **set ProcessorC6Report**	Whether the BIOS sends the C6 report to the operating system. When the OS receives the report, it can transition the processor into the lower C6 power state to decrease energy usage while maintaining optimal processor performance. This can be one of the following: • **Disabled**—The BIOS does not send the C6 report. • **Enabled**—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter. **Note** This option is available only on some C-Series servers.
Processor C1E drop-down list **set ProcessorC1E**	Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following: • **Disabled**—The CPU continues to run at its maximum frequency in C1 state. • **Enabled**—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state. **Note** This option is available only on some C-Series servers.

Name	Description
EIST PSD Function drop-down list **set ExecuteDisable**	EIST reduces the latency inherent with changing the voltage-frequency pair (P-state), thus allowing those transitions to occur more frequently. This allows for more granular, demand-based switching and can optimize the power-to-performance balance, based on the demands of the applications. This can be one of the following: • **HW ALL**— The processor is coordinates the P-state among logical processors dependencies. The OS keeps the P-state request up to date on all logical processors. • **SW ALL**—The OS Power Manager coordinates the P-state among logical processors with dependencies and initiates the transition on all of those Logical Processors.
Turbo Mode drop-down list **set IntelTurboBoostTech**	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: • **Disabled**—The processor does not increase its frequency automatically. • **Enabled**—The processor utilizes Turbo Boost Technology if required. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Uncore Frequency Scaling drop-down list **set UFSDisable**	This feature allows you configure the scaling of uncore frequency of the processor. This can be one of the following: • **enabled**—Uncore frequency of the processor scales up or down based on the load. • **disabled**—Uncore frequency of the processor remains fixed. Refer Intel® Dear Customer Letter (DCL) to know the fixed higher and lower values for **Uncore Frequency Scaling**.

Name	Description
Boot Performance Mode drop-down list **set BootPerformanceMode**	Allows you to select the BIOS performance state that is set before the operating system handoff. This can be one of the following: • **Max Performance**—Processor P-state ratio is maximum • **Max Efficient**—Processor P-state ratio is minimum • **Set by Intel NM**—Value is set automatically.
Configurable TDP Level drop-down list **set ConfigTDPLevel**	**Configurable TDP Level** feature allows adjustments in processor thermal design power values. By modifying the processor behavior and the performance levels, power consumption of a processor can be configured and TDP can be adjusted as the same time. Hence, a processor operates at higher or lower performance levels, depending on the available cooling capacities and desired power consumption. This can be one of the following: • **Normal** • **Level 1** • **Level 2** Refer Intel® Dear Customer Letter (DCL) to know the values for **TDP level**.
SpeedStep (Pstates) drop-down list **set EnhancedIntelSpeedStep**	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **Disabled**—The processor never dynamically adjusts its voltage or frequency. • **Enabled**—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. We recommend that you contact your operating system vendor to make sure the operating system supports this feature. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
Processor CMCI drop-down list **set ProcessorCMCI**	Allows the CPU to trigger interrupts on corrected machine check events. The corrected machine check interrupt (CMCI) allows faster reaction than the traditional polling timer. This can be one of the following: • **Disabled**—Disables CMCI. • **Enabled**—Enables CMCI. This is the default value.
HyperThreading [ALL] drop-down list **set IntelHyperThread**	Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **Disabled**—The processor does not permit hyperthreading. • **Enabled**—The processor allows for the parallel execution of multiple threads.
Workload Configuration drop-down list **set WorkLdConfig**	This feature allows for workload optimization. The options are Balanced and I/O Sensitive: • **Balanced** • **IO Sensitive**
Cores Enabled drop-down list **set CoreMultiProcessing**	Allows you to disable one or more of the physical cores on the server. This can be one of the following: • **All**—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • **1 through 48**—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. **Note** Contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
UPI Link Frequency Select drop-down list **set QpiLinkSpeed**	**Note** **UPI Link Frequency Select** token is not applicable for single socket configuration. This feature allows you to configure the Intel Ultra Path Interconnect (UPI) link speed between multiple sockets. This can be one of the following: • **Auto**—This option configures the optimal link speed automatically. • **9.6 GT/s**—This option configures the optimal link speed at 9.6GT/s. • **10.4 GT/s**—This option configures the optimal link speed at 10.4GT/s
UPI Prefetch drop-down list **set KTIPrefetch**	UPI prefetch is a mechanism to get the memory read started early on a DDR bus. This can be one of the following: • **disabled**—The processor does not preload any cache data. • **enabled**—The UPI prefetcher preloads the L1 cache with the data it determines to be the most relevant. • **Auto** —CPU determines the UPI Prefetch mode.
Sub NUMA Clustering drop-down list **set SNC**	Whether the CPU supports sub NUMA clustering, in which the tag directory and the memory channel are always in the same region. This can be one of the following: • **disabled**— Sub NUMA clustering does not occur. • **enabled**— Sub NUMA clustering occurs.
Power Performance Tuning drop-down list **set PwrPerfTuning**	Determines if the BIOS or Operating System can turn on the energy performance bias tuning. The options are BIOS and OS. • **BIOS**—Chooses BIOS for energy performance tuning. • **OS**—Chooses OS for energy performance tuning. • **PECI**—Chooses Platform Environmental Control Interface for energy performance tuning.

Name	Description
XPT Prefetch drop-down list **set XPTPrefetch**	Whether XPT prefetch is used to enable a read request sent to the last level cache to issue a copy of that request to the memory controller prefetcher. This can be one of the following: • **disabled**—The CPU does not use the XPT Prefetch option. • **enabled**—The CPU enables the XPT prefetch option.
Package C State **set PackageCstateLimit**	The amount of power available to the server components when they are idle. This can be one of the following: • **no-limit**—The server may enter any available C state. • **auto** —The CPU determines the physical elevation. • —The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • —When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • —When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • —When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power.

Name	Description
Energy Performance Bias Config drop-down list **set CpuEngPerfBias**	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • — The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • — The server provides all server components with enough power to keep a balance between performance and power. • — The server provides all server components with enough power to keep a balance between performance and power. • — The server provides all server components with maximum power to keep reduce power consumption.
Hardware P-States drop-down list **set CpuHWPM**	Enables processor Hardware P-State. This can be one of the following: • **disabled**—HWPM is disabled. • **hwpm-native-mode**—HWPM native mode is enabled. • **hwpm-oob-mode**—HWPM Out-Of-Box mode is enabled. • **Native Mode with no Legacy** (only GUI)
LLC Prefetch drop-down list **set LLCPrefetch**	Whether the processor uses the LLC Prefetch mechanism to fetch the date into the LLC. This can be one of the following: • **disabled**—The processor does not preload any cache data. • **enabled**—The LLC prefetcher preloads the L1 cache with the data it determines to be the most relevant.
Autonomous Core C-state drop-down list **set AutoCCState**	Enables CPU Autonomous C-State, which converts the HALT instructions to the MWAIT instructions. This can be one of the following: • **Disabled**—CPU Autonomous C-state is disabled. • **Enabled**—CPU Autonomous C-state is enabled.

Name	Description
Energy Efficient Turbo drop-down list **set EnergyEfficientTurbo**	When energy efficient turbo is enabled, the optimal turbo frequency of the CPU turns dynamic based on CPU utilization. The power/performance bias setting also influences energy efficient turbo. This can be one of the following: • **Disabled**—Energy Efficient Turbo is disabled. • **Enabled**—Energy Efficient Turbo is enabled.
Patrol Scrub drop-down list **set PatrolScrub**	Allows the system to actively search for, and correct, single bit memory errors even in unused portions of the memory on the server. This can be one of the following: • **Disabled**—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • **Enabled**—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running. • **Enable at End of POST**—The system checks for memory ECC errors after BIOS POST.
Processor EPP Profile drop-down list **set EPPProfile**	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • Performance • Balanced Performance • Balanced Power • Power
Intel Dynamic Speed Select drop-down list **set IntelDynamicSpeedSelect**	**Intel Dynamic Speed Select** modes allow you to run the CPU with different speed and cores in auto mode. This can be one of the following: • **Disabled**—**Intel Dynamic Speed Select** is disabled. • **Enabled**—**Intel Dynamic Speed Select** is enabled.

Name	Description
Intel Speed Select drop-down list **set IntelSpeedSelect**	**Intel Speed Select** modes allows you to run the CPU with different speed and cores. This can be one of the following: • **Base**— It will allow users to access maximum core and Thermal Design Power (TDP) ratio. • **Config 3**— It will allow users to access core and TDP ratio lesser than **Base**. • **Config 4**— It will allow users to access core and TDP ratio lesser than **Config 3**. Default value: **Base**.

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I/O Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 9: BIOS Parameters in I/O Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
MLOM OptionROM drop-down list **set PcieSlotMLOMOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the MLOM slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the MLOM slot.

Name	Description
MLOM Link Speed drop-down list **set PcieSlotMLOMLinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe MLOM slot. This can be one of the following: • **Disabled**—The maximum speed is not restricted. • **Auto**—System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed. • **GEN3**—16GT/s is the maximum speed allowed.
PCIe Slot*n* OptionROM drop-down list **set PcieSlot*n*OptionROM**	Whether the server can use the Option ROMs present in the PCIe card slot designated by *n*. This can be one of the following: • **Disabled**—Option ROM for slot *n* is not available. • **Enabled**—Option ROM for slot *n* is available.
PCIe Slot*n* Link Speed drop-down list **set PcieSlot*n*LinkSpeed**	System IO Controller *n* (SIOCn) add-on slot (designated by *n*) link speed. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**— The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.

Name	Description
MRAID OptionROM **set PcieSlotMRAID*n*OptionROM**	Whether the server can use the RAID Option ROMs present in the PCIe card slot designated by *n*. This can be one of the following: • **Disabled**—Option ROM for slot *n* is not available. • **Enabled**—Option ROM for slot *n* is available.
MRAID Link Speed drop-down list **set PcieSlotMRAID*n*LinkSpeed**	RAID IO Controller *n* (SIOCn) add-on slot (designated by *n*) link speed. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**— The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.
Front NVME-*n* OptionROM drop-down list **set PcieSlotFrontNvme*n*OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe slot *n*. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot

Name	Description
Front NVME-*n* Link Speed drop-down list **set PcieSlotFrontNvme*n*LinkSpeed**	Link speed for NVMe front slot designated by slot *n*. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.
Rear NVME-*n* OptionROM drop-down list **set PcieSlotRearNvme*n*OptionROM**	**Note** This options is applicable only to Cisco UCS C245 M6 servers. This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe slot *n*. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot

Name	Description
Rear NVME-*n* Link Speed drop-down list **set PcieSlotRearNvme*n*LinkSpeed**	**Note** This options is applicable only to Cisco UCS C245 M6 servers. Link speed for NVMe front slot designated by slot *n*. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.
PCIe Slot MSTOR RAID OptionROM drop-down list **set PcieSlotMSTORRAIDOptionROM**	Whether the server can use the Option ROMs present in the PCIe MSTOR RAID. This can be one of the following: • **Disabled**—Option ROM is not available. • **Enabled**—Option ROM is available.
PCIe Slot MSTOR Link Speed drop-down list **set PcieSlotMSTORRAIDLinkSpeed**	Link speed for PCIe front slot designated by slot *n*. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation. • **GEN4**—Link speed can reach up to fourth generation.

Name	Description
IPV6 PXE Support drop-down list **set IPV6PXE**	Enables or disables IPv6 support for PXE. This can be one of the following • **disabled**—IPv6 PXE support is not available. • **enabled**—IPv6 PXE support is always available.
IPV4 PXE Support drop-down list **set IPV4PXE**	Enables or disables IPv4 support for PXE. This can be one of the following • **disabled**—IPv4 PXE support is not available. • **enabled**—IPv4 PXE support is always available.
PCIe ARI Support drop-down list **set PcieARISupport**	Whether PCI Alternative Routing ID Interpretation (ARI) support in Windows is enabled. This can be one of the following: • **auto**—ARI support is set to auto controlled by the system. • **disabled**—ARI support is not available. • **enabled**—ARI support is always available.
SR-IOV Support drop-down list **set SrIov**	SR-IOV feature allows a PCIe device to appear to be multiple separate physical PCIe devices. This can be one of the following: • **Disabled**—SR-IOV feature is disabled. • **Enabled**—SR-IOV feature is enabled.
IPV6 HTTP Support drop-down list **set IPV6HTTP**	Enables or disables IPv6 support for HTTP. This can be one of the following: • **disabled**—IPv6 HTTP support is not available. • **enabled**—IPv6 HTTP support is always available.
IPV4 HTTP Support drop-down list **set IPV4HTTP**	Enables or disables IPv4 support for HTTP. This can be one of the following: • **disabled**—IPv4 HTTP support is not available. • **enabled**—IPv4 HTTP support is always available.

Name	Description
Network Stack drop-down list **set NetworkStack**	This option allows you to monitor IPv6 and IPv4. This can be one of the following • **disabled**—Network Stack support is not available. **Note** When disabled, the value set for **IPV4 PXE Support** does not impact the system. • **enabled**—Network Stack support is always available.

Server Management Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 10: BIOS Parameters in Server Management Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
OS Boot Watchdog Timer Policy drop-down list **set OSBootWatchdogTimerPolicy**	What action the system takes if the watchdog timer expires. This can be one of the following: • **Power Off**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
FRB 2 Timer drop-down list **set FRB-2**	Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.

Name	Description
OS Watchdog Timer drop-down list **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the **OS Boot Watchdog Timer Timeout** field, the Cisco IMC logs an error and takes the action specified in the **OS Boot Watchdog Policy** field.
OS Watchdog Timer Timeout drop-down list **set OSBootWatchdogTimerTimeOut**	If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following: • **5 Minutes**—The OS watchdog timer expires 5 minutes after it begins to boot. • **10 Minutes**—The OS watchdog timer expires 10 minutes after it begins to boot. • **15 Minutes**—The OS watchdog timer expires 15 minutes after it begins to boot. • **20 Minutes**—The OS watchdog timer expires 20 minutes after it begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
Baud Rate drop-down list **set BaudRate**	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: • **9.6k**—A 9,600 Baud rate is used. • **19.2k**—A 19,200 Baud rate is used. • **38.4k**—A 38,400 Baud rate is used. • **57.6k**—A 57,600 Baud rate is used. • **115.2k**—A 115,200 Baud rate is used. This setting must match the setting on the remote terminal application.

