Cisco UCS C-Series Servers Integrated Management Controller CLI Configuration Guide, Release 1.4

First Published: September 02, 2011

Last Modified: August 14, 2012

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-23490-08

CONTENTS

Preface

This preface includes the following sections:

Audience

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

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

Conventions

This document uses the following conventions:

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

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

Note Means *reader take note*.

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

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

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

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

New and Changed Information for this Release

The following tables provide an overview of the significant changes to this guide for the current release. The tables do not provide an exhaustive list of all changes made to the configuration guides or of the new features in this release.

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

New Features and Significant Behavioral Changes in Cisco Integrated Management Controller software, Release 1.4(6)

Release Notes for Cisco UCS C-Series Software, Release 1.4(6)

Feature	Description	Where Documented
Cisco UCS VIC1225 Virtual Interface Card	Support added for the Cisco UCS VIC1225 Virtual Interface Card.	Managing Network Adapters, on page 77
BIOS Properties	Support for additional BIOS properties for the Cisco UCS C22 M3 Server, Cisco UCS C24 M3 Server, Cisco UCS C220 M3 Server, and the Cisco UCS C240 M3 Server.	BIOS Parameters by Server Model, on page 157

New Features and Significant Behavioral Changes in Cisco Integrated Management Controller software, Release 1.4(5)

Release Notes for Cisco UCS C-Series Software, Release 1.4(5)

Feature	Description	Where Documented
Hard Disk Drive LED	Support added for toggling the LED on an installed hard disk drive.	Managing the Server, on page 15
BIOS Properties	Support for additional BIOS properties for the Cisco UCS C220 M3 Server and the Cisco UCS C240 M3 Server.	BIOS Parameters by Server Model, on page 157

New Features and Significant Behavioral Changes in Cisco Integrated Management Controller software, Release 1.4(4)

Release Notes for Cisco UCS C-Series Software, Release 1.4(4)

Feature	Description	Where Documented
Platform support	The features available in Release 1.4(3) are now available on the Cisco UCS C220 M3 Server and the Cisco UCS C240 M3 Server.	Release Notes for Cisco UCS C-Series Software, Release 1.4(4)
BIOS Properties	Support for additional BIOS properties for the Cisco UCS C220 M3 Server and the Cisco UCS C240 M3 Server.	BIOS Parameters by Server Model, on page 157

New Features and Significant Behavioral Changes in Cisco Integrated Management Controller software, Release 1.4(3)

Release Notes for Cisco UCS C-Series Software, Release 1.4(3)

Feature	Description	Where Documented
Integration with Cisco UCS Manager	The supported servers can be integrated into a Cisco UCS domain.	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
Technical support	Support added for downloading the tech support information file from a browser.	Server Utilities, on page 149
BIOS parameters	Support added for additional BIOS properties.	BIOS Parameters by Server Model, on page 157

New Features and Significant Behavioral Changes in Cisco Integrated Management Controller software, Release 1.4(2)

Release Notes for Cisco UCS C-Series Software, Release 1.4(2)

Feature	Description	Where Documented
Platform support	The features available in Release 1.4(1) are now available on the Cisco UCS C460 M2 Server and the Cisco UCS C260 M2 Server.	Release Notes for Cisco UCS C-Series Software, Release 1.4(2)
BIOS parameters	Support added for additional BIOS properties.	BIOS Parameters by Server Model, on page 157

New Features and Significant Behavioral Changes in Cisco Integrated Management Controller software, Release 1.4(1)

Release Notes for Cisco UCS C-Series Software, Release 1.4(1)

Feature	Description	Where Documented
Platform support	The features in this release apply to the Cisco UCS C200 M1 Server, the Cisco UCS C210 M1 Server, and the Cisco UCS C250 M1 Server.	Release Notes for Cisco UCS C-Series Software, Release 1.4(1)

Feature	Description	Where Documented
VM FEX	Support is added for virtual machine fabric extenders (VM FEX).	Managing Network Adapters, on page 77
Create vHBAs	Support added in the CLI to create up to 16 vHBAs.	Managing Network Adapters, on page 77
Active Directory groups	Support added for Active Directory authorization groups.	Managing User Accounts, on page 59
Enhanced SNMP features	Enhanced SNMPv3 and SNMP trap configuration is relocated in the user interface.	Configuring Communication Services, on page 111
XML API	Support added for CIMC control by an XML API.	Configuring Communication Services, on page 111
HTTP redirect	Support added for redirection of HTTP requests to HTTPS.	Configuring Communication Services, on page 111
BIOS parameters	Support added for additional BIOS properties.	BIOS Parameters by Server Model, on page 157

Related Cisco UCS Documentation

Documentation Roadmaps

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

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

Other Documentation Resources

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

The ISO file is updated after every major documentation release.

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

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 C200 Rack-Mount Server
- Cisco UCS C210 Rack-Mount Server
- Cisco UCS C220 Rack-Mount Server
- Cisco UCS C240 Rack-Mount Server
- Cisco UCS C250 Rack-Mount Server
- Cisco UCS C260 Rack-Mount Server
- Cisco UCS C460 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 two major software systems installed.

CIMC Firmware

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

Server OS

The main server CPU runs an OS such as Windows or Linux. The server ships with a pre-installed OS, but you can install a different OS using the DVD drive or over the network. You can use CIMC to install the new OS using the KVM console and vMedia.

Note You can access the available OS installation documentation from the *Cisco UCS C-Series Servers Documentation Roadmap* at http://www.cisco.com/go/unifiedcomputing/c-series-doc.

Cisco Integrated Management Controller

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

Note The CIMC 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 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 CIMC GUI to invoke CIMC CLI
- View a command that has been invoked through CIMC CLI in CIMC GUI
- Generate CIMC CLI output from CIMC GUI

Tasks You Can Perform in CIMC

You can use CIMC to perform the following server management tasks:

- Power on, power off, power cycle, reset and shut down the server
- Toggle the locator LED
- 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, and IPMI Over LAN
- Manage certificates
- Configure platform event filters
- Update CIMC firmware
- Monitor faults, alarms, and server status

No Operating System or Application Provisioning or Management

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

CIMC CLI

The CIMC CLI is a command-line management interface for Cisco UCS C-Series servers. You can launch the CIMC 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 #
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 #
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 #
vmfex	**scope vmfex** *index* command from adapter mode	/chassis/adapter/vmfex #
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 #

Mode Name	Command to Access	Mode Prompt
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 #
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		/ldap #

Mode Name	Command to Access	Mode Prompt
	scope ldap command from EXEC mode	
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-destination	**scope trap-destination** command from snmp mode	/snmp/trap-destination #
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 #

Complete a Command

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

Command History

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

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

Committing, Discarding, and Viewing Pending Commands

When you enter a configuration command in the CLI, the command is not applied until you enter the **commit** 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.

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.

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

KVM Console

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

Instead of using CD/DVD or floppy drives physically connected to the server, the KVM console uses virtual media, which are actual disk drives or disk image files that are mapped to virtual CD/DVD or floppy drives. 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 KVM console to install an OS on the server.

Note The KVM Console is operated only through the GUI. To launch the KVM 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.

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.
Step 3	Server /chassis # **commit**	Commits the transaction to the system configuration.

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 Locator LED for a Hard Drive

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 # **set 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.

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 #
```

Managing the Server Boot Order

Server Boot Order

Using CIMC, you can configure the order in which the server attempts to boot from available boot device types.

When you change the boot order configuration, CIMC sends the configured boot order to the BIOS the next time the server is rebooted. To implement the new boot order, reboot the server after making the configuration change. The new boot order will take effect on any subsequent reboot. The configured boot order is not sent again until the configuration is changed again.

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

- The BIOS encounters issues while trying to boot using the configured boot order.
- A user changes the boot order directly through the BIOS.

Configuring the Server 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 bios command mode.
Step 2	Server /bios # **set boot-order** *device1*[,*device2*[,*device3*[,*device4*[,*device5*]]]]	Specifies the boot device options and order. You can select one or more of the following: • cdrom—Bootable CD-ROM • fdd—Floppy disk drive • hdd—Hard disk drive • pxe—PXE boot • efi—Extensible Firmware Interface
Step 3	Server /bios # **commit**	Commits the transaction to the system configuration.

The new boot order will be used on the next BIOS boot.

This example sets the boot order and commits the transaction:

```
Server# scope bios
Server /bios # set boot-order hdd,cdrom,fdd,pxe,efi
Server /bios *# commit
Server /bios #  show detail
BIOS:
    Boot Order: HDD,CDROM,FDD,PXE,EFI

Server /bios #
```

What to Do Next

Reboot the server to boot with your new boot order.

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 CIMC.

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.

This example displays the actual 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 #
```

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.

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.

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 CIMC, the server will not become active immediately when powered on. In this case, the server will enter standby mode until the CIMC 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 chassis command mode.
Step 2	Server /chassis # **power on**	Turns on the server.

This example turns on the server:

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

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

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.

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.

This example power cycles the server:

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

Configuring Power Policies

Viewing the Power Statistics

Procedure

	Command or Action	Purpose
Step 1	Server# **show power-cap [detail]**	Displays the server power consumption statistics and the power cap policy.

The displayed fields are described in the following table:

Name	Description
Current Consumption	The power currently being used by the server, in watts.
Maximum Consumption	The maximum number of watts consumed by the server since the last time it was rebooted.
Minimum Consumption	The minimum number of watts consumed by the server since the last time it was rebooted.
Minimum Configurable Limit	The minimum amount of power that can be specified as the peak power cap for this server, in watts.
Maximum Configurable Limit	The maximum amount of power that can be specified as the peak power cap for this server, in watts.

Additional fields are described in the following table:

Name	Description
Enable Power Capping	If power capping is enabled, the system monitors how much power is allocated to the server and takes the specified action if the server goes over its maximum allotment.
Peak Power	The maximum number of watts that can be allocated to this server. If the server requests more power than specified in this field, the system takes the action defined in the **Non-Compliance Action** field. Enter a number of watts within the range defined by the **Minimum Configurable Limit** field and the **Maximum Configurable Limit** field.

Name	Description
Non-Compliance Action	The action the system should take if power capping is enabled and the server requests more than its peak power allotment. This can be one of the following: • **force-power-reduction**—The server is forced to reduce its power consumption by any means necessary. This option is available only on some C-Series servers. • **none**—No action is taken and the server is allowed to use more power than specified in the **Peak Power** field. • **power-off-host**—The server is shut down. • **throttle**—Processes running on the server are throttled to bring the total power consumption down.

This example displays the detailed power statistics:

```
Server# show power-cap detail
    Cur Consumption (W): 247
    Max Consumption (W): 286
    Min Consumption (W): 229
    Minimum Configurable Limit (W): 285
    Maximum Configurable Limit (W): 1250
    Power Cap Enabled: yes
    Peak Power: 0
    Non Compliance Action: throttle

Server#
```

Power Capping Policy

The power capping policy determines how server power consumption is actively managed. When power capping is enabled, the system monitors how much power is allocated to the server and attempts to keep the power consumption below the allocated power. If the server exceeds its maximum allotment, the power capping policy triggers the specified non-compliance action.

Configuring the Power Cap Policy

Note This feature is not available on some servers.

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope power-cap**	Enters the power cap command mode.
Step 2	Server /power-cap # **set enabled** {**yes** | **no**}	Enables or disables the capping of power to the server.
Step 3	Server /power-cap # **set peak-power** *watts*	Specifies the maximum number of watts that can be allocated to this server. Enter a number of *watts* within the range defined by the **Minimum Configurable Limit** field and the **Maximum Configurable Limit** field of the **show power-cap detail** command output. These fields are determined by the server model. If the server requests more power than specified in this command, the system takes the action defined by the **set non-compliance-action** command.
Step 4	Server /power-cap # **set non-compliance-action** {**force-power-reduction** | **none** | **power-off-host** | **throttle**}	Specifies the action the system should take if power capping is enabled and the server requests more than its peak power allotment. This can be one of the following: • **force-power-reduction**—The server is forced to reduce its power consumption by any means necessary. This option is not available on some server models. • **none**—No action is taken and the server is allowed to use more power than specified in the peak power setting. • **power-off-host**—The server is shut down. • **throttle**—Processes running on the server are throttled to bring the total power consumption down.
Step 5	Server /power-cap # **commit**	Commits the transaction to the system configuration.

This example enables and configures a power cap policy and commits the transaction:

```
Server# scope power-cap
Server /power-cap # set enabled yes
Server /power-cap *# set peak-power 1000
Server /power-cap *# set non-compliance-action throttle
Server /power-cap *# commit
Server /power-cap #  show detail
    Cur Consumption (W): 688
    Max Consumption (W): 1620
    Min Consumption (W): 48
    Minimum Configurable Limit (W): 500
    Maximum Configurable Limit (W): 2000
    Power Cap Enabled: yes
    Peak Power: 1000
    Non Compliance Action: throttle

Server /power-cap #
```

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 chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **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 3	Server /chassis # **set delay** {**fixed** | **random**}	(Optional) 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 4	Server /chassis # **set delay-value** *delay*	(Optional) Specifies the delay time in seconds. The range is 0 to 240; the default is 0.
Step 5	Server /chassis # **commit**	Commits the transaction to the system configuration.

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 chassis
Server /chassis # set policy power-on
Server /chassis *# set delay fixed
Server /chassis *# set delay-value 180
Server /chassis *# commit
Server /chassis #  show detail
Chassis:
    Power: on
    Serial Number: QCI1404A1IT
    Product Name: UCS C200 M1
    PID : R200-1120402
    UUID: 01A6E738-D8FE-DE11-76AE-8843E138AE04
    Locator LED: off
```

```
    Description: Testing power restore
    Power Restore Policy: power-on
    Power Delay Type: fixed
    Power Delay Value(sec): 180

Server /chassis #
```

Managing the Flexible Flash Controller

Cisco Flexible Flash

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 CIMC as four virtual USB drives. Three are preloaded with Cisco software and the fourth can hold a user-installed hypervisor or other content. The four virtual drives are as follows:

- Cisco UCS Server Configuration Utility (bootable)
- User-installed (may be bootable)
- Cisco drivers (not bootable)
- Cisco Host Upgrade Utility (bootable)

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

Configuring the Flexible Flash Controller Properties

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	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 # **scope operational-profile**	Enters the operational profile command mode.

	Command or Action	Purpose
Step 4	Server /chassis/flexflash/operational-profile # **set error-count-threshold**	Specifies the number of read/write errors that are permitted while accessing the Cisco Flexible Flash card. If the number of errors exceeds this threshold, the Cisco Flexible Flash card is disabled and you must reset it manually before CIMC attempts to access it again. To specify a read/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 5	Server /chassis/flexflash/operational-profile # **set raid-primary-member** {**slot1** | **slot2**}	The slot in which the primary copy of the data resides. **Important** Currently, Cisco Flexible Flash cards are supported only in slot 1. Therefore, this field must be set to **slot1**.
Step 6	Server /chassis/flexflash/operational-profile # **set virtual-drives-enabled** *list*	Specifies a list of virtual drives to be made available to the server as a USB-style drive. The options are as follows: • **SCU**—The server can access the Cisco UCS Server Configuration Utility. • **DRIVERS**—The server can access the Cisco drivers volume. • **HV**—The server can access a user-installed hypervisor. • **HUU**—The server can access the Cisco Host Upgrade Utility. When specifying more than one option, you must enclose the list in quotation marks (").
Step 7	Server /chassis/adapter # **commit**	Commits the transaction to the system configuration.

This example configures 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 error-count-threshold 100
Server /chassis/flexflash/operational-profile *# set raid-primary-member slot1
Server /chassis/flexflash/operational-profile *# set virtual-drives-enabled "SCU HUU"
Server /chassis/flexflash/operational-profile *# commit
Server /chassis/flexflash/operational-profile #
```

Booting from the Flexible Flash

You can specify a bootable virtual drive on the Cisco Flexible Flash card that will override the default boot priority the next time the server is restarted, regardless of the default boot order defined for the server. The specified boot device is used only once. After the server has rebooted, this setting is ignored.