Name	Description
Flow Control drop-down list **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **RTS/CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.
Console Redirection drop-down list **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the OS has booted, console redirection is irrelevant. This can be one of the following: • **COM 0**—Enables console redirection on COM 1 during POST. • **COM 1**—Enables console redirection on COM 1 during POST. • **Disabled**—No console redirection occurs during POST.
Terminal type drop-down list **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported VT100 video terminal and its character set are used. • **VT100-PLUS**—A supported VT100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used.

Name	Description
PCIe Slots CDN Control drop-down list **set PcieSlotsCdnEnable**	**Note** This option is available only on Cisco UCS C245 M6 servers equipped with Mellanox cards in slots 2 or 5. Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled • **Enabled**— CDN support is enabled for VIC cards.
CDN Control drop-down list **set cdnEnable**	Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled • **Enabled**— CDN support is enabled for VIC cards.
OptionROM Launch Optimization **set CiscoOpromLaunchOptimization**	When this option is **Enabled**, the OptionROMs only for the controllers present in the boot order policy will be launched. **Note** Some controllers such as Onboard storage controllers, Emulex FC adapters, and GPU controllers though not listed in the boot order policy will have the OptionROM launched. When this option is **Disabled**, all the OptionROMs will be launched.

Name	Description
BIOS Techlog Level **set CiscoDebugLevel**	This option denotes the type of messages in **BIOS tech log** file. The log file can be one of the following types: • **Minimum** - Critical messages will be displayed in the log file. • **Normal** - Warning and loading messages will be displayed in the log file. • **Maximum** - Normal and information related messages will be displayed in the log file. Default value: **Minimum**. **Note** This option is mainly for internal debugging purposes.

Security Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 11: BIOS Parameters in Security Management Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Trusted Platform Module State drop-down list **set TPMControl**	Trusted Platform Module (TPM) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. This can be one of the following: • **Disabled**—The server does not use the TPM. • **Enabled**—The server uses the TPM. **Note** Contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
SHA-1 PCR Bank drop-down list **set SHA1PCRBank**	Enable or Disable SHA-1 PCR Bank. This can be one of the following: • **Disabled**—The server does not use this feature. • **Enabled**—The server uses this feature.
SHA256 PCR Bank drop-down list **set SHA256PCRBank**	Enable or Disable SHA256 PCR Bank. This can be one of the following: • **Disabled**—The server does not use this feature. • **Enabled**—The server uses this feature.
Power on Password drop-down list **set PowerOnPassword**	This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Memory Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 12: BIOS Parameters in Memory Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.

Name	Description
NUMA Nodes per Socket drop-down list **set CbsDfCmnDramNps**	Allows you to configure the memory NUMA domains per socket. This can be one of the following: • **Auto**—Number of channels is set to auto. • **NPS0**—One NUMA node per system. • **NPS1**—One NUMA node per socket. • **NPS2**—Two NUMA nodes per socket, one per Left/Right Half of the SoC. • **NPS4**—Four NUMA nodes per socket, one per Quadrant.
Above 4G Decoding drop-down list **set MemoryMappedIOAbove4GB**	Enables or disables MMIO above 4GB or not. This can be one of the following: • **Disabled**—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **Enabled**—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. **Note** PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.
Chipselect Interleaving drop-down list **set CbsCmnMemMapBankInterleaveDdr4**	Whether memory blocks across the DRAM chip selects for node 0 are interleaved. This can be one of the following: • **Disabled**—Chip selects are not interleaved within the memory controller. • **Auto**—The CPU automatically determines how to interleave chip selects.

Name	Description
Memory interleaving Size drop-down list **set CbsDfCmnMemIntlvSize**	Determines the size of the memory blocks to be interleaved. It also determines the starting address of the interleave (bit 8,9,10 or 11). This can be one of the following: • **Auto** • **256 Bytes** • **512 Bytes** • **1 KB** • **2 KB** • **4 KB**
IOMMU drop-down list **set CbsCmnGnbNbIOMMU**	Input Output Memory Management Unit (IOMMU) allows AMD processors to map virtual addresses to physical addresses. This can be one of the following: • **Auto**—The CPU determines how map these addresses. • **Disabled**—IOMMU is not used. • **Enabled**—Address mapping takes place through the IOMMU.
BankGroupSwap **set CbsCmnMemCtrlBankGroupSwapDdr4**	Determines how physical addresses are assigned to applications. This can be one of the following: • **Auto**—The CPU automatically determines how to assign physical addresses to applications. • **Disabled**—Bank group swap is not used. • **Enabled**—Bank group swap is used to improve the performance of applications.
TSME drop-down list **set TSME**	Allows you to enable Transparent Secure Memory Encryption (TSME). This can be one of the following: • **Auto**—Feature usage is set to auto. • **Disabled**—The processor does not use the TSME function. • **Enabled**—The processor uses the TSME function.

Name	Description
SMEE drop-down list **set CbsCmnCpuSmee**	Whether the processor uses the Secure Memory Encryption Enable (SMEE) function, which provides memory encryption support. This can be one of the following: • **Auto**—The CPU determines how map these addresses. • **Disabled**—The processor does not use the SMEE function. • **Enabled**—The processor uses the SMEE function.
SNP Memory Coverage drop-down list **set CbsDbgCpuSnpMemCover**	Allows you to configure SNP memory coverage. This can be one of the following: • **Auto**—System decides the memory coverage. • **Disabled**—The processor does not use this function. • **Enabled**—This feature is enabled. • **Custom**—Custom size can be defined in **SNP Memory Size to Cover**.
SEV-SNP Support drop-down list **set CbsSevSnpSupport**	Allows you to enable Secure Nested Paging feature. This can be one of the following: • **Disabled**—The processor does not use the SEV-SNP function. • **Enabled**—The processor uses the SEV-SNP function.
BME DMA Mitigation drop-down list **set BmeDmaMitigation**	Allows you to disable the PCI BME bit to mitigate the threat from an unauthorized external DMA. This can be one of the following: • **Disabled**—PCI BME bit is disabled in the BIOS. • **Enabled**—PCI BME bit is enabled in the BIOS.
SNP Memory Size to Cover in MB field **set CbsDbgCpuSnpMemSizeCover**	Allows you to configure SNP memory size.
Burst and Postponed Refresh field **set BurstAndPostponedRefresh**	• **disabled**—The processor does not use the function. • **enabled**—The processor uses the function.

Name	Description
Post Package Repair field **set PostPackageRepair**	Cisco IMC supports Hard-PPR, which permanently remaps accesses from a designated faulty row to a designated spare row. This can be one of the following: • **Hard PPR**—Support is enabled. • **Disabled**—Support is disabled.

Power/Performance Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 13: BIOS Parameters in Power/Performance Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Core Performance Boost drop-down list **set CbsCmnCpuCpb**	Whether the AMD processor increases its frequency on some cores when it is idle or not being used much. This can be one of the following: • **auto**—The CPU automatically determines how to boost performance. • **disabled**—Core performance boost is disabled.
Global C-state Control drop-down list **set CbsCmnCpuGlobalCstateCtrl**	Whether the AMD processors control IO-based C-state generation and DF C-states This can be one of the following: • **auto**—The CPU automatically determines how to control IO-based C-state generation. • **disabled**—Global C-state control is disabled. • **enabled**—Global C-state control is enabled.

BIOS Parameters by Server Model

Name	Description
L1 Stream HW Prefetcher drop-down list **set CbsCmnCpuL1StreamHwPrefetcher**	Whether the processor allows the AMD hardware prefetcher to speculatively fetch streams of data and instruction from memory into the L1 cache when necessary. This can be one of the following: • **auto**—The CPU determines how to place data from I/O devices into the processor cache. • **disabled**—The hardware prefetcher is not used. • **enabled**—The processor uses the hardware prefetcher when cache issues are detected.
L2 Stream HW Prefetcher drop-down list **set CbsCmnCpuL2StreamHwPrefetcher**	Whether the processor allows the AMD hardware prefetcher to speculatively fetch streams of data and instruction from memory into the L2 cache when necessary. This can be one of the following: • **auto**—The CPU determines how to place data from I/O devices into the processor cache. • **disabled**—The hardware prefetcher is not used. • **enabled**—The processor uses the hardware prefetcher when cache issues are detected.
Determinism Slider drop-down list **set CbsCmnDeterminismSlider**	Allows AMD processors to determine how to operate. This can be one of the following: • **auto**—The CPU automatically uses default power determinism settings. • **performance**—Processor operates at the best performance in a consistent manner. • **power**—Processor operates at the maximum allowable performance on a per die basis.
CPPC drop-down list **set CbsCmnGnbSMUCPPC**	Allows you to configure Collaborative Processor Performance Control. This can be one of the following: • **auto**—The CPU automatically uses default CPPC settings. • **disabled**—Feature is disabled. • **enabled**—Collaborative Processor Performance is enabled.

Name	Description
Efficiency Mode Enable drop-down list **set CbsCmnEfficiencyModeEn**	Allows you to configure power consumption based on efficiency. This can be one of the following: • **auto**—The CPU automatically uses default settings. • **enabled**—Efficiency mode is enabled.

Processor Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 14: BIOS Parameters in Processor Tab

Name	Description
Reboot Host Immediately check box	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
SVM Mode drop-down list **set SvmMode**	Whether the processor uses AMD Secure Virtual Machine Technology. This can be one of the following: This can be one of the following: • **disabled**—The processor does not use SVM Technology. • **enabled**—The processor uses SVM Technology.
SMT Mode drop-down list **set CbsCpuSmtCtrl**	Whether the processor uses AMD Simultaneous MultiThreading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **auto**—The processor allows for the parallel execution of multiple threads. • **disabled**—The processor does not use SMT Mode. • **enabled**—The processor uses SMT Mode.

Name	Description
Downcore control 7xx2 drop-down list **set CbsCmnCpuGenDowncoreCtrl**	**Note** This Token is applicable for Tehama servers with 7xx2 Model processors only. The ability to remove one or more cores from operation is supported in the silicon. It may be desirable to reduce the number of cores due to OS restrictions, or power reduction requirements of the system. This item allows the control of how many cores are running. This setting can only reduce the number of cores from those available in the processor. This can be one of the following: • **auto**—The CPU determines how many cores need to be enabled. • TWO (1+1)—Two cores enabled on one CPU complex. • FOUR (2+2)—Four cores enabled on one CPU complex. • SIX (3+3)—Six cores enabled on one CPU complex.

Name	Description
CPU Downcore control 7xx3 drop-down list **set CbsCpuCoreCtrl**	**Note** This Token is applicable for Tehama servers with 7xx3 Model processors only. The ability to remove one or more cores from operation is supported in the silicon. It may be desirable to reduce the number of cores due to OS restrictions, or power reduction requirements of the system. This item allows the control of how many cores are running. This setting can only reduce the number of cores from those available in the processor. This can be one of the following: • **auto**—The CPU determines how many cores need to be enabled. • One (1+0)—One cores enabled on one CPU complex. • TWO (2+0)—Two cores enabled on one CPU complex. • THREE (3+0)—Three cores enabled on one CPU complex. • FOUR (4+0)—Four cores enabled on one CPU complex. • Five (5+0)—Five cores enabled on one CPU complex. • SIX (6+0)—Six cores enabled on one CPU complex. • SEVEN (7+0)—Seven cores enabled on one CPU complex.
Fixed SOC P-State drop-down list **set CbsCmnFixedSocPstate**	This option defines the target PState when APBDIS is set. **P*x*** – Specify a valid PState for the processor installed. This can be one of the following: • P0 • P1 • P2 • P3 • Auto

Name	Description
APBDIS drop-down list **set CbsCmnApbdis**	Allows you to select the APB Disable value for the SMU. This can be one of the following: • **0**—Clear ApbDis to SMU • **1**—Set ApbDis to SMU. • **auto**—The CPU determines the value.
CCD Control drop-down list **set CbsCpuCcdCtrlSsp**	Allows you to specify the number of CCDs that are desired to be enable in the system. This can be one of the following: • **Auto**—The maximum CCDs provided by the processor is enabled. • 2 CCDs • 3 CCDs • 4 CCDs • 6 CCDs
Cisco xGMI Max Speed drop-down list **set CiscoXgmiMaxSpeed**	This option enables 18 Gbps XGMI link speed. This can be one of the following: • **Disabled**—Feature is disabled. • **Enabled**—Feature is enabled.
ACPI SRAT L3 Cache As NUMA Domain drop-down list **set CbsDfCmnAcpiSratL3Numa**	Creates a layer of virtual domains on top of the physical domains in which each CCX is declared to be in its on domain. This can be one of the following: • **Auto**—Set to auto mode. • **Disabled**—Use NPS settings for domain configuration. • **Enabled**— Each CCX is declared to be in its own domain.
Streaming Stores Control drop-down list **set CbsCmnCpuStreamingStoresCtrl**	Enables the streaming stores functionality. This can be one of the following: • **Auto**—Set to auto mode. • **Disabled**—Feature is disabled. • **Enabled**—Feature is enabled.

Name	Description
DF C-States drop-down list **set CbsCmnGnbSMUDfCstates**	When long duration idleness is expected in a system, this control allows the system to transition into a DF Cstate which can set the system into an even lower power state. This can be one of the following: • **Auto**—Set to auto mode. • **Disabled**—Long periods of idleness are not expected so no power savings would be achieved. • **Enabled**— This option is active, saving power when the system is very idle.

For C125 Servers

Server Management Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 15: BIOS Parameters in Server Management Tab

Name	Description
Reboot Host Immediately checkbox	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
OS Boot Watchdog Timer Policy drop-down list **set OSBootWatchdogTimerPolicy**	What action the system takes if the watchdog timer expires. This can be one of the following: • **Power Off**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

Name	Description
OS Watchdog Timer drop-down list **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the **OS Boot Watchdog Timer Timeout** field, the Cisco IMC logs an error and takes the action specified in the **OS Boot Watchdog Policy** field.
Baud Rate drop-down list **set BaudRate**	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: • **9.6k**—A 9,600 Baud rate is used. • **19.2k**—A 19,200 Baud rate is used. • **38.4k**—A 38,400 Baud rate is used. • **57.6k**—A 57,600 Baud rate is used. • **115.2k**—A 115,200 Baud rate is used. This setting must match the setting on the remote terminal application.
Console Redirection drop-down list **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the OS has booted, console redirection is irrelevant. This can be one of the following: • **Serial Port A**—Enables console redirection on serial port A during POST. • **Serial Port B**—Enables console redirection on serial port B during POST. • **Disabled**—No console redirection occurs during POST.