Note Before you reboot the server, ensure that the virtual drive you select is enabled on the Cisco Flexible Flash card.

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 bios**	Enters the BIOS command mode.
Step 2	Server /bios # **set boot-override** {**None** | **SCU** | **HV** | **HUU**}	The virtual drive from which the server attempts to boot the next time it is restarted. This can be one of the following: • **None**—The server uses the default boot order • **SCU**—The server boots from the Cisco UCS Server Configuration Utility • **HV**—The server boots from the hypervisor virtual drive • **HUU**—The server boots from the Cisco Host Upgrade Utility
Step 3	Server /bios # **commit**	Commits the transaction to the system configuration.

This example specifies that the server boots from the Cisco UCS Server Configuration Utility the next time it is restarted:

```
Server# scope bios
Server /bios # set boot-override SCU
Committing the boot override BIOS will try boot to
the specified boot device first. Failure to detect
the boot device BIOS will boot from the list
configured in the BIOS boot order.
Server /bios *# commit
Server /bios #
```

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	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.

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 BIOS Settings

Viewing BIOS Status

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
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 order of bootable target types that the server will attempt to use.

Name	Description
Boot Override Priority	This can be None, SCU, HV, or HUU.
FW Update/Recovery Status	The status of any pending firmware update or recovery action.
FW Update/Recovery Progress	The percentage of completion of the most recent firmware update or recovery action.

This example displays the BIOS status:

```
Server# scope bios
Server /bios # show detail
    BIOS Version: "C460M1.1.2.2a.0 (Build Date: 01/12/2011)"
    Boot Order: EFI,CDROM,HDD
    Boot Override Priority:
    FW Update/Recovery Status: NONE
    FW Update/Recovery Progress: 100

Server /bios #
```

Configuring Main 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 main**	Enters the main BIOS settings command mode.
Step 3	Configure the BIOS settings.	The BIOS parameters available depend on the model of the server that you are using. For descriptions and information about the options for each BIOS setting, see one the following topics: • Main BIOS Parameters for C22 and C24 Servers , on page 157 • Main BIOS Parameters for C200 and C210 Servers , on page 172 • Main BIOS Parameters for C250 Servers , on page 200 • Main BIOS Parameters for C260 Servers , on page 213 • Main BIOS Parameters for C460 Servers , on page 225
Step 4	Server /bios/main # **commit**	Commits the transaction to the system configuration. Changes are applied on the next server reboot. If server power is on, you are prompted to choose whether to reboot now.

This example configures the BIOS to pause the boot upon a critical POST error and commits the transaction:

```
Server# scope bios
Server /bios # scope main
Server /bios/main # set POSTErrorPause Enabled
Server /bios/main *# 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/main #
```

Configuring Advanced BIOS Settings

Note Depending on your installed hardware, some configuration options described in this topic may not appear.

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 advanced**	Enters the advanced BIOS settings command mode.
Step 3	Configure the BIOS settings.	The BIOS parameters available depend on the model of the server that you are using. For descriptions and information about the options for each BIOS setting, see one the following topics: • Advanced BIOS Parameters for C22 and C24 Servers , on page 158 • Advanced BIOS Parameters for C200 and C210 Servers, on page 173 • Advanced BIOS Parameters for C250 Servers , on page 201 • Advanced BIOS Parameters for C260 Servers , on page 213 • Advanced BIOS Parameters for C460 Servers , on page 225
Step 4	Server /bios/advanced # **commit**	Commits the transaction to the system configuration. Changes are applied on the next server reboot. If server power is on, you are prompted to choose whether to reboot now.

This example enables low voltage DDR memory mode and commits the transaction:

```
Server# scope bios
Server /bios # scope advanced
Server /bios/advanced # set LvDDRMode Enabled
Server /bios/advanced *# 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/advanced #
```

Configuring Server Management 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 server-management**	Enters the server management BIOS settings command mode.
Step 3	Configure the BIOS settings.	The BIOS parameters available depend on the model of the server that you are using. For descriptions and information about the options for each BIOS setting, see one the following topics: • Server Management BIOS Parameters for C22 and C24 Servers , on page 169 • Server Management BIOS Parameters for C200 and C210 Servers , on page 182 • Server Management BIOS Parameters for C250 Servers , on page 210 • Server Management BIOS Parameters for C260 Servers , on page 222 • Server Management BIOS Parameters for C460 Servers , on page 234
Step 4	Server /bios/server-management # **commit**	Commits the transaction to the system configuration. Changes are applied on the next server reboot. If server power is on, you are prompted to choose whether to reboot now.

This example enables automatic detection of the BMC and commits the transaction:

```
Server# scope bios
Server /bios # scope server-management
Server /bios/server-management # set BMCPnP Enabled
Server /bios/server-management *# 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/server-management #
```

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.

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
```

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.

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:
    Power Restore Policy: power-off
    Power Delay Type: fixed
    Power Delay Value(sec): 0
```

```
Server#
```

Viewing CIMC Properties

Note CIMC 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 CIMC properties.

This example displays CIMC properties:

```
Server# show cimc detail
CIMC:
    Firmware Version: 1.4(2.18)
    Current Time: Wed Jan 11 07:01:50 2012
    Boot-loader Version: 1.4(2.18).16

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.

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.

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.

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 #
```

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. **Note** This command displays all MegaRAID controllers on the server that can be managed through CIMC. If an installed controller or storage device is not displayed, then it cannot be managed through CIMC.
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.

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	Server /chassis # **show flexflash [detail]**	(Optional) Displays the available Cisco Flexible Flash controllers.
Step 3	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.

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.

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.
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.

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 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.

This example displays PCI adapter properties:

```
Server# scope chassis
Server /chassis # show pci-adapter
Name             Slot  Vendor ID    Device ID    Product Name
---------------- ----- ------------ ------------ ------------------------
PCIe Adapter1    1     0x1137       0x0042       Cisco UCS P81E Virtual...
PCIe Adapter2    5     0x1077       0x2432       Qlogic QLE2462 4Gb dua...

Server /chassis #
```

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 cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the network command mode.
Step 3	Server /cimc/network # **show lom-mac-list** [**detail**]	Displays the MAC addresses of the LOM ports.

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

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # show lom-mac-list
Interface       MAC Address
--------------- --------------------
eth0            010000002000
eth1            010000002000

Server /cimc/network #
```

CHAPTER 5

Viewing Server Sensors

This chapter includes the following sections:

Viewing the Fault Summary

Procedure

	Command or Action	Purpose
Step 1	Server# **scope fault**	Enters fault command mode.
Step 2	Server /fault # **show discrete-alarm [detail]**	Displays a summary of faults from discrete sensors.
Step 3	Server /fault # **show threshold-alarm [detail]**	Displays a summary of faults from threshold sensors.

This example displays a summary of faults from discrete sensors:

```
Server# scope fault
Server /fault # show discrete-alarm
Name         Reading              Sensor Status
------------ -------------------- ------------------------------------
PSU2_STATUS  absent               Critical
```

```
Server /fault #
```

Viewing Power Supply Sensors

Procedure

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

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
------------------- -------------------- ---------- ---------- --------------
-------------- --------------- ---------------
PSU1_STATUS          Normal               present

PSU2_STATUS          Normal               present

Server /sensor # show psu-redundancy
Name                Reading    Sensor Status
------------------- ---------- --------------------
PSU_REDUNDANCY       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.

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
------------------- -------------- ---------- ---------- --------------- ---------------
```

```
---------------- ----------------
W793_FAN2_TACH1       Normal          2400        RPM         N/A             N/A
800              N/A
W793_FAN2_TACH2       Normal          2400        RPM         N/A             N/A
800              N/A
W793_FAN3_TACH1       Normal          2300        RPM         N/A             N/A
800              N/A
W793_FAN3_TACH2       Normal          2300        RPM         N/A             N/A
800              N/A
W793_FAN4_TACH1       Normal          2400        RPM         N/A             N/A
800              N/A
W793_FAN4_TACH2       Normal          1600        RPM         N/A             N/A
800              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.

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.

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.

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.
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.

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 #
```

CHAPTER 6

Managing Remote Presence

This chapter includes the following sections:

Managing the Virtual KVM

KVM Console

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

Instead of using CD/DVD or floppy drives physically connected to the server, the KVM console uses virtual media, which are actual disk drives or disk image files that are mapped to virtual CD/DVD or floppy drives. 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 KVM console to install an OS on the server.

Note The KVM Console is operated only through the GUI. To launch the KVM 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.

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.

	Command or Action	Purpose
Step 3	Server /kvm # **commit**	Commits the transaction to the system configuration.
Step 4	Server /kvm # **show** [**detail**]	(Optional) Displays the virtual KVM configuration.

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.
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.

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.
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 # **commit**	Commits the transaction to the system configuration.
Step 5	Server /vmedia # **show** [**detail**]	(Optional) Displays the virtual media configuration.

This example configures virtual media encryption:

```
Server# scope vmedia
Server /vmedia # set enabled yes
Server /vmedia *# set encryption yes
Server /vmedia *# commit
Server /vmedia # show detail
vMedia Settings:
    Encryption Enabled: yes
    Enabled: yes
    Max Sessions: 1
    Active Sessions: 0

Server /vmedia #
```

What to Do Next

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

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 CIMC.

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.

	Command or Action	Purpose
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.
Step 4	Server /sol # **set comport** {**com0** | **com1**	(Optional) Sets the serial port through which the system routes SoL communications. **Note** This field 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.

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 CIMC.
Step 3	Server /user # **set name** *username*	Specifies the username for the user.
Step 4	Server /user # **set password**	You are prompted to enter the password twice.
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

	Command or Action	Purpose
		• 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 • 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.

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
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
```

Configuring Active Directory

Active Directory

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 CIMC utilizes the Kerberos-based authentication service of Active Directory.

When Active Directory is enabled in the CIMC, user authentication and role authorization is performed by Active Directory for user accounts not found in the local user database.

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

Configuring the Active Directory Server

The CIMC can be configured to use Active Directory for user authentication and authorization. To use Active Directory, configure users with an attribute that holds the user role and locale information for the CIMC. You can use an existing LDAP attribute that is mapped to the CIMC user roles and locales or you can modify the Active Directory 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. For more information about altering the Active Directory schema, see the article at http://technet.microsoft.com/en-us/library/bb727064.aspx.

The following steps are to be performed on the Active Directory server.

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

Procedure

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

Step 2 Using the Active Directory 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 Active Directory 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 CIMC:

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 CIMC to configure Active Directory.

Configuring Active Directory in CIMC

Configure Active Directory (AD) in CIMC when you want to use an AD 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 for AD configuration.
Step 2	Server /ldap # **set enabled** {**yes** | **no**}	Enables or disables AD. When AD is enabled, user authentication and role authorization is performed by AD for user accounts not found in the local user database.
Step 3	Server /ldap # **set dc***n dc-host*	Specifies an Active Directory domain controller (DC) host name or IP address. You can specify up to three DCs using index *n* values from 1 to 3.
Step 4	Server /ldap # **set gc***n gc-host*	Specifies an Active Directory global catalog (GC) server host name or IP address. You can specify up to three GCs using index *n* values from 1 to 3.
Step 5	Server /ldap # **set timeout** *seconds*	Specifies the number of seconds the CIMC waits until the LDAP search operation times out.
Step 6	Server /ldap # **set encrypted** {**yes** | **no**}	If encryption is enabled, the server encrypts all information sent to AD.
Step 7	Server /ldap # **set base-dn** *domain-name*	Specifies the domain that all users must be in.
Step 8	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 CIMC 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 restricted to read-only.

	Command or Action	Purpose
Step 9	Server /ldap # **commit**	Commits the transaction to the system configuration.
Step 10	Server /ldap # **show** [**detail**]	(Optional) Displays the AD configuration.

This example configures AD using the CiscoAVPair attribute:

```
Server# scope ldap
Server /ldap # set enabled yes
Server /ldap *# set dc1 192.0.20.123
Server /ldap *# set gc1 192.0.20.11
Server /ldap *# set timeout 60
Server /ldap *# set encrypted yes
Server /ldap *# set base-dn example.com
Server /ldap *# set attribute CiscoAVPair
Server /ldap *# commit
Server /ldap # show detail
LDAP Settings:
    Domain Controller 1: 192.0.20.123
    Domain Controller 2: 0.0.0.0
    Domain Controller 3: 0.0.0.0
    BaseDN: example.com
    Encrypted: yes
    Timeout: 60
    Enabled: yes
    Attribute: CiscoAvPair
    Group Authorization: no
    Global Catalog 1: 192.0.20.11
    Global Catalog 2: 0.0.0.0
    Global Catalog 3: 0.0.0.0

Server /ldap #
```

What to Do Next

If you want to use Active Directory groups for group authorization, see *Configuring Active Directory Groups in CIMC*.

Configuring Active Directory Groups in CIMC

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 CIMC 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 # **set group-auth** {**yes** | **no**}	Enables or disables AD group authorization.
Step 3	Server /ldap # **scope role-group** *index*	Selects one of the five available group profiles for configuration, where *index* is a number between 1 and 5.
Step 4	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 5	Server /ldap/role-group # **set domain** *domain-name*	Specifies the AD domain the group must reside in.
Step 6	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. • **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 7	Server /ldap/role-group # **commit**	Commits the transaction to the system configuration.

This example shows how to configure AD group authorization:

```
Server# scope ldap
Server /ldap # 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  Name             Domain           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 #
```

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.
Username column	The username for the user.
IP Address column	The IP address from which the user accessed the server.
Type column	The method by which the user accessed the server.
Action column	If your user account is assigned the **admin** user role, this column displays **Terminate** if you can force the associated user session to end. Otherwise it displays **N/A**. **Note** You cannot terminate your current session from this tab.

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.
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.

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 CIMC. The following network mode options are available, depending on your platform:

- **Dedicated**—The management port is used to access the CIMC.
- **Shared LOM**—Any LOM (LAN On Motherboard) port can be used to access the CIMC.
- **Shared LOM 10G**—Any 10G LOM port can be used to access the CIMC. This option is only available for some adapter cards.
- **Cisco Card**—Any port on the adapter card can be used to access the CIMC. The Cisco adapter card has to be installed in a slot with Network Communications Services Interface protocol (NCSI) support.
- **Shared LOM Extended**—Any LOM port or adapter card port can be used to access the CIMC. The Cisco adapter card has to be installed in a slot with NCSI support.

NIC Redundancy

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

- **none**—Each port associated with the configured NIC mode operates independently. The ports do not fail over if there is a problem.
- **active-active**—If supported, all ports associated with the configured NIC mode operate simultaneously. This increases throughput and provides multiple paths to the CIMC.
- **active-standby**—If a port associated with the configured NIC mode fails, traffic will fail over to one of the other ports associated with the NIC mode.

Note If you select this option, make sure 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.

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

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 CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.
Step 3	Server /cimc/network # **set mode** {**dedicated** | **shared_lom** | **shared_lom_10g** | **shipping** | **cisco_card**}	Sets the NIC mode to one of the following: • Dedicated—The management Ethernet port is used to access the CIMC. • Shared LOM—The LAN On Motherboard (LOM) Ethernet host ports are used to access the CIMC. **Note** If you select Shared LOM, make sure that all host ports belong to the same subnet. • Shared LOM 10G—The 10G LOM Ethernet host ports are used to access the CIMC. • Shipping—A limited configuration for initial connection. Select another mode for normal operation.

	Command or Action	Purpose
		• Cisco card—The ports on the adapter card are used to access the CIMC.
Step 4	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 5	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.

This example configures the CIMC network interface:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set mode dedicated
Server /cimc/network *# commit
Server /cimc/network #
```

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 the CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.
Step 3	Server /cimc/network # **set hostname** *host-name*	Specifies the name of the host.

	Command or Action	Purpose
Step 4	Server /cimc/network # **commit**	Commits the transaction to the system configuration.

This example configures the common properties:

```
Server# scope cimc
Server /cimc # scope network
Server /cimc/network # set hostname Server
Server /cimc/network *# commit
Server /cimc/network #
```

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 CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.
Step 3	Server /cimc/network # **set dhcp-enabled** {**yes** | **no**}	Selects whether the CIMC uses DHCP. **Note** If DHCP is enabled, we recommend that the DHCP server be configured to reserve a single IP address for the CIMC. If the CIMC 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 CIMC.
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 CIMC 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.

	Command or Action	Purpose
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	Server /cimc/network # **show** [**detail**]	(Optional) Displays the IPv4 network settings.

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
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
    VLAN Enabled: no
    VLAN ID: 1
    VLAN Priority: 0
    Hostname: Server
    MAC Address: 01:23:45:67:89:AB
    NIC Mode: dedicated
    NIC Redundancy: none

Server /cimc/network #
```

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 CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.

	Command or Action	Purpose
Step 3	Server /cimc/network # **set vlan-enabled** {**yes** | **no**}	Selects whether the CIMC is connected to a VLAN.
Step 4	Server /cimc/network # **set vlan-id** *id*	Specifies the VLAN number.
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	Server /cimc/network # **show** [**detail**]	(Optional) Displays the network settings.

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
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
    VLAN Enabled: yes
    VLAN ID: 10
    VLAN Priority: 32
    Hostname: Server
    MAC Address: 01:23:45:67:89:AB
    NIC Mode: dedicated
    NIC Redundancy: none

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 CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.
Step 3	Server /cimc/network # **set port-profile** *port_profile_name*	Specifies the port profile CIMC should use to configure the management interface, the virtual Ethernet, and the VIF on supported adapter cards such as the Cisco UCS VIC1225 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	Server /cimc/network # **show** [**detail**]	(Optional) Displays the network settings.

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
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
    VLAN Enabled: no
    VLAN ID: 1
    VLAN Priority: 0
    Port Profile: abcde12345
    Hostname: Server
    MAC Address: 50:3D:E5:9D:63:3C
    NIC Mode: dedicated
    NIC Redundancy: none

Server /cimc/network #
```

Network Security Configuration

Network Security

The CIMC 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. CIMC 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 CIMC command mode.
Step 2	Server /cimc # **scope network**	Enters the CIMC network command mode.
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.

	Command or Action	Purpose
		Enter an integer between 300 and 900.
Step 8	Server /cimc/network/ipblocking # **commit**	Commits the transaction to the system configuration.

This example configures IP blocking:

```
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 #
```

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 P81E Virtual Interface Card
- Cisco UCS VIC1225 Virtual Interface Card

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 P81E Virtual Interface Card

The Cisco UCS P81E Virtual Interface Card is optimized for virtualized environments, for organizations that seek increased mobility in their physical environments, and for data centers that want reduced costs through NIC, HBA, cabling, and switch reduction and reduced management overhead. This Fibre Channel over Ethernet (FCoE) PCIe card offers the following benefits:

- Allows up to 16 virtual Fibre Channel and 16 virtual Ethernet adapters to be provisioned in virtualized or nonvirtualized environments using just-in-time provisioning, providing tremendous system flexibility and allowing consolidation of multiple physical adapters.
- Delivers uncompromising virtualization support, including hardware-based implementation of Cisco VN-Link technology and pass-through switching.
- Improves system security and manageability by providing visibility and portability of network polices and security all the way to the virtual machine.

The virtual interface card makes Cisco VN-Link connections to the parent fabric interconnects, which allows virtual links to connect virtual NICs in virtual machines to virtual interfaces in the interconnect. In a Cisco Unified Computing System environment, virtual links then can be managed, network profiles applied, and interfaces dynamically reprovisioned as virtual machines move between servers in the system.

Cisco UCS VIC1225 Virtual Interface Card

The Cisco UCS VIC1225 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.

The Cisco UCS VIC 1225 implements the Cisco Virtual Machine Fabric Extender (VM-FEX), which unifies virtual and physical networking into a single infrastructure. It provides virtual-machine visibility from the physical network and a consistent network operations model for physical and virtual servers. In virtualized environments, this highly configurable and self-virtualized adapter provides integrated, modular LAN interfaces on Cisco UCS C-Series Rack-Mount Servers. Additional features and capabilities include:

- Supports up to 256 PCIe virtual devices, either virtual network interface cards (vNICs) or virtual host bus adapters (vHBAs), with high I/O operations per second (IOPS), support for lossless Ethernet, and 20 Gbps to servers.
- PCIe Gen2 x16 helps assure optimal bandwidth to the host for network-intensive applications with a redundant path to the fabric interconnect.
- Half-height design reserves full-height slots in servers for Cisco certified third-party adapters.
- Centrally managed by Cisco UCS Manager with support for Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux, VMware vSphere, and Citrix XenServer.

Viewing Network Adapter Properties

Procedure

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

This example displays the properties of adapter 2:

```
Server# scope chassis
Server /chassis # show adapter
PCI Slot Product Name   Serial Number  Product ID     Vendor
-------- -------------- -------------- -------------- --------------------
1        UCS VIC 1225   FCH1613796C    UCSC-PCIE-C... Cisco Systems Inc

Server /chassis # show adapter 2 detail
PCI Slot 2:
    Product Name: UCS VIC 1225
    Serial Number: FCH1613796C
    Product ID: UCSC-PCIE-CSC-02
    Adapter Hardware Revision: 4
    Current FW Version: 2.1(0.291)
    NIV: Disabled
    FIP: Enabled
    Configuration Pending: no
    CIMC Management Enabled : no
    VID: V00
    Vendor: Cisco Systems Inc
    Description:
    Bootloader Version: 2.1(0.291)
    FW Image 1 Version: 2.1(0.291)
    FW Image 1 State: RUNNING ACTIVATED
    FW Image 2 Version: 1.6(0.547)
    FW Image 2 State: BACKUP INACTIVATED
    FW Update Status: Idle
    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 niv-mode** {**disable** | **enable**}	Enables or disables Network Interface Virtualization (NIV) on the adapter card. NIV is disabled by default. If NIV mode is enabled, vNICs: • Can be assigned to a specific channel • Can be associated with a port profile • Can fail over to another vNIC if there are communication problems
Step 6	Server /chassis/adapter # **configure-vmfex** *port-count*	If NIV mode is enabled, *port-count* specifies the number of VM FEX interfaces you want CIMC to create, from 0 to 112.
Step 7	Server /chassis/adapter # **commit**	Commits the transaction to the system configuration.

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 *# commit
Server /chassis/adapter #
```

Managing vHBAs

Guidelines for Managing vHBAs

When managing vHBAs, consider the following guidelines and restrictions:

- The Cisco UCS P81E Virtual Interface Card and Cisco UCS VIC1225 Virtual Interface Card provide two vHBAs (fc0 and fc1). You can create up to 16 additional vHBAs on these adapter cards.

Note If Network Interface Virtualization (NIV) mode is enabled for the adapter, you must assign a channel number to a vHBA when you create it.

- When using the Cisco UCS P81E Virtual Interface Card or Cisco UCS VIC1225 Virtual Interface Card in an FCoE application, you must associate the vHBA with the FCoE VLAN. Follow the instructions in Modifying vHBA Properties, on page 82 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.
Step 3	Server /chassis/adapter # **show host-fc-if** [**fc0** | **fc1** | *name*] [**detail**]	Displays properties of a single vHBA, if specified, or all vHBAs.

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: 10:00:00:22:BD:D6:5C:35
    World Wide Port Name: 20:00:00:22:BD:D6:5C:35
    FC SAN Boot: Disabled
    Persistent LUN Binding: Disabled
    Uplink Port: 0
    MAC Address: 00:22:BD:D6:5C:35
    CoS: 3
    VLAN: NONE
    Rate Limiting: OFF
    PCIe Device Order: ANY
    EDTOV: 2000
    RATOV: 10000
    Maximum Data Field Size: 2112
    Channel Number: 3
    Port Profile:

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*. **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.

	Command or Action	Purpose
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 10000 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 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-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 # **scope error-recovery**	Enters the Fibre Channel error recovery command mode.
Step 18	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 19	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 20	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 21	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 22	Server /chassis/adapter/host-fc-if/error-recovery # **exit**	Exits to the host Fibre Channel interface command mode.

	Command or Action	Purpose
Step 23	Server /chassis/adapter/host-fc-if # **scope interrupt**	Enters the interrupt command mode.
Step 24	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) • **msix** —Message Signaled Interrupts with the optional extension (MSIx). This is the recommended and default option.
Step 25	Server /chassis/adapter/host-fc-if/interrupt # **exit**	Exits to the host Fibre Channel interface command mode.
Step 26	Server /chassis/adapter/host-fc-if # **scope port**	Enters the Fibre Channel port command mode.
Step 27	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 28	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 29	Server /chassis/adapter/host-fc-if/port # **exit**	Exits to the host Fibre Channel interface command mode.
Step 30	Server /chassis/adapter/host-fc-if # **scope port-f-logi**	Enters the Fibre Channel fabric login command mode.
Step 31	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 32	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 33	Server /chassis/adapter/host-fc-if/port-f-logi # **exit**	Exits to the host Fibre Channel interface command mode.

	Command or Action	Purpose
Step 34	Server /chassis/adapter/host-fc-if # **scope port-p-logi**	Enters the Fibre Channel port login command mode.
Step 35	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 36	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 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-p-logi # **exit**	Exits to the host Fibre Channel interface command mode.
Step 38	Server /chassis/adapter/host-fc-if # **scope scsi-io**	Enters the SCSI I/O command mode.
Step 39	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. The range is 1 to 8; the default is 1.
Step 40	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 41	Server /chassis/adapter/host-fc-if/scsi-io # **exit**	Exits to the host Fibre Channel interface command mode.
Step 42	Server /chassis/adapter/host-fc-if # **scope trans-queue**	Enters the Fibre Channel transmit queue command mode.
Step 43	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 44	Server /chassis/adapter/host-fc-if/trans-queue # **exit**	Exits to the host Fibre Channel interface command mode.
Step 45	Server /chassis/adapter/host-fc-if # **scope recv-queue**	Enters the Fibre Channel receive queue command mode.
Step 46	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 47	Server /chassis/adapter/host-fc-if/recv-queue # **exit**	Exits to the host Fibre Channel interface command mode.

	Command or Action	Purpose
Step 48	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.

This example configures the properties of a vHBA:

```
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.

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-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*	(Optional) If NIV mode is enabled for the adapter, you must 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.

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 82.

Deleting a vHBA

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.
Step 4	Server /chassis/adapter # **commit**	Commits the transaction to the system configuration. **Note** The changes will take effect upon the next server reboot.

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.

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.

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.

	Command or Action	Purpose
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.

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.

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.

	Command or Action	Purpose
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.

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.
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.

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 P81E Virtual Interface Card and Cisco UCS VIC1225 Virtual Interface Card provide two default vNICs (eth0 and eth1). You can create up to 16 additional vNICs on these adapter cards.

  Note If Network Interface Virtualization (NIV) 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.

This example displays the brief properties of all vNICs and the detailed properties of eth0:

```
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
-------- ---- ----------- ----------------- --- ---- --------
eth0     1500 0           00:22:BD:D6:5C:33 0   NONE Enabled
eth1     1500 1           00:22:BD:D6:5C:34 0   NONE Enabled
```

```
Server /chassis/adapter # show host-eth-if eth0 detail
Name eth0:
    MTU: 1500
    Uplink Port: 0
    MAC Address: 00:22:BD:D6:5C:33
    CoS: 0
    Trust Host CoS: disabled
    PCI Order: ANY
    VLAN: NONE
    VLAN Mode: TRUNK
    Rate Limiting: OFF
    PXE Boot: enabled
    Channel Number: N/A
    Port Profile: N/A
    Uplink Failover: N/A
    Uplink Failback Timeout: N/A

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 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. • **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.
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. **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. The default is enable for the two default vNICs, and disable for 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 # **scope interrupt**	Enters the interrupt command mode.
Step 20	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 21	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 22	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 23	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) • **msi** —Message-Signaled Interrupt (MSI) • **msix** —Message Signaled Interrupts with the optional extension (MSI-X). This is the recommended and default option.
Step 24	Server /chassis/adapter/host-eth-if/interrupt # **exit**	Exits to the host Ethernet interface command mode.
Step 25	Server /chassis/adapter/host-eth-if # **scope recv-queue**	Enters receive queue command mode.
Step 26	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.