Name	Description
BIOS Techlog Level	This option denotes the type of messages in **BIOS tech log** file. The log file can be one of the following types: • **Minimum** - Critical messages will be displayed in the log file. • **Normal** - Warning and loading messages will be displayed in the log file. • **Maximum** - Normal and information related messages will be displayed in the log file. Default value: **Minimum**. **Note** This option is mainly for internal debugging purposes. **Note** To disable the Fast Boot option, the end user must set the following tokens as mentioned below: BIOS Techlog level to **Normal** OptionROM Launch Optimization to **Disabled**.
OptionROM Launch Optimization	When this option is **Enabled**, the OptionROMs only for the controllers present in the boot order policy will be launched. **Note** Onboard storage controllers though not listed in the boot order policy will have the OptionROM launched. When this option is **Disabled**, all the OptionROMs will be launched. Default value: **Enabled**
FRB 2 Timer drop-down list **set FRB-2**	Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.

Name	Description
OS Watchdog Timer Timeout drop-down list **set OSBootWatchdogTimerTimeOut**	If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following: • **5 Minutes**—The OS watchdog timer expires 5 minutes after it begins to boot. • **10 Minutes**—The OS watchdog timer expires 10 minutes after it begins to boot. • **15 Minutes**—The OS watchdog timer expires 15 minutes after it begins to boot. • **20 Minutes**—The OS watchdog timer expires 20 minutes after it begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
Flow Control drop-down list **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **RTS/CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.
Terminal type drop-down list **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported VT100 video terminal and its character set are used. • **VT100-PLUS**—A supported VT100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used.

Name	Description
CDN Control drop-down list **set cdnEnable**	Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled. • **Enabled**— CDN support is enabled for VIC cards.

Security Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 16: BIOS Parameters in Security Tab

Name	Description
Reboot Host Immediately checkbox	**If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.**
Trusted Platform Module Support drop-down list **set TPMAdminCtrl**	Trusted Platform Module (TPM) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. It can be one of the following: • **Disabled**—The server does not use the TPM. • **Enabled**—The server uses the TPM. **Note** Contact your operating system vendor to make sure the operating system supports this feature.
Power on Password drop-down list **set PowerOnPassword**	This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Memory Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 17: BIOS Parameters in Memory Tab

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
Above 4G Decoding drop-down list **set MemoryMappedIOAbove4GB**	Enables or disables MMIO above 4GB or not. This can be one of the following: • **Disabled**—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **Enabled**—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. **Note** PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.

Name	Description
Memory Interleaving drop-down list	Whether the AMD CPU interleaves the physical memory so that the memory can be accessed while another is being refreshed. This controls fabric level memory interleaving. Channel, die and socket have requirements based on memory populations and will be ignored if the memory does not support the selected option.This can be one of the following: • **auto**—The CPU determines how to interleave memory. • **channel**—Interleaves the physical address space over multiple channels, as opposed to each channel owning single consecutive address spaces. • **die**—Interleaves the physical address space over multiple dies, as opposed to each die owning single consecutive address spaces. • **none**—Consecutive memory blocks are accessed from the same physical memory. • **socket**—Interleaves the physical address space over multiple sockets, as opposed to each socket owning single consecutive address spaces. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Memory Interleaving Size drop-down list	Determines the size of the memory blocks to be interleaved. It also determines the starting address of the interleave (bit 8,9,10 or 11). This can be one of the following: • 1 KB • 2 KB • 256 Bytes • 512 Bytes • **auto**—The CPU determines the size of the memory block. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Chipselect Interleaving drop-down list	Whether memory blocks across the DRAM chip selects for node 0 are interleaved. This can be one of the following: • **auto**—The CPU automatically determines how to interleave chip selects. • **disabled**—Chip selects are not interleaved within the memory controller. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Bank Group Swap drop-down list	Determines how physical addresses are assigned to applications. This can be one of the following: • **auto**—The CPU automatically determines how to assign physical addresses to applications. • **disabled**—Bank group swap is not used. • **enabled**—Bank group swap is used to improve the performance of applications. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
IOMMU drop-down list	Input Output Memory Management Unit (IOMMU) allows AMD processors to map virtual addresses to physical addresses. This can be one of the following: • **auto**—The CPU determines how map these addresses. • **disabled**—IOMMU is not used. • **enabled**—Address mapping takes place through the IOMMU. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
SMEE drop-down list	Whether the processor uses the Secure Memory Encryption Enable (SMEE) function, which provides memory encryption support. This can be one of the following: • **disabled**—The processor does not use the SMEE function. • **enabled**—The processor uses the SMEE function. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
TSME drop-down list	Whether the processor uses the Transparent Secure Memory Encryption (TSME) function, which provides memory encryption support. This can be one of the following: • **disabled**—The processor does not use the TSME function. • **enabled**—The processor uses the TSME function. • **auto** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
SEV drop-down list	Enables running encrypted virtual machines (VMs) in which the code and data of the VM are isolated. This can be one of the following: • **253_ASIDs**—The value is set to 253 Minimum Address Space Identifier (ASIDs). • **509_ASIDs**—The value is set to 509 Minimum Address Space Identifier (ASIDs). • **auto** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
DRAM SW Thermal Throttling drop-down list	Provides a protective mechanism to ensure that the software functions within the temperature limits. When the temperature exceeds the maximum threshold value, the performance is permitted to drop allowing to cool down to the minimum threshold value. This can be one of the following: • **disabled**—The processor does not use the function. • **enabled**—The processor uses the function. • **auto** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Burst and Postponed Refresh drop-down list	• **disabled**—The processor does not use the function. • **enabled**—The processor uses the function. • **auto** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

I/O Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 18: BIOS Parameters in I/O Tab

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
Pcie Slot*n* Oprom drop-down list **set PcieSlotnOptionROM**	Whether the server can use the Option ROMs present in the PCIe card slot designated by *n*. This can be one of the following: • **Disabled**—Option ROM for slot *n* is not available. • **Enabled**—Option ROM for slot *n* is available.

Name	Description
PCIe Slot*n* Link Speed drop-down list **set PcieSlotnLinkSpeed**	System IO Controller *n* (SIOCn) add-on slot (designated by *n*) link speed. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**— The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.
IPV6 PXE Support drop-down list **set IPV6PXE**	Enables or disables IPV6 support for PXE. This can be one of the following • **disabled**—IPV6 PXE support is not available. • **enabled**—IPV6 PXE support is always available.
IPV4 PXE Support drop-down list **set IPV4PXE**	Enables or disables IPV4 support for PXE. This can be one of the following • **disabled**—IPV4 PXE support is not available. • **enabled**—IPV4 PXE support is always available.
SR-IOV Support drop-down list **set SrIov**	Whether SR-IOV (Single Root I/O Virtualization) is enabled or disabled on the server. This can be one of the following: • **Disabled**—SR-IOV is disabled. • **Enabled**—SR-IOV is enabled.
Front NVME *n* OptionROM drop-down list **set PcieSlot *n*OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe *n* slot. This can be one of the following: • **disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe *n* slot. • **enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe *n* slot

Name	Description
Front NVME *n* Link Speed drop-down list **set PcieSlotFrontNvme1LinkSpeed**	Link speed for NVMe front slot *n*. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.
PCIe Slot MSTOR RAID OptionROM drop-down list **set PcieSlotMSTORRAIDOptionROM**	Whether the server can use the Option ROMs present in the PCIe MSTOR RAID. This can be one of the following: • **Disabled**—Option ROM is not available. • **Enabled**—Option ROM is available.
PCIe ARI Support drop-down list **set PcieARISupport**	Beginning with release 4.1(2a), Cisco IMC supports PCIe Alternative Routing ID (ARI) Interpretation feature. The PCIe specification supports greater numbers of virtual funtions through the implementation of ARI, which reinterprets the device number field in the PCIe header allowing for more than eight functions. This can be one of the following: • **Disabled**—PCIe ARI Support is not available. • **Enabled**—PCIe ARI Support is available. • **Auto**—PCIe ARI Support is in auto mode.
IPV6 HTTP Support drop-down list **set IPV6HTTP**	Enables or disables IPv6 support for HTTP. This can be one of the following: • **disabled**—IPv6 HTTP support is not available. • **enabled**—IPv6 HTTP support is always available.
IPV4 HTTP Support drop-down list **set IPV4HTTP**	Enables or disables IPv4 support for HTTP. This can be one of the following: • **disabled**—IPv4 HTTP support is not available. • **enabled**—IPv4 HTTP support is always available.

Power/Performance Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 19: BIOS Parameters in Power/Performance Tab

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
Core Performance Boost drop-down list	Whether the AMD processor increases its frequency on some cores when it is idle or not being used much. This can be one of the following: • **auto**—The CPU automatically determines how to boost performance. • **disabled**—Core performance boost is disabled. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Global C-state Control drop-down list	Whether the AMD processors control IO-based C-state generation and DF C-states This can be one of the following: • **auto**—The CPU automatically determines how to control IO-based C-state generation. • **disabled**—Global C-state control is disabled. • **enabled**—Global C-state control is enabled. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
L1 Stream HW Prefetcher drop-down list	Whether the processor allows the AMD hardware prefetcher to speculatively fetch streams of data and instruction from memory into the L1 cache when necessary. This can be one of the following: • **auto**—The CPU determines how to place data from I/O devices into the processor cache. • **disabled**—The hardware prefetcher is not used. • **enabled**—The processor uses the hardware prefetcher when cache issues are detected. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
L2 Stream HW Prefetcher drop-down list	Whether the processor allows the AMD hardware prefetcher to speculatively fetch streams of data and instruction from memory into the L2 cache when necessary. This can be one of the following: • **auto**—The CPU determines how to place data from I/O devices into the processor cache. • **disabled**—The hardware prefetcher is not used. • **enabled**—The processor uses the hardware prefetcher when cache issues are detected. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
Determinism Slider drop-down list	Allows AMD processors to determine how to operate. This can be one of the following: • **auto**—The CPU automatically uses default power determinism settings. • **performance**—Processor operates at the best performance in a consistent manner. • **power**—Processor operates at the maximum allowable performance on a per die basis. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Processor Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 20: BIOS Parameters in Processor Tab

Name	Description
Reboot Host Immediately checkbox	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.

Name	Description
SMT Mode drop-down list	Whether the processor uses AMD Simultaneous MultiThreading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **auto**—The processor allows for the parallel execution of multiple threads. • **off**—The processor does not permit multithreading. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.
SVM Mode drop-down list	Whether the processor uses AMD Secure Virtual Machine Technology. This can be one of the following: This can be one of the following: • **disabled**—The processor does not use SVM Technology. • **enabled**—The processor uses SVM Technology. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Name	Description
Downcore control drop-down list	Allows AMD processors to disable cores and, thus, select how many cores to enable. This can be one of the following: • FOUR (2+2)—Two cores enabled on each CPU complex. • FOUR (4+0)—Four cores enabled on one CPU complex. • SIX (3+3)—Three cores enabled on each CPU complex. • THREE (3+0)—Three cores enabled on one CPU complex. • TWO (1+1)—Two cores enabled on each CPU complex. • TWO (2+0)—Two cores enabled on one CPU complex. • **auto**—The CPU determines how many cores need to be enabled. • **platform-default** —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

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I/O Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 21: BIOS Parameters in I/O Tab

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
Legacy USB Support drop-down list **set UsbLegacySupport**	Whether the system supports legacy USB devices. This can be one of the following: • **Disabled**—USB devices are only available to EFI applications. • **Enabled**—Legacy USB support is always available.

Name	Description
Intel VT for directed IO drop-down list **set IntelVTD**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions. **Note** If you change this option, you must power cycle the server before the setting takes effect.
Intel VTD coherency support drop-down list **set CoherencySupport**	Whether the processor supports Intel VT-d Coherency. This can be one of the following: • **Disabled**—The processor does not support coherency. • **Enabled**—The processor uses VT-d Coherency as required.
Intel VTD ATS support drop-down list **set ATS**	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: • **Disabled**—The processor does not support ATS. • **Enabled**—The processor uses VT-d ATS as required.
PCIe RAS Support drop-down list	Whether PCIe RAS Support is available on the PCIe slot. This can be one of the following: • **Enabled**— PCIe RAS is available on the slot. • **Disabled**— PCIe RAS is not available on port.
All Onboard LOM Ports drop-down list	Whether all LOM ports are enabled or disabled. This can be one of the following: • **Enabled**— All LOM ports are enabled. • **Disabled**— All LOM ports are disabled.
LOM Port 0 OptionROM drop-down list	Whether Option ROM is available on the LOM port 0. This can be one of the following: • **Disabled**—Option ROM is not available on LOM port 0. • **Enabled**—Option ROM is available on LOM port 0.
LOM Port 1 OptionROM	Whether Option ROM is available on the LOM port 1. This can be one of the following: • **Disabled**—Option ROM is not available on LOM port 1. • **Enabled**—Option ROM is available on LOM port 1.

Name	Description
PCIe Slot *n***OptionROM**drop-down list	Whether the server can use the Option ROMs present in the PCIe Cards. This can be one of the following: • **Disabled**—Option ROM is not available on slot *n*. • **Enabled**—Option ROM is available on slot *n*.
MRAID OptionROM	Whether the server can use the RAID Option ROMs present in the PCIe card slot designated by *n*. This can be one of the following: • **Disabled**—Option ROM for slot *n* is not available. • **Enabled**—Option ROM for slot *n* is available.
MLOM Oprom drop-down list **set PcieSlotMLOMOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the MLOM slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the MLOM slot.
HBA Oprom drop-down list **set PcieSlotHBAOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the HBA slot. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the HBA slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the HBA slot.
Front NVME1 Oprom drop-down list **set PcieSlotN1OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe1 slot. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot
Front NVME2 Oprom drop-down list **set PcieSlotN2OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following: • **Disabled**—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe2 slot. • **Enabled**—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe2 slot

Name	Description
HBA Link Speed drop-down list **set PcieSlotHBALinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe HBA slot. This can be one of the following: • **Disabled**—The maximum speed is not restricted. • **Auto**—System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed.
MLOM Link Speed drop-down list **set PcieSlotMLOMLinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe MLOM slot. This can be one of the following: • **Disabled**—The maximum speed is not restricted. • **Auto**—System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed.
MRAID Link Speed drop-down list	This option allows you to restrict the maximum speed of an adapter card installed in MRAID slot. This can be one of the following: • **Disabled**—The maximum speed is not restricted. • **Auto**—System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed.
PCIe Slot*n* Link Speed drop-down list **set PcieSlotnLinkSpeed**	System IO Controller *n* (SIOCn) add-on slot (designated by *n*) link speed. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**— The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.

Name	Description
Front NVME1 Link Speed drop-down list **set PcieSlotFrontNvme1LinkSpeed**	Link speed for NVMe front slot 1. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.
Front NVME2 Link Speed drop-down list **set PcieSlotFrontNvme2LinkSpeed**	Link speed for NVMe front slot 2. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.
Rear NVME1 Link Speed drop-down list **set PcieSlotRearNvme1LinkSpeed**	Link speed for NVMe rear slot 1. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.
Rear NVME2 Link Speed drop-down list **set PcieSlotRearNvme2LinkSpeed**	Link speed for NVMe rear slot 2. This can be one of the following: • **Disabled**—Slot is disabled, and the card is not enumerated. • **Auto**—The default link speed. Link speed is automatically assigned. • **GEN1**—Link speed can reach up to first generation. • **GEN2**—Link speed can reach up to second generation. • **GEN3**—Link speed can reach up to third generation.

Name	Description
VGA Priority drop-down list **set VgaPriority**	Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following: • **OnBoard**—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port. • **OffBoard**—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port. • **OnBoard VGA Disabled**—Priority is given to the PCIe Graphics adapter, and the onboard VGA device is disabled. The vKVM does not function when the onboard VGA is disabled.
P-SATA OptionROM drop-down list **set pSATA**	Allows you to select the PCH SATA optionROM mode. This can be one of the following: • **LSI SW Raid**— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid. • **Disabled**— Disables both SATA and sSATA controllers.
M2.SATA OptionROM drop-down list **set SataModeSelect**	Mode of operation of Serial Advanced Technology Attachment (SATA) Solid State Drives (SSD). This can be one of the following: • **AHCI**— Sets both SATA and sSATA controllers to AHCI mode. • **LSI SW Raid**— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid. • **Disabled**— Disables both SATA and sSATA controllers.
USB Port Rear drop-down list **set UsbPortRear**	Whether the rear panel USB devices are enabled or disabled. This can be one of the following • **Disabled**— Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**— Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.
USB Port Front drop-down list **set UsbPortFront**	Whether the front panel USB devices are enabled or disabled. This can be one of the following • **Disabled**— Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**— Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.

Name	Description
USB Port Internal drop-down list **set UsbPortInt**	Whether the internal USB devices are enabled or disabled. This can be one of the following • **Disabled**— Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**— Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.
USB Port KVM drop-down list **set UsbPortKVM**	Whether the vKVM ports are enabled or disabled. This can be one of the following • **Disabled**— Disables the vKVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the KVM window. • **Enabled**— Enables the vKVM keyboard and/or mouse devices.
USB Port Internal drop-down list	Whether the USB Port Internal is enabled or disabled. This can be one of the following • **Disabled**— Disables the USB Port Internal. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**— Enables the USB Port Internal. Devices connected to these ports are detected by the BIOS and operating system.
IPV6 PXE Support drop-down list **set IPV6PXE**	Enables or disables IPv6 support for PXE. This can be one of the following • **disabled**—IPv6 PXE support is not available. • **enabled**—IPv6 PXE support is always available.
IPv4 HTTP Support	Enables or disables IPv4 support for HTTP. This can be one of the following • **disabled**—IPv4 HTTP support is not available. • **enabled**—IPv4 HTTP support is always available.
IPv6 HTTP Support	Enables or disables IPv6 support for HTTP. This can be one of the following • **disabled**—IPv6 PXE support is not available. • **enabled**—IPv6 PXE support is always available.
PCIe PLL SSC drop-down list **set PciePllSsc**	Enable this feature to reduce EMI interference by down spreading clock 0.5%. Disable this feature to centralize the clock without spreading. This can be one of the following: • **auto**—EMI interference is auto adjusted. **Disabled**—EMI interference is auto adjusted. • **ZeroPointFive**—EMI interference is reduced by down spreading the clock 0.5%.

Name	Description
IPV4 PXE Support drop-down list **set IPV4PXE**	Enables or disables IPv4 support for PXE. This can be one of the following • **disabled**—IPv4 PXE support is not available. • **enabled**—IPv4 PXE support is always available.
Network Stack drop-down list **set NetworkStack**	This option allows you to monitor IPv6 and IPv4. This can be one of the following • **disabled**—Network Stack support is not available. **Note** When disabled, the value set for **IPV4 PXE Support** does not impact the system. • **enabled**—Network Stack support is always available.
External SSC enable drop-down list **set EnableClockSpreadSpec**	This option allows you to reduce the EMI of your motherboard by modulating the signals it generates so that the spikes are reduced to flatter curves. This can be one of the following: • **Disabled**—Clock Spread Spectrum support is not available. • **Enabled**—Clock Spread Spectrum support is always available.
PCIe Slot MSTOR RAID OptionROM drop-down list **set PcieSlotMSTORRAIDOptionROM**	Whether the server can use the Option ROMs present in the PCIe MSTOR RAID. This can be one of the following: • **Disabled**—Option ROM is not available. • **Enabled**—Option ROM is available.

Server Management Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 22: BIOS Parameters in Server Management Tab

Name	Description
Reboot Host Immediately checkbox	If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.

Name	Description
OS Boot Watchdog Timer Policy drop-down list **set OSBootWatchdogTimerPolicy**	What action the system takes if the watchdog timer expires. This can be one of the following: • **Power Off**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
OS Watchdog Timer drop-down list **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the **OS Boot Watchdog Timer Timeout** field, the Cisco IMC logs an error and takes the action specified in the **OS Boot Watchdog Policy** field.
OS Watchdog Timer Timeout drop-down list **set OSBootWatchdogTimerTimeOut**	If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following: • **5 Minutes**—The OS watchdog timer expires 5 minutes after it begins to boot. • **10 Minutes**—The OS watchdog timer expires 10 minutes after it begins to boot. • **15 Minutes**—The OS watchdog timer expires 15 minutes after it begins to boot. • **20 Minutes**—The OS watchdog timer expires 20 minutes after it begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

Name	Description
Baud Rate drop-down list **set BaudRate**	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: • **9.6k**—A 9,600 Baud rate is used. • **19.2k**—A 19,200 Baud rate is used. • **38.4k**—A 38,400 Baud rate is used. • **57.6k**—A 57,600 Baud rate is used. • **115.2k**—A 115,200 Baud rate is used. This setting must match the setting on the remote terminal application.
Console Redirection drop-down list **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the OS has booted, console redirection is irrelevant. This can be one of the following: • **Serial Port A**—Enables console redirection on serial port A during POST. • **Serial Port B**—Enables console redirection on serial port B during POST. • **Disabled**—No console redirection occurs during POST.

Name	Description
Adaptive Memory Training	When this option is **Enabled**: The Memory training will not happen in every boot but the BIOS will use the saved memory training result in every re-boot. Some exceptions when memory training happens in every boot are: BIOS update, CMOS reset, CPU or Memory configuration change, SPD or run-time uncorrectable error or the last boot has occurred more than 24 hours before. When this option is **Disabled**, the Memory training happens in every boot. Default value: **Enabled**. **Note** To disable the Fast Boot option, the end user must set the following tokens as mentioned below: Adaptive Memory Training to **Disabled** BIOS Techlog level to **Normal** OptionROM Launch Optimization to **Disabled**.
BIOS Techlog Level	This option denotes the type of messages in **BIOS tech log** file. The log file can be one of the following types: • **Minimum** - Critical messages will be displayed in the log file. • **Normal** - Warning and loading messages will be displayed in the log file. • **Maximum** - Normal and information related messages will be displayed in the log file. Default value: **Minimum**. **Note** This option is mainly for internal debugging purposes.

Name	Description
OptionROM Launch Optimization	When this option is **Enabled**, the OptionROMs only for the controllers present in the boot order policy will be launched. **Note** Some controllers such as Onboard storage controllers, Emulex FC adapters, and GPU controllers though not listed in the boot order policy will have the OptionROM launched. When this option is **Disabled**, all the OptionROMs will be launched. Default value: **Enabled**
CDN Control drop-down list **set cdnEnable**	Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled • **Enabled**— CDN support is enabled for VIC cards.
FRB 2 Timer drop-down list **set FRB-2**	Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.
Flow Control drop-down list **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **RTS/CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Terminal type drop-down list **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported VT100 video terminal and its character set are used. • **VT100-PLUS**—A supported VT100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used.
PCIe Slots CDN Control drop-down list **set PcieSlotsCdnEnable**	**Note** This option is available only on Cisco UCS C240 M5 servers equipped with Qlogic cards in slots 2 or 5. Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled • **Enabled**— CDN support is enabled for VIC cards.

Security Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 23: BIOS Parameters in Security Tab

Name	Description
Reboot Host Immediately checkbox	**If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.**
Trusted Platform Module State drop-down list **set TPMAdminCtrl**	Trusted Platform Module (TPM) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. It can be one of the following: • **Disabled**—The server does not use the TPM. • **Enabled**—The server uses the TPM. **Note** Contact your operating system vendor to make sure the operating system supports this feature.
SHA-1 PCR Bank	Enable or Disable SHA-1 PCR Bank. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
SHA256 PCR Bank	Enable or Disable SHA256 PCR Bank. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Intel Trusted Execution Technology Support	Can be Enabled only when Trusted Platform Module (TPM) is Enabled. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Power ON Password drop-down list **set PowerOnPassword**	This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Processor Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 24: BIOS Parameters in Processor Tab

Name	Description
Intel Virtualization Technology drop-down list **set IntelVT**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions.
Extended APIC drop-down list **set LocalX2Apic**	Allows you to enable or disable extended APIC support. This can be one of the following: • **Enabled**—Enables APIC support • **Disabled**—Disables APIC support.
Processor C1E drop-down list **set ProcessorC1E**	Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following: • **Disabled**—The CPU continues to run at its maximum frequency in C1 state. • **Enabled**—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state. **Note** This option is available only on some C-Series servers.

Name	Description
Processor C6 Report drop-down list **set ProcessorC6Report**	Whether the BIOS sends the C6 report to the operating system. When the OS receives the report, it can transition the processor into the lower C6 power state to decrease energy usage while maintaining optimal processor performance. This can be one of the following: • **Disabled**—The BIOS does not send the C6 report. • **Enabled**—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter. **Note** This option is available only on some C-Series servers.
Execute Disable Bit drop-down list **set ExecuteDisable**	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: • **Disabled**—The processor does not classify memory areas. • **Enabled**—The processor classifies memory areas. **Note** Contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
Turbo Mode drop-down list **set IntelTurboBoostTech**	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: • **Disabled**—The processor does not increase its frequency automatically. • **Enabled**—The processor utilizes Turbo Boost Technology if required. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
EIST PSD Function drop-down list	EIST reduces the latency inherent with changing the voltage-frequency pair (P-state), thus allowing those transitions to occur more frequently. This allows for more granular, demand-based switching and can optimize the power-to-performance balance, based on the demands of the applications. This can be one of the following: • HW ALL: The processor is coordinates the P-state among logical processors dependencies. The OS keeps the P-state request up to date on all logical processors. • SW ALL: The OS Power Manager coordinates the P-state among logical processors with dependencies and initiates the transition on all of those Logical Processors.

Name	Description
SpeedStep (Pstates) drop-down list **set EnhancedIntelSpeedStep**	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **Disabled**—The processor never dynamically adjusts its voltage or frequency. • **Enabled**—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. We recommend that you contact your operating system vendor to make sure the operating system supports this feature. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
HyperThreading [ALL] drop-down list **set IntelHyperThread**	Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **Disabled**—The processor does not permit hyperthreading. • **Enabled**—The processor allows for the parallel execution of multiple threads.
Cores Enabled drop-down list **set CoreMultiProcessing**	Allows you to disable one or more of the physical cores on the server. This can be one of the following: • **All**—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • **1 through 27**—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. **Note** Contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
Processor CMCI drop-down list **set ProcessorCMCI**	Allows the CPU to trigger interrupts on corrected machine check events. The corrected machine check interrupt (CMCI) allows faster reaction than the traditional polling timer. This can be one of the following: • **Disabled**—Disables CMCI. • **Enabled**—Enables CMCI. This is the default value.
Enhanced Intel SpeedStep Tech drop-down list **set EnhancedIntelSpeedStep**	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **Disabled**—The processor never dynamically adjusts its voltage or frequency. • **Enabled**—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. We recommend that you contact your operating system vendor to make sure the operating system supports this feature. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Workload Configuration drop-down list **set WorkLdConfig**	This feature allows for workload optimization. The options are Balanced and I/O Sensitive: • **NUMA** • **UMA**
Sub NUMA Clustering drop-down list	Whether the CPU supports sub NUMA clustering, in which the tag directory and the memory channel are always in the same region. This can be one of the following: • **disabled**— Sub NUMA clustering does not occur. • **enabled**— Sub NUMA clustering occurs. • **auto** — The BIOS determines what Sub NUMA clustering is done.