	Command or Action	Purpose
Step 27	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 to 4094; the default is 512.
Step 28	Server /chassis/adapter/host-eth-if/recv-queue # **exit**	Exits to the host Ethernet interface command mode.
Step 29	Server /chassis/adapter/host-eth-if # **scope trans-queue**	Enters transmit queue command mode.
Step 30	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 31	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 4094; the default is 256.
Step 32	Server /chassis/adapter/host-eth-if/trans-queue # **exit**	Exits to the host Ethernet interface command mode.
Step 33	Server /chassis/adapter/host-eth-if # **scope comp-queue**	Enters completion queue command mode.
Step 34	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. In general, the number of completion queues equals the number of transmit queues plus the number of receive queues.
Step 35	Server /chassis/adapter/host-eth-if/comp-queue # **exit**	Exits to the host Ethernet interface command mode.
Step 36	Server /chassis/adapter/host-eth-if # **scope offload**	Enters TCP offload command mode.
Step 37	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).

	Command or Action	Purpose
Step 38	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.
Step 39	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 40	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 41	Server /chassis/adapter/host-eth-if/offload # **exit**	Exits to the host Ethernet interface command mode.
Step 42	Server /chassis/adapter/host-eth-if # **scope rss**	Enters Receive-side Scaling (RSS) command mode.
Step 43	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 44	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-ipv4** {**disable** | **enable**}	Enables or disables IPv4 RSS. The default is enable.
Step 45	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 46	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-ipv6** {**disable** | **enable**}	Enables or disables IPv6 RSS. The default is enable.

	Command or Action	Purpose
Step 47	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 48	Server /chassis/adapter/host-eth-if/rss # **set rss-hash-ipv6-ex** {**disable** | **enable**}	Enables or disables IPv6 Extension RSS. The default is disable.
Step 49	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 50	Server /chassis/adapter/host-eth-if/rss # **exit**	Exits to the host Ethernet interface command mode.
Step 51	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.

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 *# 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.

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.
Step 4	Server /chassis/adapter/host-eth-if # **set channel-number** *number*	(Optional) 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.

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.

	Command or Action	Purpose
		Note The changes will take effect upon the next server reboot.

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 #
```

Managing VM FEX

Virtual Machine Fabric Extender

Cisco Virtual Machine Fabric Extender (VM FEX) extends the (prestandard) IEEE 802.1Qbh port extender architecture to virtual machines. In this architecture, each VM interface is provided with a virtual Peripheral Component Interconnect Express (PCIe) device and a virtual port on a switch.

Viewing VM FEX Properties

Before You Begin

- The server must be powered on, or the properties will not display.
- 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 # **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 vmfex** [**detail**]	Displays the general VM FEX properties. For field descriptions, see General Properties Settings, on page 103.
Step 4	Server /chassis/adapter # **scope vmfex** *name*	Enters the command mode for the specified VM FEX interface.

	Command or Action	Purpose
Step 5	Server /chassis/adapter/vmfex # **show interrupt** [**detail**]	Displays Ethernet interrupt settings. For field descriptions, see Ethernet Interrupt Settings, on page 104.
Step 6	Server /chassis/adapter/vmfex # **show recv-queue** [**detail**]	Displays Ethernet receive queue settings. For field descriptions, see Ethernet Receive Queue Settings, on page 104.
Step 7	Server /chassis/adapter/vmfex # **show trans-queue** [**detail**]	Displays Ethernet transmit queue settings. For field descriptions, see Ethernet Transmit Queue Settings, on page 105.
Step 8	Server /chassis/adapter/vmfex # **show comp-queue** [**detail**]	Displays completion queue settings. For field descriptions, see Completion Queue Settings, on page 105.
Step 9	Server /chassis/adapter/vmfex # **show offload** [**detail**]	Displays TCP offload settings. For field descriptions, see TCP Offload Settings, on page 105.
Step 10	Server /chassis/adapter/vmfex # **show rss** [**detail**]	Displays RSS settings. For field descriptions, see Receive Side Scaling Settings, on page 106.

This example displays the VM FEX properties:

```
Server /chassis/adapter # show vmfex detail
Name pts0:
    MTU: 1500
    Uplink Port: 0
    MAC Address: 00:00:00:00:00:00
    CoS: N/A
    Trust Host CoS:
    PCI Order:
    VLAN: N/A
    VLAN Mode: N/A
    Rate Limiting:
    PXE Boot: disabled
    Channel Number: 0
    Port Profile:
    Uplink Failover: Enabled
    Uplink Failback Timeout: 5

Server /chassis/adapter # scope vmfex pts0

Server /chassis/adapter/vmfex # show interrupt
Interrupt Count Coalescing Time (us) Coalescing Type Interrupt Mode
--------------- -------------------- --------------- ---------------
6               125                  MIN             MSI

Server /chassis/adapter/vmfex # show recv-queue
Receive Queue Count Receive Queue Ring Size
------------------- ------------------------------
4                   512

Server /chassis/adapter/vmfex # show trans-queue
Transmit Queue Count Transmit Queue Ring Size
-------------------- ------------------------------
1                    256
```

```
Server /chassis/adapter/vmfex # show comp-queue
Completion Queue Count    Completion Queue Ring Size
------------------------- --------------------------
5                         1

Server /chassis/adapter/vmfex # show offload
TCP Segment Offload  TCP Rx Checksum  TCP Tx Checksum  Large Receive
-------------------- ---------------- ---------------- -------------
enabled              enabled          enabled          enabled

Server /chassis/adapter/vmfex # show rss
TCP Rx Side Scaling
--------------------
enabled

Server /chassis/adapter/vmfex #
```

VM FEX Settings

The following tables describe the VM FEX settings that you can view.

General Properties Settings

Name	Description
Name	A user-defined name for the VM FEX.
MTU	The maximum transmission unit, or packet size, that this VM FEX accepts.
Uplink Port	The uplink port associated with this VM FEX. All traffic for this VM FEX goes through this uplink port.
MAC Address	The MAC address associated with the VM FEX.
Class of Service	The class of service to associate with traffic from this VM FEX.
Trust Host CoS	Whether the VM FEX can use the class of service provided by the host operating system.
PCI Order	The order in which this VM FEX will be used.
Default VLAN	The default VLAN for this VM FEX.
VLAN Mode	Whether VLAN trunking or access is configured.
Rate Limit	If rate limiting is configured, the maximum rate.
Enable PXE Boot	Whether the VM FEX can be used to perform a PXE boot.
Channel Number	If NIV mode is enabled for the adapter, the channel number assigned to this VM FEX.

Name	Description
Port Profile	If NIV mode is enabled for the adapter, the port profile associated with theVM FEX. **Note** This field displays the port profiles defined on the switch to which this server is connected.
Enable Uplink Failover	If NIV mode is enabled for the adapter, whether traffic on this VM FEX should fail over to the secondary interface if there are communication problems.
Failback Timeout	After a VM FEX 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 VM FEX.

Ethernet Interrupt Settings

Name	Description
Interrupt Count field	The number of interrupt resources allocated to this VM FEX.
Coalescing Time field	The time CIMC waits between interrupts or the idle period that must be encountered before an interrupt is sent.
Coalescing Type field	This can be one of the following: • **MIN**—The system waits for the time specified in the **Coalescing Time** field before sending another interrupt event. • **IDLE**—The system does not send an interrupt until there is a period of no activity lasting as least as long as the time specified in the **Coalescing Time** field.
Interrupt Mode field	The preferred driver interrupt mode. This can be one of the following: • **MSIx**—Message Signaled Interrupts (MSI) with the optional extension. • **MSI**—MSI only. • **INTx**—PCI INTx interrupts.

Ethernet Receive Queue Settings

Name	Description
Receive Queue Count field	The number of receive queue resources allocated to this VM FEX.
Receive Queue Ring Size field	The number of descriptors in each receive queue.

Ethernet Transmit Queue Settings

Name	Description
Transmit Queue Count field	The number of transmit queue resources allocated to this VM FEX.
Transmit Queue Ring Size field	The number of descriptors in each transmit queue.

Completion Queue Settings

Name	Description
Completion Queue Count field	The number of completion queue resources allocated to this VM FEX.
Completion Queue Ring Size field	The number of descriptors in each completion queue.

TCP Offload Settings

Name	Description
Enable TCP Segmentation Offload field	If enabled, the CPU sends large TCP packets to the hardware to be segmented. If disabled, the CPU segments large packets. **Note** This option is also known as Large Send Offload (LSO).
Enable TCP Rx Offload Checksum Validation field	If enabled, the CPU sends all packet checksums to the hardware for validation. If disabled, the CPU validates all packet checksums.
Enable TCP Tx Offload Checksum Generation field	If enabled, the CPU sends all packets to the hardware so that the checksum can be calculated. If disabled, the CPU calculates all packet checksums.
Enable Large Receive field	If enabled, the hardware reassembles all segmented packets before sending them to the CPU. If disabled, the CPU processes all large packets.

Receive Side Scaling Settings

Name	Description
Enable TCP Receive Side Scaling field	Receive Side Scaling (RSS) distributes network receive processing across multiple CPUs in multiprocessor systems. If enabled, network receive processing is shared across processors whenever possible. If disabled, network receive processing is always handled by a single processor even if additional processors are available.
Enable IPv4 RSS field	If enabled, RSS is enabled on IPv4 networks.
Enable TCP-IPv4 RSS field	If enabled, RSS is enabled for TCP transmissions across IPv4 networks.
Enable IPv6 RSS field	If enabled, RSS is enabled on IPv6 networks.
Enable TCP-IPv6 RSS field	If enabled, RSS is enabled for TCP transmissions across IPv6 networks.
Enable IPv6 Extension RSS field	If enabled, RSS is enabled for IPv6 extensions.
Enable TCP-IPv6 Extension RSS field	If enabled, RSS is enabled for TCP transmissions across IPv6 networks.

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*.

	Command or Action	Purpose
		Note The server must be powered on before you can view or change adapter settings.
Step 3	Server /chassis/adapter # **export-vnic** *tftp-ip-address path-and-filename*	Starts the export operation. The adapter configuration file will be stored at the specified path and filename on the TFTP server at the specified IP address.

This example exports the configuration of adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # export-vnic 192.0.2.34 /ucs/backups/adapter4.dat
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.
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.

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.

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 CIMC 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 CIMC GUI or CLI. 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.
Step 3	Server /chassis # **recover-adapter-update** [*pci-slot*] [*pci-slot*]	(Optional) Clears an incomplete firmware update condition on one or two specified adapters or, if no adapter is specified, on all adapters.

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 109.

Activating Adapter Firmware

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.

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.

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.

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

Configuring Communication Services

This chapter includes the following sections:

Configuring HTTP

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 enabled** {**yes** | **no**}	Enables or disables HTTP and HTTPS service on the CIMC.
Step 3	Server /http # **set http-port** *number*	Sets the port to use for HTTP communication. The default is 80.
Step 4	Server /http # **set https-port** *number*	Sets the port to use for HTTPS communication. The default is 443.
Step 5	Server /http # **set http-redirect** {**yes** | **no**}	Enables or disables the redirection of an HTTP request to HTTPS.

	Command or Action	Purpose
Step 6	Server /http # **set timeout** *seconds*	Sets the number of seconds to wait between HTTP requests before the CIMC times out and terminates the session. Enter an integer between 60 and 10,800. The default is 1,800 seconds.
Step 7	Server /http # **commit**	Commits the transaction to the system configuration.

This example configures HTTP for the CIMC:

```
Server# scope http
Server /http # set 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 Enabled HTTP Redirected
---------- ---------- -------- --------------- ------- ----------------
80         443        1800     0               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 CIMC.
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. 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.

This example configures SSH for the CIMC:

```
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 CIMC

The Cisco CIMC XML application programming interface (API) is a programmatic interface to CIMC 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 CIMC 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 CIMC.
Step 3	Server /xmlapi # **commit**	Commits the transaction to the system configuration.

This example enables XML API control of CIMC 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 CIMC 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.
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.

	Command or Action	Purpose
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.

This example configures IPMI over LAN for the CIMC:

```
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 #
```

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 CIMC, see the *MIB Quick Reference for Cisco UCS* at this URL: http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/mib/reference/UCS_MIBRef.html.

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 community-str** *community*	Specifies the default SNMP v1 or v2c community name that CIMC includes on any trap messages it sends to the SNMP host. The name can be up to 18 characters.
Step 5	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 6	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 7	Server /snmp # **commit**	Commits the transaction to the system configuration.

This example configures the SNMP properties and commits the transaction:

```
Server# scope snmp
Server /snmp # set enabled yes
Server /snmp *# commit
Server /snmp # set community-str cimcpublic
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: 161
    System Contact: User Name <username@example.com> +1-408-555-1212
    System Location: San Jose, California
    SNMP Community: cimcpublic
    SNMP Trap community: 0
    Enabled: yes
    SNMP Trap Version: 1
    SNMP Inform Type: inform

Server /snmp #
```

What to Do Next

Configure SNMP trap settings as described in Configuring SNMP Trap Settings, on page 116.

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 # **set trap-community-str** *string*	Enter the name of the SNMP community to which trap information should be sent.
Step 3	Server /snmp # **set trap-ver** {**1** | **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.
Step 4	Server /snmp # **set inform-type** {**trap** | **inform**}	Specifies whether SNMP notification messages are sent as simple traps or as inform requests requiring acknowledgment by the receiver.
Step 5	Server /snmp # **scope trap-destination** *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 4.
Step 6	Server /snmp/trap-destination # **set enabled** {**yes** | **no**}	Enables or disables the SNMP trap destination.
Step 7	Server /snmp/trap-destination # **set addr** *ip-address*	Specifies the destination IP address to which SNMP trap information is sent.
Step 8	Server /snmp/trap-destination # **commit**	Commits the transaction to the system configuration.

This example configures general SNMP trap settings and trap destination number 1 and commits the transaction:

```
Server# scope snmp
Server /snmp # set trap-community-str public
Server /snmp # set trap-ver 3
Server /snmp # set inform-type inform
Server /snmp *# scope trap-destination 1
Server /snmp/trap-destination *# set enabled yes
Server /snmp/trap-destination *# set addr 192.0.20.41
Server /snmp/trap-destination *# commit
Server /snmp/trap-destination # show
Trap Destination IP Address       Enabled
---------------- ---------------- --------
1                192.0.20.41      yes

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 # **scope trap-destination** *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 4.
Step 3	Server /snmp/trap-destination # **sendSNMPtrap**	Sends an SNMPv1 test trap to the configured SNMP trap destination. **Note** The trap must be configured and enabled in order to send a test message.

This example sends a test message to SNMP trap destination 1:

```
Server# scope snmp
Server /snmp # scope trap-destination 1
Server /snmp/trap-destination # sendSNMPtrap
SNMP Test Trap sent to Destination:1
Server /snmp/trap-destination #
```

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.
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.