Name	Description
Energy/Performance Bias Config	Displays the energy or performance bias configuration. This can be one of the following: • Balanced Performance • Performance • Balanced Power • Power
XPT Prefetch drop-down list	Whether XPT prefetch is used to enable a read request sent to the last level cache to issue a copy of that request to the memory controller prefetcher. This can be one of the following: • **disabled**—The CPU does not use the XPT Prefetch option. • **enabled**—The CPU enables the XPT prefetch option.
UPI Prefetch drop-down list	UPI prefetch is a mechanism to get the memory read started early on a DDR bus. This can be one of the following: • **disabled**—The processor does not preload any cache data. • **enabled**—The UPI prefetcher preloads the L1 cache with the data it determines to be the most relevant.

Name	Description
Energy Performance Bias Config drop-down list **set CpuEngPerfBias**	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • — The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • — The server provides all server components with enough power to keep a balance between performance and power. • — The server provides all server components with enough power to keep a balance between performance and power. • — The server provides all server components with maximum power to keep reduce power consumption.
Power Performance Tuning drop-down list **set PwrPerfTuning**	Determines if the BIOS or Operating System can turn on the energy performance bias tuning. The options are BIOS and OS. • **bios**— Chooses BIOS for energy performance tuning. • **os**— Chooses OS for energy performance tuning.
LLC Prefetch drop-down list	Whether the processor uses the LLC Prefetch mechanism to fetch the date into the LLC. This can be one of the following: • **disabled**—The processor does not preload any cache data. • **enabled**—The LLC prefetcher preloads the L1 cache with the data it determines to be the most relevant.

Name	Description
Package C State **set package-c-state-limit-config package-c-state-limit**	The amount of power available to the server components when they are idle. This can be one of the following: • **no-limit**—The server may enter any available C state. • **auto** —The CPU determines the physical elevation. • —The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • —When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • —When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • —When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power.
Hardware P-States drop-down list **set CpuHWPM**	Enables processor Hardware P-State. This can be one of the following: • **disabled**—HWPM is disabled. • **hwpm-native-mode**—HWPM native mode is enabled. • **hwpm-oob-mode**—HWPM Out-Of-Box mode is enabled. • **Native Mode with no Legacy** (only GUI)

Name	Description
Intel Speed Select drop-down list **set IntelSpeedSelect**	**Intel Speed Select** modes will allow users to run the CPU with different speed and cores. This can be one of the following: • **Base**— It will allow users to access maximum core and Thermal Design Power (TDP) ratio. • **Config 1**— It will allow users to access core and TDP ratio lesser than **Base**. • **Config 2**— It will allow users to access core and TDP ratio lesser than **Config 1**. Default value: **Base**.
Uncore Frequency Scaling drop-down list **set UFSDisable**	This feature allows you configure the scaling of uncore frequency of the processor. This can be one of the following: • **enabled**—Uncore frequency of the processor scales up or down based on the load. • **disabled**—Uncore frequency of the processor remains fixed. Refer Intel® Dear Customer Letter (DCL) to know the fixed higher and lower values for **Uncore Frequency Scaling**.
Configurable TDP Level drop-down list **set ConfigTDPLevel**	**Configurable TDP Level** feature allows adjustments in processor thermal design power values. By modifying the processor behavior and the performance levels, power consumption of a processor can be configured and TDP can be adjusted as the same time. Hence, a processor operates at higher or lower performance levels, depending on the available cooling capacities and desired power consumption. This can be one of the following: • **Normal** • **Level 1** • **Level 2** Refer Intel® Dear Customer Letter (DCL) to know the values for **TDP level**.

Name	Description
UPI Link Speed drop-down list **set QpiLinkSpeed**	**Note** **UPI Link Frequency Select** token is not applicable for single socket configuration. This feature allows you to configure the Intel Ultra Path Interconnect (UPI) link speed between multiple sockets. This can be one of the following: • **Auto**—This option configures the optimal link speed automatically. • **9.6 GT/s**—This option configures the optimal link speed at 9.6GT/s. • **10.4 GT/s**—This option configures the optimal link speed at 10.4GT/s
Energy Efficient Turbo drop-down list **set EnergyEfficientTurbo**	When energy efficient turbo is enabled, the optimal turbo frequency of the CPU turns dynamic based on CPU utilization. The power/performance bias setting also influences energy efficient turbo. This can be one of the following: • **Disabled**—Energy Efficient Turbo is disabled. • **Enabled**—Energy Efficient Turbo is enabled.
Processor EPP Enable	Displays the selected value for Processor EPP Enable. • **Disabled**—Processor EPP Enable is disabled. • **Enabled**—Processor EPP Enable is enabled.
Autonomous Core C-state drop-down list **set AutoCCState**	Enables CPU Autonomous C-State, which converts the HALT instructions to the MWAIT instructions. This can be one of the following: • **Disabled**—CPU Autonomous C-state is disabled. • **Enabled**—CPU Autonomous C-state is enabled.

Name	Description
Patrol Scrub drop-down list **set PatrolScrub**	Allows the system to actively search for, and correct, single bit memory errors even in unused portions of the memory on the server. This can be one of the following: • **Disabled**—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • **Enabled**—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running. • **Enable at End of POST**—The system checks for memory ECC errors after BIOS POST.
Processor EPP Profile drop-down list **set EPPProfile**	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • Performance • Balanced Performance • Balanced Power • Power

Memory Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 25: BIOS Parameters in Memory Tab

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.

Name	Description
Select Memory RAS configuration drop-down list **set SelectMemoryRAS**	Determines how the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: • **Maximum Performance**—System performance is optimized. • **ADDDC Sparing**—Adaptive virtual lockstep is an algorithm implemented in the hardware and firmware to support the ADDDC mode. When selected, the system performance is optimized till the algorithm is activated. The algorithm is activated in case of DRAM device failure. Once the algorithm is activated, the virtual lockstep regions are activated to map out the failed region during run-time dynamically, and the performance impact is restricted at a region level. • **Mirror Mode 1LM**—System reliability is optimized by using half the system memory as backup. • **Partial Mirror Mode 1LM**—Partial DIMM Mirroring creates a mirrored copy of a specific region of memory cells, rather than keeping the complete mirror copy. Partial Mirroring creates a mirrored region in memory map with the attributes of a partial mirror copy. Up to 50% of the total memory capacity can be mirrored, using up to 4 partial mirrors.
Above 4G Decoding drop-down list **set MemoryMappedIOAbove4GB**	Enables or disables MMIO above 4GB or not. This can be one of the following: • **Disabled**—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **Enabled**—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. **Note** PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.
DCPMM Firmware Downgrade drop-down list **set DCPMMFirmwareDowngrade**	Whether the BIOS supports downgrading the DCPMM firmware. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Name	Description
Partial Memory Mirror Mode drop-down list **set PartialMirrorModeConfig**	The partial memory size is either in percentage or in GB. This can be one of the following: • **Percentage**—The partial memory mirror is defined in percentage. • **Value in GB**—The partial memory mirror is defined in GB. • **Disabled**—Partial memory mirror is disabled.
Partial Mirror percentage field **set PartialMirrorPercent**	Percentage of memory to mirror above 4GB. Enter an integer between 0 and 50.
Partial Mirror1 Size in GB field **set PartialMirrorValue1**	Size of the first partial memory mirror in GB. Enter an integer between 0 and 65535. **Note** The combined memory size of all the partial mirror should not exceed 50% of the physical memory size.
Partial Mirror2 Size in GB field **set PartialMirrorValue2**	Size of the second partial memory mirror in GB. Enter an integer between 0 and 65535. **Note** The combined memory size of all the partial mirror should not exceed 50% of the physical memory size.
Partial Mirror3 Size in GB field **set PartialMirrorValue3**	Size of the third partial memory mirror in GB. Enter an integer between 0 and 65535. **Note** The combined memory size of all the partial mirror should not exceed 50% of the physical memory size.
Partial Mirror4 Size in GB field **set PartialMirrorValue4**	Size of the fourth partial memory mirror in GB. Enter an integer between 0 and 65535. **Note** The combined memory size of all the partial mirror should not exceed 50% of the physical memory size.
Memory Size Limit in GB field **set MemorySizeLimit**	Use this option to reduce the size of the physical memory limit in GB. Enter an integer between 0 and 65535.

Name	Description
NUMA drop-down list **set NUMAOptimize**	Whether the BIOS supports Non-Uniform Memory Access (NUMA). This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
BME DMA Mitigation drop-down list **set BmeDmaMitigation**	Allows you to disable the PCI BME bit to mitigate the threat from an unauthorized external DMA. This can be one of the following: • **Disabled**—PCI BME bit is disabled in the BIOS. • **Enabled**—PCI BME bit is enabled in the BIOS.
Select PPR Type drop-down list **set SelectPprType**	Cisco IMC supports **Hard-PPR**, which permanently remaps accesses from a designated faulty row to a designated spare row. This can be one of the following: • **Hard PPR**—Support is enabled. **Note** Hard PPR can be used only when **Memory RAS Configuration** is set to **ADDDC Sparing**. For other RAS selections, this setting should be set to **Disabled**. • **Disabled**—Support is disabled.
CR QoS drop-down list **CRQoS**	Enables you to select the CR QoS tuning. This can be one of the following: • **Recipe 1**—For QoS knobs and is recommended for 2-2-2 memory configuration in active directory. • **Recipe 2**—For QoS knobs and is recommended for other memory configuration in active directory. • **Recipe 3**—For QoS knobs and is recommended for 1 DIMM per channel configuration. • **Disabled**—**CR QoS** feature is disabled.

Name	Description
Snoopy mode for AD drop-down list **SnoopyModeForAD**	Enables new AD specific feature to avoid directory updates to DDRT memory from non-NUMA optimized workloads. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
CR FastGo Config drop-down list **CrfastgoConfig**	Enables you to select CR QoS configuration profiles. This can be one of the following: • **Default** • **Option 1** • **Option 2** • **Option 3** • **Option 4** • **Option 5** • **Auto**
NVM Performance Setting drop-down list **NvmdimmPerformConfig**	Enables you to configure NVM baseline performance settings depending on the workload behavior. • **BW Optimized** • **Latency Optimized** • **Balanced Profile**
Snoopy mode for 2LM drop-down list **SnoopyModeFor2LM**	Enables you to avoid directory updates to far-memory from non-NUMA optimized workloads. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Name	Description
Memory Thermal Throttling Mode drop-down list **MemoryThermalThrottling**	This function is used for adjusting memory temperature. If memory temperature is excessively high after the function is enabled, the memory access rate is reduced and Baseboard Management Controller (BMC) adjusts the fan to cool down the memory to avoid any DIMM damage. This can be one of the following: • **Disabled**—Support is disabled. • **CLTT with PECI**—Enables Closed Loop Thermal Throttling with Platform Environment Control Interface.
Memory Refresh Rate drop-down list **MemoryRefreshRate**	Enables you to increase or decrease memory refresh rate. Increasing the DRAM refresh rate reduces the maximum number of activates (hammers) that can occur before the next refresh. This can be one of the following: • **1X Refresh**—Refresh rate is at minimum. • **2X Refresh** —Refresh is 2X faster.
Panic and High Watermark drop-down list **PanicHighWatermark**	When set to low, the memory controller does not postpone refreshes while **Memory Refresh Rate** is set to **1X Refresh**. This can be one of the following: • **Low**—Refresh rate is set to low. • **High** —Refresh rate is set to high.
Advanced Memory Test drop-down list **AdvancedMemTest**	**Note** This feature is applicable only to Samsung, Hynix and Micron DIMMs. You can enable advance DIMM testing during BIOS POST using this feature. This can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.
Enhanced Memory Test drop-down list	This can be one of the following: • **Auto**—Support is set to Auto. • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Power/Performance Tab

Note BIOS parameters listed in this tab may vary depending on the server.

Table 26: BIOS Parameters in Power/Performance Tab

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
Hardware Prefetcher drop-down list **set HardwarePrefetch**	Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following: • **Disabled**—The hardware prefetcher is not used. • **Enabled**—The processor uses the hardware prefetcher when cache issues are detected.
Adjacent Cache Line Prefetcher drop-down list **set AdjacentCacheLinePrefetch**	Whether the processor fetches cache lines in even or odd pairs instead of fetching just the required line. This can be one of the following: • **Disabled**—The processor only fetches the required line. • **Enabled**—The processor fetches both the required line and its paired line.
DCU Streamer Prefetch drop-down list **set DcuStreamerPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • **Enabled**—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.
DCU IP Prefetcher drop-down list **set DcuIpPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not preload any cache data. • **Enabled**—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.

Name	Description
CPU Performance drop-down list **set CPUPerformance**	Sets the CPU performance profile for the options listed above. This can be one of the following: • **Enterprise**—All options are enabled. • **HPC**—All options are enabled. This setting is also known as high performance computing. • **Hight Throughput**—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • **Custom**—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured as well.

C460 M4 Servers

Main Tab for C460 M4 Servers

Main BIOS Parameters

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
TPM Support **set TPMAdminCtrl**	TPM (Trusted Platform Module) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. It can be one of the following: • **Disabled**—The server does not use the TPM. • **Enabled**—The server uses the TPM. **Note** We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Power ON Password Support drop-down	This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Actions Area

Name	Description
Save button	Saves the settings for the BIOS parameter and closes the dialog box. If the **Reboot Host Immediately** check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Reset button	Resets the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened.
Restore Defaults button	Sets the BIOS parameters on all three tabs to their default settings.

Advanced Tab for C460 M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.

Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Processor Configuration Parameters

Name	Description
Intel Hyper-Threading Technology **set IntelHyperThread**	Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **Disabled**—The processor does not permit hyperthreading. • **Enabled**—The processor allows for the parallel execution of multiple threads. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
Number of Enabled Cores **set CoreMultiProcessing**	Allows you to disable one or more of the physical cores on the server. This can be one of the following: • **All**—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • **1** through ***n***—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Execute Disable **set ExecuteDisable**	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: • **Disabled**—The processor does not classify memory areas. • **Enabled**—The processor classifies memory areas. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Intel VT **set IntelVT**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions. **Note** If you change this option, you must power cycle the server before the setting takes effect.
Intel VT-d **set IntelVTD**	Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following: • **Disabled**—The processor does not use virtualization technology. • **Enabled**—The processor uses virtualization technology.