	Command or Action	Purpose
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.
Step 6	Server /snmp/v3users # **set v3proto** {**MD5** | **SHA**}	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**}	Select an encryption protocol for this user.
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.

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 11

Managing Certificates

This chapter includes the following sections:

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 the CIMC 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.

Procedure

Step 1 Generate the CSR from the CIMC.

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 the CIMC.

Note The uploaded certificate must be created from a CSR generated by the CIMC. Do not upload a certificate that was not created by this method.

Generating a Certificate Signing Request

Before You Begin

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

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:

Common Name (CN)	The fully qualified hostname of the CIMC.
Organization Name (O)	The organization requesting the certificate.
Organization Unit (OU)	The organizational unit.
Locality (L)	The city or town in which the company requesting the certificate is headquartered.
StateName (S)	The state or province in which the company requesting the certificate is headquartered.
Country Code (CC)	The two-letter ISO country code for the country in which the company is headquartered.
Email	The administrative 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.

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 CIMC 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.

If you did not use the first option, in which CIMC internally generates and uploads a self-signed certificate, you must upload the new certificate using the **upload** command in certificate command mode.

Creating a Self-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 CIMC CLI.

Before You Begin

Obtain and install a certificate server software package on a server within your organization.

Procedure

	Command or Action	Purpose
Step 1	**openssl genrsa -out** *CA_keyfilename keysize* **Example:** `# openssl genrsa -out ca.key 1024`	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** **Example:** `# openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 04 -CAkey ca.key -out myserver05.crt -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.

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 1024
Generating RSA private key, 1024 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 CIMC.

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.

Note You must first generate a CSR using the CIMC 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.

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/SINv7wd6Vv2pBt6ZpXgD4VBNKOND1
GMbkPayVlQjbG4MD2dx2+H8EH3LMtdZrgKvPxPTE+bF5wZVNAgMBAAGgJTAjBgkq
hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcmQwDQYJKoZIhvcNAQEFBQAD
gYEAG61CaJoJaVMhzCl903O6Mg51zq1zXcz75+VFj2I6rH9asckCld3mkOVx5gJU
Ptt5CVQpNgNLdvbDPSsXretysOhqHmp9+CLv8FDuy1CDYfuaLtvlWvfhevskV0j6
mK3Ku+YiORnv6DhxrOoqau8r/hyI/L43l7IPN1HhOi3oha4=
-----END CERTIFICATE-----
<CTRL+D>
```

CHAPTER 12

Configuring Platform Event Filters

This chapter includes the following sections:

Platform Event Filters

A platform event filter (PEF) can trigger an action and generate an alert when a critical hardware-related event occurs. For each PEF, you can choose the action to be taken (or take no action) when a platform event occurs. You can also choose to generate and send an alert when a platform event occurs. Alerts are sent as an SNMP trap, so you must configure an SNMP trap destination before the alerts can be sent.

You can globally enable or disable the generation of platform event alerts. When disabled, alerts are not sent even if PEFs are configured to send them.

Enabling Platform Event Alerts

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.

	Command or Action	Purpose
Step 3	Server /fault # **commit**	Commits the transaction to the system configuration.
Step 4	Server /fault # **show** [**detail**]	(Optional) Displays the platform event alert configuration.

The following example enables platform event alerts:

```
Server# scope fault
Server /fault # set platform-event-enabled yes
Server /fault *# commit
Server /fault # show
SNMP Community String Platform Event Enabled
--------------------- ----------------------
public                yes

Server /fault #
```

Disabling Platform Event Alerts

Procedure

	Command or Action	Purpose
Step 1	Server# **scope fault**	Enters the fault command mode.
Step 2	Server /fault # **set platform-event-enabled no**	Disables platform event alerts.
Step 3	Server /fault # **commit**	Commits the transaction to the system configuration.
Step 4	Server /fault # **show** [**detail**]	(Optional) Displays the platform event alert configuration.

The following example disables platform event alerts:

```
Server# scope fault
Server /fault # set platform-event-enabled no
Server /fault *# commit
Server /fault # show
SNMP Community String Platform Event Enabled
--------------------- ----------------------
public                no

Server /fault #
```

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	Temperature Warning Assert Filter
3	Voltage Critical Assert Filter
4	Current Assert Filter
5	Fan Critical Assert Filter
6	Processor Assert Filter
7	Power Supply Critical Assert Filter
8	Power Supply Warning Assert Filter
9	Power Supply Redundancy Lost Filter
10	Discrete Power Supply Assert Filter
11	Memory Assert Filter
12	Drive Slot Assert Filter

Procedure

	Command or Action	Purpose
Step 1	Server# **scope fault**	Enters the fault command mode.
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 # **set send-alert** {**yes** | **no**}	Enables or disables the sending of a platform event alert for this event.

	Command or Action	Purpose
		Note For an alert to be sent, the filter trap settings must be configured properly and platform event alerts must be enabled.
Step 5	Server /fault/pef # **commit**	Commits the transaction to the system configuration.

This example configures the platform event alert for an event:

```
Server# scope fault
Server /fault # scope pef 13
Server /fault/pef # set action reboot
Server /fault/pef *# set send-alert yes
Server /fault/pef *# commit
Server /fault/pef # show
Platform Event Filter Event                      Action      Send Alert
-------------------- --------------------------- ----------- ------------------
13                   Memory Assert Filter        reboot      yes

Server /fault/pef #
```

What to Do Next

If you configure any PEFs to send an alert, complete the following tasks:

- Enable platform event alerts
- Configure SNMP trap settings

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 # **set trap-community-str** *string*	Enter the name of the SNMP community to which trap information should be sent.
Step 3	Server /snmp # **set trap-ver** {**1** | **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 4	Server /snmp # **set inform-type** {**trap** | **inform**}	Specifies whether SNMP notification messages are sent as simple traps or as inform requests requiring acknowledgment by the receiver.
Step 5	Server /snmp # **scope trap-destination** *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 4.
Step 6	Server /snmp/trap-destination # **set enabled** {**yes** | **no**}	Enables or disables the SNMP trap destination.
Step 7	Server /snmp/trap-destination # **set addr** *ip-address*	Specifies the destination IP address to which SNMP trap information is sent.
Step 8	Server /snmp/trap-destination # **commit**	Commits the transaction to the system configuration.

This example configures general SNMP trap settings and trap destination number 1 and commits the transaction:

```
Server# scope snmp
Server /snmp # set trap-community-str public
Server /snmp # set trap-ver 3
Server /snmp # set inform-type inform
Server /snmp *# scope trap-destination 1
Server /snmp/trap-destination *# set enabled yes
Server /snmp/trap-destination *# set addr 192.0.20.41
Server /snmp/trap-destination *# commit
Server /snmp/trap-destination # show
Trap Destination IP Address       Enabled
---------------- ---------------- --------
1                192.0.20.41      yes

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 # **scope trap-destination** *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 4.

	Command or Action	Purpose
Step 3	Server /snmp/trap-destination # **sendSNMPtrap**	Sends an SNMPv1 test trap to the configured SNMP trap destination. **Note** The trap must be configured and enabled in order to send a test message.

This example sends a test message to SNMP trap destination 1:

```
Server# scope snmp
Server /snmp # scope trap-destination 1
Server /snmp/trap-destination # sendSNMPtrap
SNMP Test Trap sent to Destination:1
Server /snmp/trap-destination #
```

Interpreting Platform Event Traps

A CIMC platform event alert sent as an SNMP trap contains an enterprise object identifier (OID) in the form `1.3.6.1.4.1.3183.1.1.0.event`. The first ten fields of the OID represent the following information: `iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).wired_for_management(3183).PET(1).version(1).version(0)`, indicating an IPMI platform event trap (PET) version 1.0 message. The last field is an event number, indicating the specific condition or alert being notified.

Platform Event Trap Descriptions

The following table provides a description of the event being notified in a platform event trap message, based on the event number in the trap OID.

Event Number [Note 1]		Platform Event Description
0	0h	Test Trap
65799	010107h	Temperature Warning
65801	010109h	Temperature Critical
131330	020102h	Under Voltage, Critical
131337	020109h	Voltage Critical
196871	030107h	Current Warning
262402	040102h	Fan Critical
459776	070400h	Processor related (IOH-Thermalert/Caterr sensor) – predictive failure deasserted
459777	070401h	Processor related (IOH-Thermalert/Caterr sensor) – predictive failure asserted
460032	070500h	Processor Power Warning – limit not exceeded
460033	070501h	Processor Power Warning – limit exceeded

Event Number [Note 1]		Platform Event Description
524533	0800F5h	Power Supply Critical
524551	080107h	Power Supply Warning
525313	080401h	Discrete Power Supply Warning
527105	080B01h	Power Supply Redundancy Lost
527106	080B02h	Power Supply Redundancy Restored
552704	086F00h	Power Supply Inserted
552705	086F01h	Power Supply Failure
552707	086F03h	Power Supply AC Lost
786433	0C0001h	Correctable ECC Memory Errors, Release 1.3(1) and later releases, filter set to accept all reading types [Note 4]
786439	0C0007h	DDR3_INFO sensor LED - RED bit asserted (Probable ECC error on a DIMM), Generic Sensor [Notes 2,3]
786689	0C0101h	Correctable ECC Memory Errors, Release 1.3(1) and later releases
818945	0C7F01h	Correctable ECC Memory Errors, Release 1.2(x) and earlier releases
818951	0C7F07h	DDR3_INFO sensor LED - RED bit asserted (Probable ECC error on a DIMM), 1.2(x) and earlier releases [Note 3]
851968	0D0000h	HDD sensor indicates no fault, Generic Sensor [Note 2]
851972	0D0004h	HDD sensor indicates a fault, Generic Sensor [Note 2]
854016	0D0800h	HDD Absent, Generic Sensor [Note 2]
854017	0D0801h	HDD Present, Generic Sensor [Note 2]
880384	0D6F00h	HDD Present, no fault indicated
880385	0D6F01h	HDD Fault
880512	0D6F80h	HDD Not Present
880513	0D6F81h	HDD is deasserted but not in a fault state
884480	0D7F00h	Drive Slot LED Off
884481	0D7F01h	Drive Slot LED On
884482	0D7F02h	Drive Slot LED fast blink
884483	0D7F03h	Drive Slot LED slow blink
884484	0D7F04h	Drive Slot LED green
884485	0D7F05h	Drive Slot LED amber
884486	0D7F01h	Drive Slot LED blue
884487	0D7F01h	Drive Slot LED read

Event Number [Note 1]		Platform Event Description
884488	0D7F08h	Drive Slot Online
884489	0D7F09h	Drive Slot Degraded
Note 1: Basic information about the event number format can be found in the *IPMI Platform Event Trap Format Specification v1.0* at this URL: ftp://download.intel.com/design/servers/ipmi/pet100.pdf.		
Note 2: Some platforms and releases use generic sensor implementations, while some use Cisco proprietary sensor implementations.		
Note 3: In Release 1.3(1) and later releases, the ECC sensor no longer activates the LED.		
Note 4: When the event filter is set to accept all reading types, bits 15:8 of the hex event number are masked to 0. For example, event number 786689 (0C0101h) becomes 786433 (0C0001h).		

CHAPTER 13

CIMC Firmware Management

This chapter includes the following sections:

Overview of Firmware

C-Series servers use Cisco-certified firmware 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 new BIOS firmware, it must be from the same software release as the CIMC firmware running on the server. Do not install new BIOS firmware until after you have activated the matching CIMC 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, CIMC, 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 CIMC 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 elect to update the firmware manually, you must update the CIMC firmware first. The CIMC firmware update process is divided into the following stages to minimize the amount of time the server will be offline:

- Installation. During this stage, CIMC installs the selected CIMC firmware in the non-active, or backup, slot on the server.
- Activation. During this stage, CIMC sets the non-active firmware version as active and reboots the server, causing a disruption in service. When the server reboots, the firmware in the new active slot becomes the running version.

After you activate the CIMC firmware, you can update the BIOS firmware. The server must be powered off during the entire BIOS update process, so the process is not divided into stages. Instead, you only need to issue a single command and CIMC installs and updates the BIOS firmware as quickly as possible. Once the CIMC 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.

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 CIMC 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 CIMC 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 upgrade the CIMC and BIOS firmware manually, do the following:

a) From the ISO file, open the ZIP file containing the firmware installation files.
The ZIP file is on the top-level of the ISO file, and its name follows the format *ServerModel_ReleaseNumber*.ZIP.

For example, C240M3_1.4.4A.ZIP.

You do not need to extract all of the files contained in this ZIP file. Instead, you only need to open it so that you can access the BIOS firmware installation CAP file and the ZIP file containing the CIMC firmware installation BIN file.

b) From the *ServerModel_ReleaseNumber*.ZIP file, extract the BIOS firmware installation CAP file and save it to your local drive.
The CAP file is in the *ReleaseNumber*/bios/cimc folder, and its name follows the format *Server*-BIOS-*Release-Number*.CAP.

For example, 1.4.4a/bios/cimc/C240-BIOS-1-4-4c-0.CAP.

c) From the *ServerModel_ReleaseNumber*.ZIP file, open the ZIP file containing the CIMC firmware installation files.
The ZIP file is in the *ReleaseNumber*/cimc folder and its name follows the format *server-model*-cimc-*release*.zip.

For example, 1.4.4a/cimc/c240-m3-cimc.1.4.4a.zip.

You do not need to extract all of the files contained in this zip file. Instead, you only need to open it so that you can access the CIMC firmware installation BIN file.

d) From the *server-model*-cimc-*release*.zip file, extract the full CIMC firmware installation BIN file and save it to your local drive.
The BIN file is in the *server-model*-cimc-*release* folder and its name follows the format upd-pkg-*server-model*-cimc.full.*release*.bin.

For example, c240-m3-cimc.1.4.4a/upd-pkg-c240-m3-cimc.full.1.4.4a.bin.

Step 12 (Optional) If you plan to install the firmware from a TFTP server, copy the BIOS installation CAP file and the CIMC installation BIN file to the TFTP server you want to use.
The server must have read permission for the destination folder on the TFTP server.

What to Do Next

Use the Cisco Host Upgrade Utility to upgrade all firmware on the server or manually install the CIMC firmware on the server.

Installing CIMC Firmware from a TFTP Server

Before You Begin

- Log in to the CIMC CLI 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 136.

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 cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope firmware**	Enters the CIMC firmware command mode.
Step 3	Server /cimc/firmware # **update** *tftp-ip-address path-and-filename*	Starts the firmware update. The server will obtain the update firmware at the specified path and file name from the TFTP server at the specified IP address.
Step 4	Server /cimc/firmware # **show detail**	(Optional) Displays the progress of the firmware update.