Name	Description
Intel(R) Interrupt Remapping drop-down list **set InterruptRemap**	Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following: • **Disabled**—The processor does not support remapping. • **Enabled**—The processor uses VT-d Interrupt Remapping as required.
Intel(R) Passthrough DMA drop-down list **set PassThroughDMA**	Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following: • **Disabled**—The processor does not support pass-through DMA. • **Enabled**—The processor uses VT-d Pass-through DMA as required.
Intel VT-d Coherency Support **set CoherencySupport**	Whether the processor supports Intel VT-d Coherency. This can be one of the following: • **Disabled**—The processor does not support coherency. • **Enabled**—The processor uses VT-d Coherency as required.
Intel VT-d ATS Support **set ATS**	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: • **Disabled**—The processor does not support ATS. • **Enabled**—The processor uses VT-d ATS as required.

Name	Description
CPU Performance **set CPUPerformance**	Sets the CPU performance profile for the server. The performance profile consists of the following options: • DCU Streamer Prefetcher • DCU IP Prefetcher • Hardware Prefetcher • Adjacent Cache-Line Prefetch This can be one of the following: • **Enterprise**—All options are enabled. • **High_Throughput**—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • **HPC**—All options are enabled. This setting is also known as high performance computing. • **Custom**—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured in the fields below.
Hardware Prefetcher **set HardwarePrefetch**	Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following: • **Disabled**—The hardware prefetcher is not used. • **Enabled**—The processor uses the hardware prefetcher when cache issues are detected.
Adjacent Cache Line Prefetcher **set AdjacentCacheLinePrefetch**	Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following: • **Disabled**—The processor only fetches the required line. • **Enabled**— The processor fetches both the required line and its paired line.

Name	Description
DCU Streamer Prefetch **set DcuStreamerPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • **Enabled**—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.
DCU IP Prefetcher **set DcuIpPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not preload any cache data. • **Enabled**—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.
Direct Cache Access Support **set DirectCacheAccess**	Allows processors to increase I/O performance by placing data from I/O devices directly into the processor cache. This setting helps to reduce cache misses. This can be one of the following: • **Disabled**—Data from I/O devices is not placed directly into the processor cache. • **Enabled**—Data from I/O devices is placed directly into the processor cache.
Power Technology **set CPUPowerManagement**	Enables you to configure the CPU power management settings for the following options: • Enhanced Intel Speedstep Technology • Intel Turbo Boost Technology • Processor Power State C6 Power Technology can be one of the following: • **Custom**—The server uses the individual settings for the BIOS parameters mentioned above. You must select this option if you want to change any of these BIOS parameters. • **Disabled**—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored. • **Energy_Efficient**—The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters.

Name	Description
Enhanced Intel Speedstep Technology **set EnhancedIntelSpeedStep**	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **Disabled**—The processor never dynamically adjusts its voltage or frequency. • **Enabled**—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. We recommend that you contact your operating system vendor to make sure the operating system supports this feature. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Intel Turbo Boost Technology **set IntelTurboBoostTech**	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: • **Disabled**—The processor does not increase its frequency automatically. • **Enabled**—The processor utilizes Turbo Boost Technology if required. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Processor C3 Report **set ProcessorC3Report**	Whether the BIOS sends the C3 report to the operating system. When the OS receives the report, it can transition the processor into the lower C3 power state to decrease energy usage while maintaining optimal processor performance. This can be one of the following: • **Disabled**—BIOS does not send C3 report. • **Enabled**—BIOS sends the C3 report, allowing the OS to transition the processor to the C3 low power state. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
Processor C6 Report **set ProcessorC6Report**	Whether the BIOS sends the C6 report to the operating system. When the OS receives the report, it can transition the processor into the lower C6 power state to decrease energy usage while maintaining optimal processor performance. This can be one of the following: • **Disabled**—The BIOS does not send the C6 report. • **Enabled**—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Processor Power State C1 Enhanced **set ProcessorC1EReport**	Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following: • **Disabled**—The CPU continues to run at its maximum frequency in C1 state. • **Enabled**—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.
P-STATE Coordination **set PsdCoordType**	Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification. • **HW_ALL**—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package). • **SW_ALL**—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors. • **SW_ANY**—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
SINGLE_PCTL drop-down list **get SinglePCTLEn**	Facilitates single PCTL support for better processor power management. This can be one of the following: • **No** • **Yes**
Config TDP drop-down list **get ConfigTDP**	Allows you to configure the Thermal Design Power (TDP) settings for the system. TDP is the maximum amount of power allowed for running applications without triggering an overheating event. This can be one of the following: • **Disabled**—Disables the TDP settings. This is the default value. • **Enabled**—Enables the TDP settings.
Energy Performance Tuning **set PwrPerfTuning**	Allows you to choose BIOS or Operating System for energy performance bias tuning. This can be one of the following: • **OS**— Chooses OS for energy performance tuning. • **BIOS**— Chooses BIOS for energy performance tuning.
Energy Performance **set CpuEngPerfBias**	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • **Balanced_Energy** • **Balanced_Performance** • **Energy_Efficient** • **Performance**

Name	Description
Package C State Limit **set PackageCStateLimit**	The amount of power available to the server components when they are idle. This can be one of the following: • **C0_state**—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • **C1_state**—When the CPU is idle, the system slightly reduces the power consumption. This option requires less power than C0 and allows the server to return quickly to high performance mode. • **C3_state**—When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • **C6_state**—When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • **C7_state**—When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves the maximum amount of power but it also requires the longest time for the server to return to high performance mode. • **No_Limit**—The server may enter any available C state.
Extended APIC **set LocalX2Apic**	Allows you to enable or disable extended APIC support. This can be one of the following: • **XAPIC**—Enables APIC support. • **X2APIC**—Enables APIC and also enables Intel VT-d and Interrupt Remapping .
Workload Configuration **set WorkLdConfig**	Allows you to set a parameter to optimize workload characterization. This can be one of the following: • **Balanced**— Chooses balanced option for optimization. • **I/O Sensitive**— Chooses I/O sensitive option for optimization. **Note** We recommend you to set the workload configuration to **Balanced**.

Name	Description
IIO Error Enable drop-down list **get IohErrorEn**	Allows you to generate the IIO-related errors. This can be one of the following: • **Yes** • **No**

Memory Configuration Parameters

Name	Description
Select Memory RAS **set SelectMemoryRAS**	How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: • **Maximum_Performance**—System performance is optimized. • **Mirroring**—System reliability is optimized by using half the system memory as backup. • **Lockstep**—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. This option offers better system performance than Mirroring and better reliability than Maximum Performance but lower reliability than Mirroring and lower system performance than Maximum Performance.
DRAM Clock Throttling **set DRAMClockThrottling**	Allows you to tune the system settings between the memory bandwidth and power consumption. This can be one of the following: • **Balanced**— DRAM clock throttling is reduced, providing a balance between performance and power. • **Performance**—DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power. • **Energy_Efficient**—DRAM clock throttling is increased to improve energy efficiency.

Name	Description
Low Voltage DDR Mode **set LvDDRMode**	Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following: • **Power_Saving_Mode**—The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low. • **Performance_Mode**—The system prioritizes high frequency operations over low voltage operations.
Closed Loop Therm Throt drop-down list **set closedLoopThermThrotl**	Allows for the support of Closed-Loop Thermal Throttling, which improves reliability and reduces CPU power consumption through the automatic voltage control while the CPUs are in the idle state. This can be one of the following: • **Disabled**—Disables closed loop thermal throttling. • **Enabled**—Enables closed loop thermal throttling. This is the default value.
Channel Interleaving **set ChannelInterLeave**	Whether the CPU divides memory blocks and spreads contiguous portions of data across interleaved channels to enable simultaneous read operations. This can be one of the following: • **Auto**—The CPU determines what interleaving is done. • **1_Way**—Some channel interleaving is used. • **2_Way** • **3_Way** • **4_Way**—The maximum amount of channel interleaving is used.
Rank Interleaving **set RankInterLeave**	Whether the CPU interleaves physical ranks of memory so that one rank can be accessed while another is being refreshed. This can be one of the following: • **Auto**—The CPU determines what interleaving is done. • **1_Way**—Some rank interleaving is used. • **2_Way** • **4_Way** • **8_Way**—The maximum amount of rank interleaving is used.

Name	Description
Patrol Scrub **set PatrolScrub**	Whether the system actively searches for, and corrects, single bit memory errors even in unused portions of the memory on the server. This can be one of the following: • **Disabled**—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • **Enabled**—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running.
Demand Scrub **set DemandScrub**	Whether the system corrects single bit memory errors encountered when the CPU or I/O makes a demand read. This can be one of the following: • **Disabled**— Single bit memory errors are not corrected. • **Enabled**— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read.
Altitude **set Altitude**	The approximate number of meters above sea level at which the physical server is installed. This can be one of the following: • **Auto**—The CPU determines the physical elevation. • **300_M**—The server is approximately 300 meters above sea level. • **900_M**—The server is approximately 900 meters above sea level. • **1500_M**—The server is approximately 1500 meters above sea level. • **3000_M**—The server is approximately 3000 meters above sea level.
Panic and High Watermark drop-down list **PanicHighWatermark**	When set to low, the memory controller does not postpone refreshes while **Memory Refresh Rate** is set to **1X Refresh**. This can be one of the following: • **Low**—Refresh rate is set to low. • **High** —Refresh rate is set to high.

QPI Configuration Parameters

Name	Description
QPI Link Frequency Select **set QPILinkFrequency**	The Intel QuickPath Interconnect (QPI) link frequency, in gigatransfers per second (GT/s). This can be one of the following: • **Auto**—The CPU determines the QPI link frequency. • **6.4_GT/s** • **7.2_GT/s** • **8.0_GT/s**
QPI Snoop Mode **set QpiSnoopMode**	The Intel QuickPath Interconnect (QPI) snoop mode. This can be one of the following: • **Disabled**—Disables the QPI snoop mode. • **Cluster on Die**—Enables Cluster On Die. When enabled LLC is split into two parts with an independent caching agent for each. This helps increase the performance in some workloads. This mode is available only for processors that have 10 or more cores. It is the best mode for highly NUMA optimized workloads. • **Auto**—The CPU automatically recognizes this as Early Snoop mode. This is the default value.

USB Configuration Parameters

Name	Description
Legacy USB Support **set LegacyUSBSupport**	Whether the system supports legacy USB devices. This can be one of the following: • **Disabled**—USB devices are only available to EFI applications. • **Enabled**—Legacy USB support is always available. • **Auto**—Disables legacy USB support if no USB devices are connected.
Port 60/64 Emulation **set UsbEmul6064**	Whether the system supports 60h/64h emulation for complete USB keyboard legacy support. This can be one of the following: • **Disabled**—60h/64 emulation is not supported. • **Enabled**—60h/64 emulation is supported. You should select this option if you are using a non-USB aware operating system on the server.

Name	Description
All USB Devices **set AllUsbDevices**	Whether all physical and virtual USB devices are enabled or disabled. This can be one of the following: • **Disabled**—All USB devices are disabled. • **Enabled**—All USB devices are enabled.
USB Port: Rear **set UsbPortRear**	Whether the rear panel USB devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.
USB Port: Internal **set UsbPortInt**	Whether the internal USB devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.
USB Port: KVM **set UsbPortKVM**	Whether the vKVM ports are enabled or disabled. This can be one of the following: • **Disabled**—Disables the vKVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the vKVM window. • **Enabled**—Enables the vKVM keyboard and/or mouse devices.
USB Port: vMedia **set UsbPortVMedia**	Whether the virtual media devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the vMedia devices. • **Enabled**—Enables the vMedia devices.
xHCI Mode **set PchUsb30Mode**	Whether the xHCI controller legacy support is enabled or disabled. This can be one of the following: • **Disabled**—Disables the xHCI controller legacy support. • **Enabled**—Enables the xHCI controller legacy support.

PCI Configuration Parameters

Name	Description
Memory Mapped I/O Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable MMIO above 4GB or not. This can be one of the following: • **Disabled**—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **Enabled**—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. **Note** PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.
SR-IOV Support drop-down list **set SrIov**	Whether SR-IOV (Single Root I/O Virtualization) is enabled or disabled on the server. This can be one of the following: • **Disabled**—SR-IOV is disabled. • **Enabled**—SR-IOV is enabled.

Serial Configuration Parameters

Name	Description
Out-of-Band Mgmt Port **set comSpcrEnable**	Allows you to configure the COM port 0 that can be used for Windows Emergency Management services. ACPI SPCR table is reported based on this setup option. This can be one of the following: • **Disabled**—Configures the COM port 0 as a general purpose port for use with the Windows Operating System. • **Enabled**—Configures the COM port 0 as a remote management port for Windows Emergency Management services.
Console Redirection **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following: • **Disabled**—No console redirection occurs during POST. • **COM_0**—Enables console redirection on COM port 0 during POST. • **COM_1**—Enables console redirection on COM port 1 during POST.

Name	Description
Terminal Type **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported vt100 video terminal and its character set are used. • **VT100+**—A supported vt100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used. **Note** This setting must match the setting on the remote terminal application.
Bits per second **set BaudRate**	What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following: • **9600**—A 9,600 BAUD rate is used. • **19200**—A 19,200 BAUD rate is used. • **38400**—A 38,400 BAUD rate is used. • **57600**—A 57,600 BAUD rate is used. • **115200**—A 115,200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.
Flow Control **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **Hardware_RTS/CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Putty KeyPad **set PuttyFunctionKeyPad**	Allows you to change the action of the PuTTY function keys and the top row of the numeric keypad. This can be one of the following: • **VT100**—The function keys generate **ESC OP** through **ESC O[.** • **LINUX**—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate **ESC [[A** through **ESC [[E**. • **XTERMR6**—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate **ESC OP** through ESC OS, which are the sequences produced by the top row of the keypad on Digital terminals. • **SCO**—The function keys F1 to F12 generate **ESC [M** through **ESC [X**. The function and shift keys generate **ESC [Y** through **ESC [j**. The control and function keys generate **ESC [k** through **ESC [v**. The shift, control and function keys generate **ESC [w** through **ESC [{**. • **ESCN**—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as **ESC [11~** and **ESC [12~**. • **VT400**—The function keys behave like the default mode. The top row of the numeric keypad generates **ESC OP** through **ESC OS**.
Redirection After BIOS POST **set RedirectionAfterPOST**	Whether BIOS console redirection should be active after BIOS POST is complete and control given to the OS bootloader. This can be one of the following: • **Always_Enable**—BIOS Legacy console redirection is active during the OS boot and run time. • **Bootloader**—BIOS Legacy console redirection is disabled before giving control to the OS boot loader.