This example updates the CIMC firmware:

```
Server# scope cimc
Server /cimc # scope firmware
Server /cimc/firmware # update 192.0.20.34 //test/dnld-ucs-k9-bundle.1.0.2h.bin
  <CR>  Press Enter key
Firmware update has started.
Please check the status using "show detail"
Server /cimc/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	Log back into the CLI and repeat steps 1–3 to verify the activation.	(Optional)

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 from a TFTP Server

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 CIMC CLI as a user with admin privileges.
- Activate the CIMC firmware that goes with the BIOS version you want to install, as described in Activating Installed CIMC Firmware, on page 138.
- Power off the server.

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 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	Make sure the firmware version shown in the **Current FW Version** field matches the BIOS firmware version you are installing.	**Important** If the CIMC firmware version does not match, activate the CIMC firmware before continuing with this procedure or the server will not boot. For details, see Activating Installed CIMC Firmware, on page 138.
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** *tftp-ip-address path-and-filename*	Starts the BIOS firmware update. The server will obtain the update firmware at the specified path and file name from the TFTP server at the specified IP address.

This example updates the BIOS firmware to CIMC software release 1.4(3j):

```
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
Server /cimc/firmware # top
Server# scope bios
Server /bios # update 192.0.20.34 //upgrade_bios_files/C260-BIOS-1-4-3j-0.CAP
```

CHAPTER 14

Viewing Logs

This chapter includes the following sections:

CIMC Log

Viewing the CIMC Log

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope log**	Enters the CIMC log command mode.
Step 3	Server /cimc/log # **show entries** [**detail**]	Displays CIMC events, including timestamp, the software module that logged the event, and a description of the event.

This example displays the log of CIMC 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 CIMC Log

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope log**	Enters the CIMC log command mode.
Step 3	Server /cimc/log # **clear**	Clears the CIMC log.

The following example clears the log of CIMC events:

```
Server# scope cimc
Server /cimc # scope log
Server /cimc/log # clear
```

Configuring the CIMC Log Threshold

You can specify the lowest level of messages that will be included in the CIMC log.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope log**	Enters the CIMC 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** CIMC does not log any messages with a severity below the selected severity. For example, if you select **error**, then the CIMC 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.
Step 5	Server /cimc/log # **show local-syslog-severity**	(Optional) Displays the configured severity level.

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 CIMC Log to a Remote Server

You can configure profiles for one or two remote syslog servers to receive CIMC 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 CIMC command mode.
Step 2	Server /cimc # **scope log**	Enters the CIMC log command mode.
Step 3	Server /cimc/log # **set remote-syslog-severity** *level*	(Optional) The severity *level* can be one of the following, in decreasing order of severity: • emergency • alert • critical • error • warning • notice • informational • debug **Note** CIMC 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 CIMC 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** *ip-address*	Specifies the remote syslog server IP address.
Step 6	Server /cimc/log/server # **set enabled** {**yes** | **no**}	Enables the sending of CIMC log entries to this syslog server.
Step 7	Server /cimc/log/server # **commit**	Commits the transaction to the system configuration.

This example shows how to configure a remote syslog server profile and enable the sending of CIMC 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 2
Server /cimc/log/server *# set server-ip 192.0.2.34
Server /cimc/log/server *# set enabled yes
Server /cimc/log/server *# commit
Server /cimc/log/server # exit
Server /cimc/log # show server
Syslog Server    IP Address       Enabled
---------------- ---------------- --------
1                0.0.0.0          no
2                192.0.2.34       yes

Server /cimc/log # show remote-syslog-severity
    Remote Syslog Severity: warning

Server /cimc/log #
```

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.

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.

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 15

Server Utilities

This chapter includes the following sections:

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 CIMC command mode.
Step 2	Server /cimc # **scope tech-support**	Enters the tech-support command mode.
Step 3	Server /cimc/tech-support # **set tftp-ip** *ip-address*	Specifies the IP address of the TFTP server on which the technical support data file should be stored.
Step 4	Server /cimc/tech-support # **set path** *path/filename*	Specifies the file name in which the support data should be stored on the server. When you enter this name,

	Command or Action	Purpose
		include the relative path for the file from the top of the TFTP 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 # **commit**	Commits the transaction to the system configuration.
Step 6	Server /cimc/tech-support # **start**	Begins the transfer of the data file to the TFTP server.
Step 7	Server /cimc/tech-support # **cancel**	(Optional) Cancels the transfer of the data file to the TFTP server.

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 tftp-ip 192.0.20.41
Server /cimc/tech-support *# set path /user/user1/default.tar.gz
Server /cimc/tech-support *# commit
Server /cimc/tech-support # start
Tech Support upload started.
```

What to Do Next

Provide the generated report file to Cisco TAC.

Rebooting the CIMC

On rare occasions, such as an issue with the current running firmware, troubleshooting a server may require you to reboot the CIMC. This procedure is not part of the normal maintenance of a server. After you reboot the CIMC, you are logged off and the CIMC will be unavailable for a few minutes.

Note If you reboot the CIMC 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 CIMC reboot is complete.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **reboot**	The CIMC reboots.

This example reboots the CIMC:

```
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.

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 CIMC 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.

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 CIMC to Factory Defaults

On rare occasions, such as an issue with the current running firmware, troubleshooting a server may require you to reset the CIMC 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 CIMC, you are logged off and must log in again. You may also lose connectivity and may need to reconfigure the network settings.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **factory-default**	After a prompt to confirm, the CIMC resets to factory defaults.

The CIMC factory defaults include the following conditions:

- SSH is enabled for access to the CIMC CLI. Telnet is disabled.
- HTTPS is enabled for access to the CIMC GUI.
- A single user account exists (user name is **admin** , password is **password**).
- DHCP is enabled on the management port.
- The boot order is EFI, CDROM, PXE (using LoM), FDD, HDD.

- KVM and vMedia are enabled.
- USB is enabled.
- SoL is disabled.

This example resets the CIMC 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]
```

Exporting and Importing the CIMC Configuration

Exporting and Importing the CIMC Configuration

To perform a backup of the CIMC configuration, you take a snapshot of the system configuration and export the resulting CIMC 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 CIMC configuration file to the same system or you can import it to another CIMC 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 CIMC configuration file is an XML text file whose structure and elements correspond to the CIMC 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.

Exporting the CIMC Configuration

Note For security reasons, this operation does not export user accounts or the server certificate.

Important If any firmware or BIOS updates are in progress, do not export the CIMC configuration until those tasks are complete.

Before You Begin

Obtain the backup TFTP server IP address.

If you want the option to restore the SNMP configuration information when you import the configuration file, make sure that SNMP is enabled on this server before you create the configuration file. If SNMP is disabled when you export the configuration, CIMC will not apply the SNMP values when the file is imported.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope import-export**	Enters the import-export command mode.
Step 3	Server /cimc/import-export # **export-config** *tftp-ip-address path-and-filename*	Starts the backup operation. The configuration file will be stored at the specified path and file name on the TFTP server at the specified IP address.

To determine whether the export operation has completed successfully, use the **show detail** command. To abort the operation, type CTRL+C.

This example shows how to back up the CIMC configuration:

```
Server# scope cimc
Server /cimc # scope import-export
Server /cimc/import-export # export-config 192.0.2.34 /ucs/backups/cimc5.xml
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 CIMC Configuration

Important If any firmware or BIOS updates are in progress, do not import the CIMC configuration until those tasks are complete.

Before You Begin

If you want to restore the SNMP configuration information when you import the configuration file, make sure that SNMP is disabled on this server before you do the import. If SNMP is enabled when you perform the import, CIMC does not overwrite the current values with those saved in the configuration file.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope cimc**	Enters the CIMC command mode.
Step 2	Server /cimc # **scope import-export**	Enters the import-export command mode.
Step 3	Server /cimc/import-export # **import-config** *tftp-ip-address path-and-filename*	Starts the import operation. The configuration file at the specified path and file name on the TFTP server at the specified IP address will be imported.

To determine whether the import operation has completed successfully, use the **show detail** command. To abort the operation, type CTRL+C.

This example shows how to import a CIMC configuration:

```
Server# scope cimc
Server /cimc # scope import-export
Server /cimc/import-export # import-config 192.0.2.34 /ucs/backups/cimc5.xml
Import config started. Please check the status using "show detail".
Server /cimc/import-export #
```

APPENDIX A

BIOS Parameters by Server Model

This appendix contains the following sections:

C22 and C24 Servers

Main BIOS Parameters for C22 and C24 Servers

Name	Description
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.

Advanced BIOS Parameters for C22 and C24 Servers

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.
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 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.
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.
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.

Name	Description
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 Power State C6 **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.

Name	Description
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.
Frequency Floor Override **set CpuFreqFloor**	Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following: • **Disabled**— The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance. • **Enabled**— The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption.
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** **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter. In addition, some operating systems, such as Windows 2008, ignore this parameter in favor of their own power plan.

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: • **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. • **Maximum_Performance**—System performance is optimized. • **Mirroring**—System reliability is optimized by using half the system memory as backup.
NUMA **set NUMAOptimize**	Whether the BIOS supports NUMA. This can be one of the following: • **Disabled**—The BIOS does not support NUMA. • **Enabled**—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.
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.

Name	Description
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.
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.

Name	Description
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.

QPI Configuration Parameters

Name	Description
QPI Link Frequency **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**

Onboard Storage Parameters

Name	Description
Onboard SCU Storage Support **set DisableSCU**	Whether the onboard software RAID controller is available to the server. This can be one of the following: • **Disabled**—The software RAID controller is not available. • **Enabled**—The software RAID controller is available.

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.

PCI Configuration Parameters

Name	Description
PCIe OptionROM Priority **set OptionROMPriority**	If the server has both legacy and EFI compatible PCI Option ROMs, this parameter specifies which Option ROM the server should launch. This can be one of the following: • **EFI_Compatible_ROM**—The server launches the EFI compatible PCI Option ROM. • **Legacy_ROM**—The server launches the legacy PCI Option ROM.
MMIO Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **Disabled**—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.

Serial Configuration Parameters

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. • **Enabled**—Enables console redirection on serial port A 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.

LOM and PCIe Slots Configuration Parameters

Name	Description
LOM Port 0 Legacy OptionROM **set LomOpromControlPort0**	Whether LOM port 0 is available to the server. This can be one of the following: • **Disabled**—LOM port 0 is not available. • **Enabled**—LOM port 0 is available.
LOM Port 1 Legacy OptionROM **set LomOpromControlPort1**	Whether LOM port 1 is available to the server. This can be one of the following: • **Disabled**—LOM port 1 is not available. • **Enabled**—LOM port 1 is available.
All PCIe Slots OptionROM **set PcieOptionROMs**	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: • **Disabled**—PCIe Option ROMs are not available. • **Enabled**—PCIe Option ROMs are available.
PCIe Slot:*n* OptionROM **set Slot-*n*-ROM**	Whether PCIe expansion slot ***n*** is available to the server. This can be one of the following: • **Disabled**—The expansion slot ***n*** is not available. • **Enabled**—The expansion slot ***n*** is available.

Name	Description
PCIe Slot:*n* Link Speed **PCIe Slot:*n*LinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe slot ***n***. This can be one of the following: • **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. For example, if you have a 3rd generation adapter card in PCIe slot 2 that you want to run at a maximum of 5GT/s instead of the 8GT/s that card supports, set the PCIe Slot 2 Link Speed to **GEN2**. The system then ignores the card's supported maximum speed of 8GT/s and forces it to run at a maximum of 5 GT/s.

Server Management BIOS Parameters for C22 and C24 Servers

Name	Description
FRB-2 Timer **set FRB-2**	Whether the FRB2 timer is used by CIMC 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.
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 CIMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.

Name	Description
OS Watchdog Timer Timeout **set OSBootWatchdogTimerTimeOut**	What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following: • **5_Minutes**—The watchdog timer expires 5 minutes after the OS begins to boot. • **10_Minutes**—The watchdog timer expires 10 minutes after the OS begins to boot. • **15_Minutes**—The watchdog timer expires 15 minutes after the OS begins to boot. • **20_Minutes**—The watchdog timer expires 20 minutes after the OS begins to boot. **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.

Name	Description
Boot Order Rules **set ManagedBootRule**	How the server changes the boot order list defined through the CIMC GUI or CLI when there are no devices of a particular device type available or when the user defines a different boot order using the server's BIOS Setup Utility. The supported device types are: • **HDD**—Hard disk drive • **FDD**—Floppy disk drive • **CDROM**—Bootable CD-ROM or DVD • **PXE**—PXE boot • **EFI**—Extensible Firmware Interface The Boot Order Rules option can be one of the following: • **Strict**—When no devices of a particular type are available, the system creates a placeholder for that device type in the boot order list. When a device of that type becomes available, it is added to the boot order in the previously defined position. If the user defines a boot order through the server's BIOS Setup Utility, that boot order is given priority over the boot order configured through the CIMC GUI or CLI. All device types defined through CIMC that are not present in the boot order defined through the BIOS Setup Utility are removed from the boot order list. • **Loose**—When no devices of a particular type are available, the system removes that device type from the boot order. When a device of that type becomes available, the system adds it to the end of the boot order list. If the boot order is configured through the server's BIOS Setup Utility, that boot order is given priority over the boot order configured through the CIMC GUI or CLI. All device types defined through CIMC that are not present in the boot order defined through the BIOS Setup Utility are moved to the end of the boot order list.

C200 and C210 Servers

Main BIOS Parameters for C200 and C210 Servers

Name	Description
POST Error Pause **set POSTErrorPause**	What happens when the server encounters a critical error during POST. This can be one of the following: • **Enabled**—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST. • **Disabled**—The BIOS continues to attempt to boot the server.
Boot Option Retry **set BootOptionRetry**	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: • **Enabled**—Continually retries NON-EFI based boot options without waiting for user input. • **Disabled**—Waits for user input before retrying NON-EFI based boot options.
USB Boot Priority **set USBBootPriority**	Whether the BIOS tries to boot from any available USB device before it tries to boot from the server hard drive. This can be one of the following: • **Enabled**—The server attempts to boot from a USB device if one is available. In addition, when a USB device is discovered, it is put at the top of its boot category. • **Disabled**—The server attempts to boot from the server hard drive before it tries USB devices. In addition, when a USB device is discovered, it is put at the bottom of its boot category.

Advanced BIOS Parameters for C200 and C210 Servers

Processor Configuration Parameters

Name	Description
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.
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.
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. To disable Hyper Threading and have only one logical processor core running on the server, select **1**. 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 Virtualization Technology **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 for Directed IO **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 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 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 Address Translation Services **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.
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.
Direct Cache Access **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.