LOM and PCIe Slots Configuration Parameters

Name	Description
CDN Support for VIC **set CdnEnable**	Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled. • **Enabled**— CDN support is enabled for VIC cards. **Note** CDN support for VIC cards work with Windows 2012 or the latest OS only.

Name	Description
PCI ROM CLP **set PciRomClp**	PCI ROM Command Line Protocol (CLP) controls the execution of different Option ROMs such as PxE and iSCSI that are present in the card. By default, it is disabled. • **Enabled**— Enables you to configure execution of different option ROMs such as PxE and iSCSI for an individual ports separately. • **Disabled**—The default option. You cannot choose different option ROMs. A default option ROM is executed during PCI enumeration.
PCH SATA Mode **set SataModeSelect**	This options allows you to select the PCH SATA mode. This can be one of the following: • **AHCI**—Sets both SATA and sSATA controllers to AHCI mode. • **Disabled**—Disables both SATA and sSATA controllers. • **LSI SW Raid**— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid
All Onboard LOM Ports **set AllLomPortControl**	Whether all LOM ports are enabled or disabled. This can be one of the following: • **Disabled**—All LOM ports are disabled. • **Enabled**—All LOM ports are enabled.
LOM Port *n* OptionROM **set LomOpromControlPort*n***	Whether Option ROM is available on the LOM port designated by ***n***. This can be one of the following: • **Disabled**—The Option ROM for slot ***n*** is not available. • **Enabled**—The Option ROM for slot ***n*** is available. • **UEFI_Only**—The Option ROM for slot ***n*** is available for UEFI only. • **Legacy_Only**—The Option ROM for slot ***n*** is available for legacy only.
All PCIe Slots OptionROM **set PcieOptionROMs**	Whether the server can use Option ROM present in the PCIe Cards. This can be one of the following: • **Disabled**—The Option ROM for slot ***n*** is not available. • **Enabled**—The Option ROM for slot ***n*** is available. • **UEFI_Only**—The Option ROM for slot ***n*** is available for UEFI only. • **Legacy_Only**—The Option ROM for slot ***n*** is available for legacy only.

Name	Description
PCIe Slot:*n* OptionROM **set PcieSlot*n*OptionROM**	Whether the server can use the Option ROMs present in the PCIe Cards. This can be one of the following: • **Disabled**—The Option ROM for slot ***n*** is not available. • **Enabled**—The Option ROM for slot ***n*** is available. • **UEFI_Only**—The Option ROM for slot ***n*** is available for UEFI only. • **Legacy_Only**—The Option ROM for slot ***n*** is available for legacy only.
PCIe Slot:MLOM OptionROM **set PcieSlotMLOMOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:HBA OptionROM **set PcieSlotHBAOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the HBA slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:N1 OptionROM **set PcieSlotN1OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe1 slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.

Name	Description
PCIe Slot:N2 OptionROM **set PcieSlotN2OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:N2 OptionROM **set PcieSlotN2OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:HBA Link Speed **PCIe SlotHBALinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe HBA slot. This can be one of the following: • **Auto**— System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed. • **Disabled**—The maximum speed is not restricted.

BIOS Configuration Dialog Box Button Bar

Important The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

Name	Description
Save Changes button	Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the **Reboot Host Immediately** check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Reset Values button	Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened.
Restore Defaults button	Sets the BIOS parameters on all three tabs to their default settings.
Cancel button	Closes the dialog box without making any changes.

Server Management Tab for C460 M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.

Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Server Management BIOS Parameters

Name	Description
FRB-2 Timer **set FRB-2**	Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.

Name	Description
OS Watchdog Timer **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified by the **set OSBootWatchdogTimerTimeout** command, the Cisco IMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.
OS Watchdog Timer Timeout **set OSBootWatchdogTimerTimeOut**	If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following: • **5_Minutes**—The OS watchdog timer expires 5 minutes after it begins to boot. • **10_Minutes**—The OS watchdog timer expires 10 minutes after it begins to boot. • **15_Minutes**—The OS watchdog timer expires 15 minutes after it begins to boot. • **20_Minutes**—The OS watchdog timer expires 20 minutes after it begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
OS Watchdog Timer Policy **set OSBootWatchdogTimerPolicy**	What action the system takes if the watchdog timer expires. This can be one of the following: • **Do_Nothing**—The server takes no action if the watchdog timer expires during OS boot. • **Power_Down**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

BIOS Configuration Dialog Box Button Bar

Important The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

Name	Description
Save Changes button	Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the **Reboot Host Immediately** check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Reset Values button	Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened.
Restore Defaults button	Sets the BIOS parameters on all three tabs to their default settings.
Cancel button	Closes the dialog box without making any changes.

C220 M4 and C240 M4 Servers

Main Tab for C220M4 and C240M4 Servers

Main BIOS Parameters

Name	Description
Reboot Host Immediately checkbox	Upon checking, reboots the host server immediately. You must check the checkbox after saving changes.
TPM Support **set TPMAdminCtrl**	TPM (Trusted Platform Module) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. It can be one of the following: • **Disabled**—The server does not use the TPM. • **Enabled**—The server uses the TPM. **Note** We recommend that you contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
Power ON Password Support drop-down	This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following: • **Disabled**—Support is disabled. • **Enabled**—Support is enabled.

Actions Area

Name	Description
Save button	Saves the settings for the BIOS parameters and closes the dialog box. If the **Reboot Host Immediately** check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Reset button	Resets the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened.
Restore Defaults button	Sets the BIOS parameters on all three tabs to their default settings.

Advanced Tab for C220M4 and C240M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.

Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

BIOS Parameters by Server Model

Processor Configuration Parameters

Name	Description
Intel Hyper-Threading Technology **set IntelHyperThread**	Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **Disabled**—The processor does not permit hyperthreading. • **Enabled**—The processor allows for the parallel execution of multiple threads. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Number of Enabled Cores **set CoreMultiProcessing**	Allows you to disable one or more of the physical cores on the server. This can be one of the following: • **All**—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • **1** through ***n***—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Execute Disable **set ExecuteDisable**	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: • **Disabled**—The processor does not classify memory areas. • **Enabled**—The processor classifies memory areas. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Intel VT **set IntelVT**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions. **Note** If you change this option, you must power cycle the server before the setting takes effect.

Name	Description
Intel VT-d **set IntelVTD**	Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following: • **Disabled**—The processor does not use virtualization technology. • **Enabled**—The processor uses virtualization technology.
Intel VT-d Interrupt Remapping **set InterruptRemap**	Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following: • **Disabled**—The processor does not support remapping. • **Enabled**—The processor uses VT-d Interrupt Remapping as required.
Intel VT-d PassThrough DMA **set PassThroughDMA**	Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following: • **Disabled**—The processor does not support pass-through DMA. • **Enabled**—The processor uses VT-d Pass-through DMA as required.
Intel VT-d Coherency Support **set CoherencySupport**	Whether the processor supports Intel VT-d Coherency. This can be one of the following: • **Disabled**—The processor does not support coherency. • **Enabled**—The processor uses VT-d Coherency as required.
Intel VT-d ATS Support **set ATS**	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: • **Disabled**—The processor does not support ATS. • **Enabled**—The processor uses VT-d ATS as required.

Name	Description
CPU Performance **set CPUPerformance**	Sets the CPU performance profile for the server. The performance profile consists of the following options: • DCU Streamer Prefetcher • DCU IP Prefetcher • Hardware Prefetcher • Adjacent Cache-Line Prefetch This can be one of the following: • **Enterprise**—All options are enabled. • **High_Throughput**—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • **HPC**—All options are enabled. This setting is also known as high performance computing. • **Custom**—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured in the fields below.
Hardware Prefetcher **set HardwarePrefetch**	Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following: • **Disabled**—The hardware prefetcher is not used. • **Enabled**—The processor uses the hardware prefetcher when cache issues are detected.
Adjacent Cache Line Prefetcher **set AdjacentCacheLinePrefetch**	Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following: • **Disabled**—The processor only fetches the required line. • **Enabled**— The processor fetches both the required line and its paired line.

Name	Description
DCU Streamer Prefetch **set DcuStreamerPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • **Enabled**—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.
DCU IP Prefetcher **set DcuIpPrefetch**	Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following: • **Disabled**—The processor does not preload any cache data. • **Enabled**—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.
Direct Cache Access Support **set DirectCacheAccess**	Allows processors to increase I/O performance by placing data from I/O devices directly into the processor cache. This setting helps to reduce cache misses. This can be one of the following: • **Disabled**—Data from I/O devices is not placed directly into the processor cache. • **Enabled**—Data from I/O devices is placed directly into the processor cache.
Power Technology **set CPUPowerManagement**	Enables you to configure the CPU power management settings for the following options: • Enhanced Intel Speedstep Technology • Intel Turbo Boost Technology • Processor Power State C6 Power Technology can be one of the following: • **Custom**—The server uses the individual settings for the BIOS parameters mentioned above. You must select this option if you want to change any of these BIOS parameters. • **Disabled**—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored. • **Energy_Efficient**—The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters.

Name	Description
Enhanced Intel Speedstep Technology **set EnhancedIntelSpeedStep**	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **Disabled**—The processor never dynamically adjusts its voltage or frequency. • **Enabled**—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. We recommend that you contact your operating system vendor to make sure the operating system supports this feature. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Intel Turbo Boost Technology **set IntelTurboBoostTech**	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: • **Disabled**—The processor does not increase its frequency automatically. • **Enabled**—The processor utilizes Turbo Boost Technology if required. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Processor C3 Report **set ProcessorC3Report**	Whether the BIOS sends the C3 report to the operating system. When the OS receives the report, it can transition the processor into the lower C3 power state to decrease energy usage while maintaining optimal processor performance. This can be one of the following: • **Disabled**—BIOS does not send C3 report. • **Enabled**—BIOS sends the C3 report, allowing the OS to transition the processor to the C3 low power state. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
Processor C6 Report **set ProcessorC6Report**	Whether the BIOS sends the C6 report to the operating system. When the OS receives the report, it can transition the processor into the lower C6 power state to decrease energy usage while maintaining optimal processor performance. This can be one of the following: • **Disabled**—The BIOS does not send the C6 report. • **Enabled**—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.
Processor Power State C1 Enhanced **set ProcessorC1EReport**	Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following: • **Disabled**—The CPU continues to run at its maximum frequency in C1 state. • **Enabled**—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.
P-STATE Coordination **set PsdCoordType**	Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification. • **HW_ALL**—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package). • **SW_ALL**—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors. • **SW_ANY**—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain. **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter.

Name	Description
Boot Performance Mode drop-down list **set BootPerformanceMode**	Allows the user to select the BIOS performance state that is set before the operating system handoff. This can be one of the following: • **Max Performance**—Processor P-state ratio is maximum • **Max Efficient**— Processor P-state ratio is minimum
Energy Performance Tuning **set PwrPerfTuning**	Allows you to choose BIOS or Operating System for energy performance bias tuning. This can be one of the following: • **OS**— Chooses OS for energy performance tuning. • **BIOS**— Chooses BIOS for energy performance tuning.
Energy Performance **set CpuEngPerfBias**	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: • **Balanced_Energy** • **Balanced_Performance** • **Energy_Efficient** • **Performance**

Name	Description
Package C State Limit **set PackageCStateLimit**	The amount of power available to the server components when they are idle. This can be one of the following: • **C0_state**—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • **C1_state**—When the CPU is idle, the system slightly reduces the power consumption. This option requires less power than C0 and allows the server to return quickly to high performance mode. • **C3_state**—When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • **C6_state**—When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • **C7_state**—When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves the maximum amount of power but it also requires the longest time for the server to return to high performance mode. • **No_Limit**—The server may enter any available C state.
Extended APIC **set LocalX2Apic**	Allows you to enable or disable extended APIC support. This can be one of the following: • **XAPIC**—Enables APIC support. • **X2APIC**—Enables APIC and also enables Intel VT-d and Interrupt Remapping .
Workload Configuration **set WorkLdConfig**	Allows you to set a parameter to optimize workload characterization. This can be one of the following: • **Balanced**— Chooses balanced option for optimization. • **I/O Sensitive**— Chooses I/O sensitive option for optimization. **Note** We recommend you to set the workload configuration to **Balanced**.

Name	Description
CPU HWPM drop-down list **set HWPMEnable**	Enables the Hardware Power Management (HWPM) interface for better CPU performance and energy efficiency. This can be one of the following: • **Disabled**—The P-States are controlled the same way as on predecessor processor generations. • **Native Mode**—HWPM works with the operating system through a software interface. • **OOB Mode**—The CPU autonomously controls its frequency based on the operating system energy efficiency.
CPU Autonomous Cstate drop-down list **set AutonumousCstateEnable**	Enables CPU Autonomous C-State, which converts the HALT instructions to the MWAIT instructions. This can be one of the following: • **Disabled**—CPU Autonomous C-state is disabled. This is the default value. • **Enabled**—CPU Autonomous C-state is enabled.
Processor CMCI drop-down list **set CmciEnable**	Allows the CPU to trigger interrupts on corrected machine check events. The corrected machine check interrupt (CMCI) allows faster reaction than the traditional polling timer. This can be one of the following: • **Disabled**—Disables CMCI. • **Enabled**—Enables CMCI. This is the default value.

Memory Configuration Parameters

Name	Description
Select Memory RAS **set SelectMemoryRAS**	How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: • **Maximum_Performance**—System performance is optimized. • **Mirroring**—System reliability is optimized by using half the system memory as backup. • **Lockstep**—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. This option offers better system performance than Mirroring and better reliability than Maximum Performance but lower reliability than Mirroring and lower system performance than Maximum Performance.