Name	Description
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**—The BIOS does not send the C3 report. • **ACPI_C2**—The BIOS sends the C3 report using the ACPI C2 format, allowing the OS to transition the processor to the C3 low power state. • **ACPI_C3**—The BIOS sends the C3 report using the ACPI C3 format, allowing the OS to transition the processor to the C3 low power state.
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.

Name	Description
CPU Performance **set CPUPerformance**	Sets the CPU performance profile for the server. The performance profile consists of the following options: • Data Reuse Optimization • DCU Streamer Prefetcher • DCU IP Prefetcher • Hardware Prefetcher • Adjacent Cache-Line Prefetch This can be one of the following: • **Enterprise**—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • **High_Throughput**—All options are enabled. • **HPC**—Data Reuse Optimization is disabled and all other 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. **Note** **CPUPerformance** must be set to **Custom** in order to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.

Name	Description
Adjacent Cache-Line Prefetch **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. **Note** **CPUPerformance** must be set to **Custom** in order to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.
CPU C State **set ProcessorCcxEnable**	Whether the system can enter a power savings mode during idle periods. This can be one of the following: • **Disabled**—The system remains in high performance state even when idle. • **Enabled**—The system can reduce power to system components such as the DIMMs and CPUs. The amount of power reduction is specified by the **set PackageCStateLimit** command.
C1E **set ProcessorC1eEnable**	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 used only if **ProcessorCcxEnable** is enabled.
OEM AESNI **set OEMAESNIControl**	Whether the server uses the AES-NI encryption instruction set that improves on the Advanced Encryption Standard (AES) algorithm. This can be one of the following: • **Disabled**—The server only uses AES encryption. • **Enabled**—The server uses AES-NI encryption when possible.

Mass Storage Controller Configuration Parameters

Name	Description
Onboard SATA Controller **set OnboardSATA**	Whether the processor uses its built-in SATA controller. This can be one of the following: • **Disabled**—The server does not use the onboard SATA controller. • **Enabled**—The processor uses the built-in SATA controller.
SATA Mode **set ConfigSATAMode**	The mode in which the SATA controller runs. This can be one of the following: • **AHCI**—The controller enables the Advanced Host Controller Interface (AHCI) and disables RAID. • **Compatibility**—The controller disables both AHCI and RAID and runs in IDE emulation mode. • **Enhanced**—The controller enables both AHCI and RAID. • **S/W_RAID**—The controller enables RAID and disables the AHCI.

Serial Port Configuration Parameters

Name	Description
Serial A Enable **set Serial-PortA**	Whether serial port A is enabled or disabled. This can be one of the following: • **Disabled**—The serial port is disabled. • **Enabled**—The serial port is enabled.
Serial A Address **set SerialPortAAddress**	If serial port A is enabled, select the hex address that it should use. This can be one of the following: • **3F8** • **2F8** • **3E8** • **2E8**
Serial B Enable **set Serial-PortB**	Whether serial port B is enabled or disabled. This can be one of the following: • **Disabled**—The serial port is disabled. • **Enabled**—The serial port is enabled.

Name	Description
Serial B Address **set SerialPortBAddress**	If serial port B is enabled, select the hex address that it should use. This can be one of the following: • **3F8** • **2F8** • **3E8** • **2E8**

USB Configuration Parameters

Name	Description
USB Controller **set USBController**	Whether the processor uses its built-in USB controller. This can be one of the following: • **Disabled**—The server does not use the built-in USB controller. • **Enabled**—The processor uses the built-in USB controller.
Make Device Non-Bootable **set MakeUSBDeviceNonBootable**	Whether the server can boot from a USB device. This can be one of the following: • **Disabled**—The server can boot from a USB device. • **Enabled**—The server cannot boot from a USB device.
USB Performance Mode **set USB-Performance-Mode**	Whether the server uses USB 2.0 or USB 1.1 mode. This can be one of the following: • **High_Performance**—The server enables the EHCI (USB 2.0) controllers so that all USB devices function in USB 2.0 mode. This option maximizes USB device performance but requires additional power. • **Lower_Idle_Power**—The server disables the EHCI (USB 2.0) controllers so that all USB devices function in USB 1.1 mode. This option requires less power but decreases USB device performance.

PCI Configuration Parameters

Name	Description
Memory Mapped I/O Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **Disabled**—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.
Onboard Gb NIC 1 **set OnboardNic1**	Whether the first onboard Network Interface Card (NIC) is enabled or disabled on the server. This can be one of the following: • **Disabled**—NIC 1 is not available. • **Enabled**—NIC 1 is available.
Onboard Gb NIC 2 **set OnboardNic2**	Whether the second onboard NIC is enabled or disabled on the server. This can be one of the following: • **Disabled**—NIC 2 is not available. • **Enabled**—NIC 2 is available.
Onboard Gb NIC *n* ROM **set OnboardNic*n*ROM**	Whether the system loads the embedded PXE option ROM for the onboard NIC designated by ***n***. This can be one of the following: • **Disabled**—PXE option ROM is not available for NIC ***n***. • **Enabled**—PXE option ROM is available for NIC ***n***.
PCIe OptionROMs **set Pci-Opt-Roms**	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: • **Disabled**—PCIe Option ROMs are not available. • **Enabled**—PCIe Option ROMs are available.
PCIe Slot *n* ROM **set Slot-*n*-ROM**	Whether PCIe expansion slot ***n*** is available to the server. This can be one of the following: • **Disabled**—The expansion slot ***n*** is not available. • **Enabled**—The expansion slot ***n*** is available.

Name	Description
PCIe Mezzanine Slot ROM **set Slot-M-ROM**	Whether the PCIe mezzanine slot expansion ROM is available to the server. This can be one of the following: • **Disabled**—The mezzanine slot is not available. • **Enabled**—The mezzanine slot is available.
Active Video **set ActiveVideo**	How the server displays video. This can be one of the following: • **Auto**—The server uses an external graphics adapter for display if one is available. • **Onboard_Device**—The server always uses its internal graphics adapter even if an external graphics adapter is available.

Server Management BIOS Parameters for C200 and C210 Servers

Name	Description
Assert NMI on SERR **set AssertNMIOnSERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a SERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable **Assert_NMI_on_PERR**.
Assert NMI on PERR **set AssertNMIOnPERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a PERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable **Assert_NMI_on_SERR** to use this setting.

Name	Description
FRB2 Enable **set FRB-2**	Whether the FRB2 timer is used by CIMC 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.
PlugNPlay BMC Detection **set BMCPnP**	Whether the system automatically detects the BMC in ACPI-compliant operating systems. This can be one of the following: • **Disabled**—The system never automatically detects the BMC. • **Enabled**—The system automatically detects the BMC whenever possible.
ACPI1.0 Support **set ACPI10Support**	Whether the BIOS publishes the ACPI 1.0 version of FADT in the Root System Description table. This version may be required for compatibility with OS versions that only support ACPI 1.0. This can be one of the following: • **Disabled**—ACPI 1.0 version is not published. • **Enabled**—ACPI 1.0 version is published.
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. • **Serial_Port_A**—Enables console redirection on serial port A during POST. **Note** If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.
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. • **RTS-CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Baud Rate **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 9600 BAUD rate is used. • **19.2k**—A 19200 BAUD rate is used. • **38.4k**—A 38400 BAUD rate is used. • **57.6k**—A 57600 BAUD rate is used. • **115.2k**—A 115200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.
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-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. **Note** This setting must match the setting on the remote terminal application.
Legacy OS Redirection **set LegacyOSRedir**	Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following: • **Disabled**—The serial port enabled for console redirection is hidden from the legacy operating system. • **Enabled**—The serial port enabled for console redirection is visible to the legacy operating system.

C220 and C240 Servers

Main BIOS Parameters for C220 and C240 Servers

Name	Description
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.

Advanced BIOS Parameters for C220 and C240 Servers

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
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.
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
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.
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.

Name	Description
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.
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.

Name	Description
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 Power State C6 **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.
Frequency Floor Override **set CpuFreqFloor**	Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following: • **Disabled**— The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance. • **Enabled**— The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption.

Name	Description
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** **Note** **CPUPowerManagement** must be set to **Custom** or the server ignores the setting for this parameter. In addition, some operating systems, such as Windows 2008, ignore this parameter in favor of their own power plan.

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: • **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. • **Maximum_Performance**—System performance is optimized. • **Mirroring**—System reliability is optimized by using half the system memory as backup.
NUMA **set NUMAOptimize**	Whether the BIOS supports NUMA. This can be one of the following: • **Disabled**—The BIOS does not support NUMA. • **Enabled**—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.

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.
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.

QPI Configuration Parameters

Name	Description
QPI Link Frequency **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**

Onboard Storage Parameters

Name	Description
Onboard SCU Storage Support **set DisableSCU**	Whether the onboard software RAID controller is available to the server. This can be one of the following: • **Disabled**—The software RAID controller is not available. • **Enabled**—The software RAID controller is available.

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.

PCI Configuration Parameters

Name	Description
PCIe OptionROM Priority **set OptionROMPriority**	If the server has both legacy and EFI compatible PCI Option ROMs, this parameter specifies which Option ROM the server should launch. This can be one of the following: • **EFI_Compatible_ROM**—The server launches the EFI compatible PCI Option ROM. • **Legacy_ROM**—The server launches the legacy PCI Option ROM.
MMIO Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **Disabled**—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.

Serial Configuration Parameters

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.

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.

PCIe Slots Configuration Parameters

Name	Description
LOM Port *n* Legacy OptionROM **set LomOpromControlPort*n***	Whether Option ROM is available on the legacy LOM port designated by ***n***. This can be one of the following: • **Disabled**—Option ROM is not available on LOM port ***n***. • **Enabled**—Option ROM is available on LOM port ***n***.
All PCIe Slots OptionROM **set PcieOptionROMs**	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: • **Disabled**—PCIe Option ROMs are not available. • **Enabled**—PCIe Option ROMs are available.
PCIe Slot:*n* OptionROM **set PcieSlot*n*OptionROM**	Whether PCIe expansion slot ***n*** is available to the server. This can be one of the following: • **Disabled**—The expansion slot ***n*** is not available. • **Enabled**—The expansion slot ***n*** is available.
PCIe Mezzanine OptionROM **set PcieMezzOptionROM**	Whether the PCIe mezzanine slot expansion ROM is available to the server. This can be one of the following: • **Disabled**—The mezzanine slot is not available. • **Enabled**—The mezzanine slot is available.
PCIe Slot:*n* Link Speed **PCIe Slot:*n*LinkSpeed**	This option allows you to restrict the maximum speed of an adapter card installed in PCIe slot ***n***. This can be one of the following: • **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. For example, if you have a 3rd generation adapter card in PCIe slot 2 that you want to run at a maximum of 5GT/s instead of the 8GT/s that card supports, set the PCIe Slot 2 Link Speed to **GEN2**. The system then ignores the card's supported maximum speed of 8GT/s and forces it to run at a maximum of 5 GT/s.

Server Management BIOS Parameters for C220 and C240 Servers

Name	Description
FRB-2 Timer **set FRB-2**	Whether the FRB2 timer is used by CIMC 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.
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 CIMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.
OS Watchdog Timer Timeout **set OSBootWatchdogTimerTimeOut**	What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following: • **5_Minutes**—The watchdog timer expires 5 minutes after the OS begins to boot. • **10_Minutes**—The watchdog timer expires 10 minutes after the OS begins to boot. • **15_Minutes**—The watchdog timer expires 15 minutes after the OS begins to boot. • **20_Minutes**—The watchdog timer expires 20 minutes after the OS begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

Name	Description
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.

Name	Description
Boot Order Rules **set ManagedBootRule**	How the server changes the boot order list defined through the CIMC GUI or CLI when there are no devices of a particular device type available or when the user defines a different boot order using the server's BIOS Setup Utility. The supported device types are: • **HDD**—Hard disk drive • **FDD**—Floppy disk drive • **CDROM**—Bootable CD-ROM or DVD • **PXE**—PXE boot • **EFI**—Extensible Firmware Interface The Boot Order Rules option can be one of the following: • **Strict**—When no devices of a particular type are available, the system creates a placeholder for that device type in the boot order list. When a device of that type becomes available, it is added to the boot order in the previously defined position. If the user defines a boot order through the server's BIOS Setup Utility, that boot order is given priority over the boot order configured through the CIMC GUI or CLI. All device types defined through CIMC that are not present in the boot order defined through the BIOS Setup Utility are removed from the boot order list. • **Loose**—When no devices of a particular type are available, the system removes that device type from the boot order. When a device of that type becomes available, the system adds it to the end of the boot order list. If the boot order is configured through the server's BIOS Setup Utility, that boot order is given priority over the boot order configured through the CIMC GUI or CLI. All device types defined through CIMC that are not present in the boot order defined through the BIOS Setup Utility are moved to the end of the boot order list.

C250 Servers

Main BIOS Parameters for C250 Servers

Name	Description
POST Error Pause **set POSTErrorPause**	What happens when the server encounters a critical error during POST. This can be one of the following: • **Enabled**—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST. • **Disabled**—The BIOS continues to attempt to boot the server.
Boot Option Retry **set BootOptionRetry**	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: • **Enabled**—Continually retries NON-EFI based boot options without waiting for user input. • **Disabled**—Waits for user input before retrying NON-EFI based boot options.
USB Boot Priority **set USBBootPriority**	Whether the BIOS tries to boot from any available USB device before it tries to boot from the server hard drive. This can be one of the following: • **Enabled**—The server attempts to boot from a USB device if one is available. In addition, when a USB device is discovered, it is put at the top of its boot category. • **Disabled**—The server attempts to boot from the server hard drive before it tries USB devices. In addition, when a USB device is discovered, it is put at the bottom of its boot category.

Advanced BIOS Parameters for C250 Servers

Processor Configuration Parameters

Name	Description
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.
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.
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. To disable Hyper Threading and have only one logical processor core running on the server, select **1**. 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 Virtualization Technology **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 for Directed IO **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 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 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 Address Translation Services **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.
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.
Direct Cache Access **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.

Name	Description
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**—The BIOS does not send the C3 report. • **ACPI_C2**—The BIOS sends the C3 report using the ACPI C2 format, allowing the OS to transition the processor to the C3 low power state. • **ACPI_C3**—The BIOS sends the C3 report using the ACPI C3 format, allowing the OS to transition the processor to the C3 low power state.
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.

Name	Description
CPU Performance **set CPUPerformance**	Sets the CPU performance profile for the server. The performance profile consists of the following options: • Data Reuse Optimization • DCU Streamer Prefetcher • DCU IP Prefetcher • Hardware Prefetcher • Adjacent Cache-Line Prefetch This can be one of the following: • **Enterprise**—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • **High_Throughput**—All options are enabled. • **HPC**—Data Reuse Optimization is disabled and all other 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. **Note** **CPUPerformance** must be set to **Custom** in order to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.