Name	Description
NUMA **set NUMAOptimize**	Whether the BIOS supports Non-Uniform Memory Access (NUMA). This can be one of the following: • **Disabled**—The BIOS does not support NUMA. • **Enabled**—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.
Channel Interleaving **set ChannelInterLeave**	Whether the CPU divides memory blocks and spreads contiguous portions of data across interleaved channels to enable simultaneous read operations. This can be one of the following: • **Auto**—The CPU determines what interleaving is done. • **1_Way**—Some channel interleaving is used. • **2_Way** • **3_Way** • **4_Way**—The maximum amount of channel interleaving is used.
Rank Interleaving **set RankInterLeave**	Whether the CPU interleaves physical ranks of memory so that one rank can be accessed while another is being refreshed. This can be one of the following: • **Auto**—The CPU determines what interleaving is done. • **1_Way**—Some rank interleaving is used. • **2_Way** • **4_Way** • **8_Way**—The maximum amount of rank interleaving is used.
Patrol Scrub **set PatrolScrub**	Whether the system actively searches for, and corrects, single bit memory errors even in unused portions of the memory on the server. This can be one of the following: • **Disabled**—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • **Enabled**—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running.

Name	Description
Demand Scrub **set DemandScrub**	Whether the system corrects single bit memory errors encountered when the CPU or I/O makes a demand read. This can be one of the following: • **Disabled**— Single bit memory errors are not corrected. • **Enabled**— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read.
Altitude **set Altitude**	The approximate number of meters above sea level at which the physical server is installed. This can be one of the following: • **Auto**—The CPU determines the physical elevation. • **300_M**—The server is approximately 300 meters above sea level. • **900_M**—The server is approximately 900 meters above sea level. • **1500_M**—The server is approximately 1500 meters above sea level. • **3000_M**—The server is approximately 3000 meters above sea level.
Panic and High Watermark drop-down list **PanicHighWatermark**	When set to low, the memory controller does not postpone refreshes while **Memory Refresh Rate** is set to **1X Refresh**. This can be one of the following: • **Low**—Refresh rate is set to low. • **High** —Refresh rate is set to high.

QPI Configuration Parameters

Name	Description
QPI Link Frequency Select **set QPILinkFrequency**	The Intel QuickPath Interconnect (QPI) link frequency, in gigatransfers per second (GT/s). This can be one of the following: • **Auto**—The CPU determines the QPI link frequency. • **6.4_GT/s** • **7.2_GT/s** • **8.0_GT/s**

Name	Description
QPI Snoop Mode **set QpiSnoopMode**	The Intel QuickPath Interconnect (QPI) snoop mode. This can be one of the following: • **Auto**—The CPU automatically recognizes this as Early Snoop mode. • **Early Snoop**—The distributed cache ring stops can send a snoop probe or a request to another caching agent directly. This mode has lower latency and it is best for workloads that have shared data sets across threads and can benefit from a cache-to-cache transfer, or for workloads that are not NUMA optimized. • **Home Snoop**—The snoop is always spawned by the home agent (centralized ring stop) for the memory controller. This mode has a higher local latency than early snoop, but it provides extra resources for a larger number of outstanding transactions. • **Home Directory Snoop**— The home directory is an optional enabled feature that is implemented at both the HA and iMC logic in the processor. The goal of the directory is to filter snoops to the remote sockets and a node controller in scalable platforms and 2S and 4S configurations. • **Home Directory Snoop with OSB**— In the Opportunistic Snoop Broadcast (OSB) directory mode, the HA could choose to do speculative home snoop broadcast under very lightly loaded conditions even before the directory information has been collected and checked. • **Cluster on Die**—Enables Cluster On Die. When enabled LLC is split into two parts with an independent caching agent for each. This helps increase the performance in some workloads. This mode is available only for processors that have 10 or more cores. It is the best mode for highly NUMA optimized workloads.

USB Configuration Parameters

Name	Description
Legacy USB Support **set LegacyUSBSupport**	Whether the system supports legacy USB devices. This can be one of the following: • **Disabled**—USB devices are only available to EFI applications. • **Enabled**—Legacy USB support is always available. • **Auto**—Disables legacy USB support if no USB devices are connected.

Name	Description
Port 60/64 Emulation **set UsbEmul6064**	Whether the system supports 60h/64h emulation for complete USB keyboard legacy support. This can be one of the following: • **Disabled**—60h/64 emulation is not supported. • **Enabled**—60h/64 emulation is supported. You should select this option if you are using a non-USB aware operating system on the server.
xHCI Mode **set PchUsb30Mode**	Whether the xHCI controller legacy support is enabled or disabled. This can be one of the following: • **Disabled**—Disables the xHCI controller legacy support. • **Enabled**—Enables the xHCI controller legacy support.
xHCI Legacy Support drop-down list **set UsbXhciSupport**	Whether the system supports legacy xHCI controller. This can be one of the following: • **Disabled**—Disables xHCI legacy support. • **Enabled**—Enables xHCI legacy support. This is the default value.
All USB Devices **set AllUsbDevices**	Whether all physical and virtual USB devices are enabled or disabled. This can be one of the following: • **Disabled**—All USB devices are disabled. • **Enabled**—All USB devices are enabled.
USB Port: Rear **set UsbPortRear**	Whether the rear panel USB devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.
USB Port: Front **set UsbPortFront**	Whether the front panel USB devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system • **Enabled**—Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.

Name	Description
USB Port: Internal **set UsbPortInt**	Whether the internal USB devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • **Enabled**—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.
USB Port: KVM **set UsbPortKVM**	Whether the vKVM ports are enabled or disabled. This can be one of the following: • **Disabled**—Disables the vKVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the vKVM window. • **Enabled**—Enables the vKVM keyboard and/or mouse devices.
USB Port: vMedia **set UsbPortVMedia**	Whether the virtual media devices are enabled or disabled. This can be one of the following: • **Disabled**—Disables the vMedia devices. • **Enabled**—Enables the vMedia devices.

PCI Configuration Parameters

Name	Description
Memory Mapped I/O Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable MMIO above 4GB or not. This can be one of the following: • **Disabled**—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • **Enabled**—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. **Note** PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.
Sriov **set SrIov**	Whether SR-IOV (Single Root I/O Virtualization) is enabled or disabled on the server. This can be one of the following: • **Disabled**—SR-IOV is disabled. • **Enabled**—SR-IOV is enabled.

Name	Description
ASPM Support drop-down list **set ASPMSupport**	Allows you to set the level of ASPM (Active Power State Management) support in the BIOS. This can be one of the following: • **Disabled**—ASPM support is disabled in the BIOS. • **Force L0s**—Force all links to L0 standby (L0s) state. • **Auto**—The CPU determines the power state
NVMe SSD Hot-Plug Support drop-down list **set PCIeSSDHotPlugSupport**	Allows you to replace an NVMe SSD without powering down the server. This can be one of the following: • **Disabled**—NVMe SSD hot-plug support is disabled. This is the default value. • **Enabled**—NVMe SSD hot-plug support is enabled.
VGA Priority drop-down list **set VgaPriority**	Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following: • **Onboard**—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port. • **Offboard**—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port. • **Onboard VGA Disabled**—Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled.

Serial Configuration Parameters

Name	Description
Out-of-Band Mgmt Port **set comSpcrEnable**	Allows you to configure the COM port 0 that can be used for Windows Emergency Management services. ACPI SPCR table is reported based on this setup option. This can be one of the following: • **Disabled**—Configures the COM port 0 as a general purpose port for use with the Windows Operating System. • **Enabled**—Configures the COM port 0 as a remote management port for Windows Emergency Management services.

Name	Description
Console Redirection **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following: • **Disabled**—No console redirection occurs during POST. • **COM_0**—Enables console redirection on COM port 0 during POST. • **COM_1**—Enables console redirection on COM port 1 during POST.
Terminal Type **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported vt100 video terminal and its character set are used. • **VT100+**—A supported vt100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used. **Note** This setting must match the setting on the remote terminal application.
Bits per second **set BaudRate**	What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following: • **9600**—A 9,600 BAUD rate is used. • **19200**—A 19,200 BAUD rate is used. • **38400**—A 38,400 BAUD rate is used. • **57600**—A 57,600 BAUD rate is used. • **115200**—A 115,200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Flow Control **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **Hardware_RTS/CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.
Putty KeyPad **set PuttyFunctionKeyPad**	Allows you to change the action of the PuTTY function keys and the top row of the numeric keypad. This can be one of the following: • **VT100**—The function keys generate **ESC OP** through **ESC O[.** • **LINUX**—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate **ESC [[A** through **ESC [[E**. • **XTERMR6**—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate **ESC OP** through ESC OS, which are the sequences produced by the top row of the keypad on Digital terminals. • **SCO**—The function keys F1 to F12 generate **ESC [M** through **ESC [X**. The function and shift keys generate **ESC [Y** through **ESC [j**. The control and function keys generate **ESC [k** through **ESC [v**. The shift, control and function keys generate **ESC [w** through **ESC [{**. • **ESCN**—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as **ESC [11~** and **ESC [12~**. • **VT400**—The function keys behave like the default mode. The top row of the numeric keypad generates **ESC OP** through **ESC OS**.
Redirection After BIOS POST **set RedirectionAfterPOST**	Whether BIOS console redirection should be active after BIOS POST is complete and control given to the OS bootloader. This can be one of the following: • **Always_Enable**—BIOS Legacy console redirection is active during the OS boot and run time. • **Bootloader**—BIOS Legacy console redirection is disabled before giving control to the OS boot loader.

LOM and PCIe Slots Configuration Parameters

Name	Description
CDN Support for VIC **set CdnEnable**	Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: • **Disabled**— CDN support for VIC cards is disabled. • **Enabled**— CDN support is enabled for VIC cards. **Note** CDN support for VIC cards work with Windows 2012 or the latest OS only.
PCI ROM CLP **set PciRomClp**	PCI ROM Command Line Protocol (CLP) controls the execution of different Option ROMs such as PxE and iSCSI that are present in the card. By default, it is disabled. • **Enabled**— Enables you to configure execution of different option ROMs such as PxE and iSCSI for an individual ports separately. • **Disabled**—The default option. You cannot choose different option ROMs. A default option ROM is executed during PCI enumeration.
PCH SATA Mode **set SataModeSelect**	This options allows you to select the PCH SATA mode. This can be one of the following: • **AHCI**—Sets both SATA and sSATA controllers to AHCI mode. • **Disabled**—Disables both SATA and sSATA controllers. • **LSI SW Raid**— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid
All Onboard LOM Ports **set AllLomPortControl**	Whether all LOM ports are enabled or disabled. This can be one of the following: • **Disabled**—All LOM ports are disabled. • **Enabled**—All LOM ports are enabled.
LOM Port *n* OptionROM **set LomOpromControlPort*n***	Whether Option ROM is available on the LOM port designated by ***n***. This can be one of the following: • **Disabled**—The Option ROM for slot ***n*** is not available. • **Enabled**—The Option ROM for slot ***n*** is available. • **UEFI_Only**—The Option ROM for slot ***n*** is available for UEFI only. • **Legacy_Only**—The Option ROM for slot ***n*** is available for legacy only.

Name	Description
All PCIe Slots OptionROM **set PcieOptionROMs**	Whether the server can use Option ROM present in the PCIe Cards. This can be one of the following: • **Disabled**—The Option ROM for slot ***n*** is not available. • **Enabled**—The Option ROM for slot ***n*** is available. • **UEFI_Only**—The Option ROM for slot ***n*** is available for UEFI only. • **Legacy_Only**—The Option ROM for slot ***n*** is available for legacy only.
PCIe Slot:*n* OptionROM **set PcieSlot*n*OptionROM**	Whether the server can use the Option ROMs present in the PCIe Cards. This can be one of the following: • **Disabled**—The Option ROM for slot ***n*** is not available. • **Enabled**—The Option ROM for slot ***n*** is available. • **UEFI_Only**—The Option ROM for slot ***n*** is available for UEFI only. • **Legacy_Only**—The Option ROM for slot ***n*** is available for legacy only.
PCIe Slot:MLOM OptionROM **set PcieSlotMLOMOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:HBA OptionROM **set PcieSlotHBAOptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the HBA slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.

Name	Description
PCIe Slot:N1 OptionROM **set PcieSlotN1OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe1 slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:N2 OptionROM **set PcieSlotN2OptionROM**	This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following: • **Enabled**—Executes both legacy and UEFI Option ROM. • **Disabled**—Both legacy and UEFI Option ROM will not be executed. • **UEFI Only**—Executes only UEFI Option ROM. • **Legacy Only**—Executes only Legacy Option ROM.
PCIe Slot:HBA Link Speed **PCIe SlotHBALinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe HBA slot. This can be one of the following: • **Auto**— System selects the maximum speed allowed. • **GEN1**—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • **GEN2**—5GT/s is the maximum speed allowed. • **GEN3**—8GT/s is the maximum speed allowed. • **Disabled**—The maximum speed is not restricted.

BIOS Configuration Dialog Box Button Bar

Important The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

Name	Description
Save Changes button	Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the **Reboot Host Immediately** check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
Reset Values button	Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened.
Restore Defaults button	Sets the BIOS parameters on all three tabs to their default settings.
Cancel button	Closes the dialog box without making any changes.

Server Management Tab for C220M4 and C240M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.

Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Server Management BIOS Parameters

Name	Description
FRB-2 Timer **set FRB-2**	Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.

Name	Description
OS Watchdog Timer **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified by the **set OSBootWatchdogTimerTimeout** command, the Cisco IMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.
OS Watchdog Timer Timeout **set OSBootWatchdogTimerTimeOut**	If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following: • **5_Minutes**—The OS watchdog timer expires 5 minutes after it begins to boot. • **10_Minutes**—The OS watchdog timer expires 10 minutes after it begins to boot. • **15_Minutes**—The OS watchdog timer expires 15 minutes after it begins to boot. • **20_Minutes**—The OS watchdog timer expires 20 minutes after it begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
OS Watchdog Timer Policy **set OSBootWatchdogTimerPolicy**	What action the system takes if the watchdog timer expires. This can be one of the following: • **Do_Nothing**—The server takes no action if the watchdog timer expires during OS boot. • **Power_Down**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

BIOS Configuration Dialog Box Button Bar

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Save Changes button	Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the **Reboot Host Immediately** check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.
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Cancel button	Closes the dialog box without making any changes.