Name	Description
Adjacent Cache-Line Prefetch **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. **Note** **CPUPerformance** must be set to **Custom** in order to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.
CPU C State **set ProcessorCcxEnable**	Whether the system can enter a power savings mode during idle periods. This can be one of the following: • **Disabled**—The system remains in high performance state even when idle. • **Enabled**—The system can reduce power to system components such as the DIMMs and CPUs. The amount of power reduction is specified by the **set PackageCStateLimit** command.
C1E **set ProcessorC1eEnable**	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 used only if **ProcessorCcxEnable** is enabled.
Spread Spectrum **set Ck410bConfigSpreadSpectrumEnable**	Spread Spectrum modulates the pulses produced by the clock on the motherboard in order to reduce the EMI (Electromagnetic Interference) generated by those pulses. This can be one of the following: • **Disabled**— The server does not use the spread spectrum function. • **Enabled**— The server uses the spread spectrum function.

Name	Description
OEM AESNI **set OEMAESNIControl**	Whether the server uses the AES-NI encryption instruction set that improves on the Advanced Encryption Standard (AES) algorithm. This can be one of the following: • **Disabled**—The server only uses AES encryption. • **Enabled**—The server uses AES-NI encryption when possible.

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. • **Sparing**—The system reserves some memory for use in the event a DIMM fails. If that happens, the server takes the DIMM offline and replaces it with the reserved memory. This option provides less redundancy than mirroring, but it leaves more of the memory available for programs running on the server.
NUMA Optimized **set NUMAOptimize**	Whether the BIOS supports NUMA. This can be one of the following: • **Disabled**—The BIOS does not support NUMA. • **Enabled**—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.
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.

Serial Port Configuration Parameters

Name	Description
Serial A Enable **set Serial-PortA**	Whether serial port A is enabled or disabled. This can be one of the following: • **Disabled**—The serial port is disabled. • **Enabled**—The serial port is enabled.
Serial A Address **set SerialPortAAddress**	If serial port A is enabled, select the hex address that it should use. This can be one of the following: • **3F8** • **2F8** • **3E8** • **2E8**

USB Configuration Parameters

Name	Description
USB Controller **set USBController**	Whether the processor uses its built-in USB controller. This can be one of the following: • **Disabled**—The server does not use the built-in USB controller. • **Enabled**—The processor uses the built-in USB controller.
Make Device Non-Bootable **set MakeUSBDeviceNonBootable**	Whether the server can boot from a USB device. This can be one of the following: • **Disabled**—The server can boot from a USB device. • **Enabled**—The server cannot boot from a USB device.

PCI Configuration Parameters

Name	Description
Memory Mapped I/O Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **Disabled**—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.
Onboard Gb NIC 1 **set OnboardNic1**	Whether the first onboard Network Interface Card (NIC) is enabled or disabled on the server. This can be one of the following: • **Disabled**—NIC 1 is not available. • **Enabled**—NIC 1 is available.
Onboard Gb NIC 2 **set OnboardNic2**	Whether the second onboard NIC is enabled or disabled on the server. This can be one of the following: • **Disabled**—NIC 2 is not available. • **Enabled**—NIC 2 is available.
Onboard Gb NIC *n* ROM **set OnboardNic*n*ROM**	Whether the system loads the embedded PXE option ROM for the onboard NIC designated by ***n***. This can be one of the following: • **Disabled**—PXE option ROM is not available for NIC ***n***. • **Enabled**—PXE option ROM is available for NIC ***n***.
PCIe OptionROMs **set Pci-Opt-Roms**	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: • **Disabled**—PCIe Option ROMs are not available. • **Enabled**—PCIe Option ROMs are available.
PCIe Slot *X* ROM **set Slot-*X*-ROM**	Whether the PCIe expansion slot designated by ***X*** is available to the server. This can be one of the following: • **Disabled**—The expansion slot ***X*** is not available. • **Enabled**—The expansion slot ***X*** is available.

Name	Description
Active Video **set ActiveVideo**	How the server displays video. This can be one of the following: • **Auto**—The server uses an external graphics adapter for display if one is available. • **Onboard_Device**—The server always uses its internal graphics adapter even if an external graphics adapter is available.

Server Management BIOS Parameters for C250 Servers

Name	Description
Assert NMI on SERR **set AssertNMIOnSERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a SERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable **Assert_NMI_on_PERR**.
Assert NMI on PERR **set AssertNMIOnPERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a PERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable **Assert_NMI_on_SERR** to use this setting.
FRB2 Enable **set FRB-2**	Whether the FRB2 timer is used by CIMC 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
PlugNPlay BMC Detection **set BMCPnP**	Whether the system automatically detects the BMC in ACPI-compliant operating systems. This can be one of the following: • **Disabled**—The system never automatically detects the BMC. • **Enabled**—The system automatically detects the BMC whenever possible.
ACPI1.0 Support **set ACPI10Support**	Whether the BIOS publishes the ACPI 1.0 version of FADT in the Root System Description table. This version may be required for compatibility with OS versions that only support ACPI 1.0. This can be one of the following: • **Disabled**—ACPI 1.0 version is not published. • **Enabled**—ACPI 1.0 version is published.
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. • **Serial_Port_A**—Enables console redirection on serial port A during POST. **Note** If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.
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. • **RTS-CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Baud Rate **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 9600 BAUD rate is used. • **19.2k**—A 19200 BAUD rate is used. • **38.4k**—A 38400 BAUD rate is used. • **57.6k**—A 57600 BAUD rate is used. • **115.2k**—A 115200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.
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-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. **Note** This setting must match the setting on the remote terminal application.
Legacy OS Redirection **set LegacyOSRedir**	Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following: • **Disabled**—The serial port enabled for console redirection is hidden from the legacy operating system. • **Enabled**—The serial port enabled for console redirection is visible to the legacy operating system.

C260 Servers

Main BIOS Parameters for C260 Servers

Name	Description
POST Error Pause **set POSTErrorPause**	What happens when the server encounters a critical error during POST. This can be one of the following: • **Enabled**—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST. • **Disabled**—The BIOS continues to attempt to boot the server.
Boot Option Retry **set BootOptionRetry**	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: • **Enabled**—Continually retries NON-EFI based boot options without waiting for user input. • **Disabled**—Waits for user input before retrying NON-EFI based boot options.

Advanced BIOS Parameters for C260 Servers

Processor Configuration Parameters

Name	Description
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.

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.
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. To disable Hyper Threading and have only one logical processor core running on the server, select **1**. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
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 Virtualization Technology **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 for Directed IO **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 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.

Name	Description
Intel VT-d Address Translation Services **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.
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.
Direct Cache Access **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.
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**—The BIOS does not send the C3 report. • **ACPI_C2**—The BIOS sends the C3 report using the ACPI C2 format, allowing the OS to transition the processor to the C3 low power state. • **ACPI_C3**—The BIOS sends the C3 report using the ACPI C3 format, allowing the OS to transition the processor to the C3 low power state.

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.
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. **Note** This option is used only if **CPU C State** is enabled.

Name	Description
CPU C State **set ProcessorCcxEnable**	Whether the system can enter a power savings mode during idle periods. This can be one of the following: • **Disabled**—The system remains in high performance state even when idle. • **Enabled**—The system can reduce power to system components such as the DIMMs and CPUs. The amount of power reduction is specified by the **set PackageCStateLimit** command.
C1E **set ProcessorC1eEnable**	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 used only if **ProcessorCcxEnable** is enabled.

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. • **Sparing**—The system reserves some memory for use in the event a DIMM fails. If that happens, the server takes the DIMM offline and replaces it with the reserved memory. This option provides less redundancy than mirroring, but it leaves more of the memory available for programs running on the server.

Name	Description
NUMA Optimized **set NUMAOptimize**	Whether the BIOS supports NUMA. This can be one of the following: • **Disabled**—The BIOS does not support NUMA. • **Enabled**—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.
Sparing Mode **set SparingMode**	The sparing mode used by the CIMC. This can be one of the following: • **Rank_Sparing**—The spared memory is allocated at the rank level. • **DIMM Sparing**—The spared memory is allocated at the DIMM level. **Note** This option is used only if **set SelectMemoryRAS** is set to **Sparing**.
Mirroring Mode **set MirroringMode**	Mirroring is supported across Integrated Memory Controllers (IMCs) where one memory riser is mirrored with another. This can be one of the following: • **Intersocket**—Each IMC is mirrored across two sockets. • **Intrasocket**—One IMC is mirrored with another IMC in the same socket. **Note** This option is used only if **SelectMemoryRAS** is set to **Mirroring**.
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
Patrol Scrub Interval **set PatrolScrubDuration**	Controls the time interval between each patrol scrub memory access. A lower interval scrubs the memory more often but requires more memory bandwidth. Select a value between 5 and 23. The default value is 8. **Note** This option is used only if **Patrol Scrub** is enabled.
CKE Low Policy **set CkeLowPolicy**	Controls the DIMM power savings mode policy. This can be one of the following: • **Disabled**—DIMMs do not enter power saving mode. • **Slow**—DIMMs can enter power saving mode, but the requirements are higher. Therefore, DIMMs enter power saving mode less frequently. • **Fast**—DIMMs enter power saving mode as often as possible. • **Auto**—The BIOS controls when a DIMM enters power saving mode based on the DIMM configuration.

Serial Port Configuration Parameters

Name	Description
Serial A Enable **set Serial-PortA**	Whether serial port A is enabled or disabled. This can be one of the following: • **Disabled**—The serial port is disabled. • **Enabled**—The serial port is enabled.

USB Configuration Parameters

Name	Description
Make Device Non-Bootable **set MakeUSBDeviceNonBootable**	Whether the server can boot from a USB device. This can be one of the following: • **Disabled**—The server can boot from a USB device. • **Enabled**—The server cannot boot from a USB device.

PCI Configuration Parameters

Name	Description
Memory Mapped I/O Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **Disabled**—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.
Onboard NIC *n* ROM **set NIC-*n*-ROM**	Whether the system loads the embedded PXE option ROM for the onboard NIC designated by ***n***. This can be one of the following: • **Disabled**—PXE option ROM is not available for NIC ***n***. • **Enabled**—PXE option ROM is available for NIC ***n***.
PCIe OptionROMs **set PciOptionRomsDisable**	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: • **Disabled**—PCIe Option ROMs are not available. • **Enabled**—PCIe Option ROMs are available.
PCIe Slot *n* ROM **set Slot-*n*-ROM**	Whether PCIe expansion slot ***n*** is available to the server. This can be one of the following: • **Disabled**—The expansion slot ***n*** is not available. • **Enabled**—The expansion slot ***n*** is available.

Server Management BIOS Parameters for C260 Servers

Name	Description
Assert NMI on SERR **set AssertNMIOnSERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a SERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable **Assert_NMI_on_PERR**.
Assert NMI on PERR **set AssertNMIOnPERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a PERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable **Assert_NMI_on_SERR** to use this setting.
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. • **Serial_Port_A**—Enables console redirection on serial port A during POST. **Note** If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.
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. • **RTS-CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Baud Rate **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 9600 BAUD rate is used. • **19.2k**—A 19200 BAUD rate is used. • **38.4k**—A 38400 BAUD rate is used. • **57.6k**—A 57600 BAUD rate is used. • **115.2k**—A 115200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.
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-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. **Note** This setting must match the setting on the remote terminal application.
OS Boot Watchdog Timer Timeout **set OSBootWatchdogTimerTimeOut**	What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following: • **5_Minutes**—The watchdog timer expires 5 minutes after the OS begins to boot. • **10_Minutes**—The watchdog timer expires 10 minutes after the OS begins to boot. • **15_Minutes**—The watchdog timer expires 15 minutes after the OS begins to boot. • **20_Minutes**—The watchdog timer expires 20 minutes after the OS begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

Name	Description
OS Boot Watchdog Policy **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.
Legacy OS Redirection **set LegacyOSRedir**	Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following: • **Disabled**—The serial port enabled for console redirection is hidden from the legacy operating system. • **Enabled**—The serial port enabled for console redirection is visible to the legacy operating system.
OS Boot 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 CIMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.

C460 Servers

Main BIOS Parameters for C460 Servers

Name	Description
POST Error Pause **set POSTErrorPause**	What happens when the server encounters a critical error during POST. This can be one of the following: • **Enabled**—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST. • **Disabled**—The BIOS continues to attempt to boot the server.
Boot Option Retry **set BootOptionRetry**	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: • **Enabled**—Continually retries NON-EFI based boot options without waiting for user input. • **Disabled**—Waits for user input before retrying NON-EFI based boot options.

Advanced BIOS Parameters for C460 Servers

Processor Configuration Parameters

Name	Description
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.

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.
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. To disable Hyper Threading and have only one logical processor core running on the server, select **1**. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
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 Virtualization Technology **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 for Directed IO **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 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.

Name	Description
Intel VT-d Address Translation Services **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.
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.
Direct Cache Access **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.
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**—The BIOS does not send the C3 report. • **ACPI_C2**—The BIOS sends the C3 report using the ACPI C2 format, allowing the OS to transition the processor to the C3 low power state. • **ACPI_C3**—The BIOS sends the C3 report using the ACPI C3 format, allowing the OS to transition the processor to the C3 low power state.

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.
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. **Note** This option is used only if **CPU C State** is enabled.

Name	Description
CPU C State **set ProcessorCcxEnable**	Whether the system can enter a power savings mode during idle periods. This can be one of the following: • **Disabled**—The system remains in high performance state even when idle. • **Enabled**—The system can reduce power to system components such as the DIMMs and CPUs. The amount of power reduction is specified by the **set PackageCStateLimit** command.
C1E **set ProcessorC1eEnable**	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 used only if **ProcessorCcxEnable** is enabled.

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. • **Sparing**—The system reserves some memory for use in the event a DIMM fails. If that happens, the server takes the DIMM offline and replaces it with the reserved memory. This option provides less redundancy than mirroring, but it leaves more of the memory available for programs running on the server.

Name	Description
NUMA Optimized **set NUMAOptimize**	Whether the BIOS supports NUMA. This can be one of the following: • **Disabled**—The BIOS does not support NUMA. • **Enabled**—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.
Sparing Mode **set SparingMode**	The sparing mode used by the CIMC. This can be one of the following: • **Rank_Sparing**—The spared memory is allocated at the rank level. • **DIMM Sparing**—The spared memory is allocated at the DIMM level. **Note** This option is used only if **set SelectMemoryRAS** is set to **Sparing**.
Mirroring Mode **set MirroringMode**	Mirroring is supported across Integrated Memory Controllers (IMCs) where one memory riser is mirrored with another. This can be one of the following: • **Intersocket**—Each IMC is mirrored across two sockets. • **Intrasocket**—One IMC is mirrored with another IMC in the same socket. **Note** This option is used only if **SelectMemoryRAS** is set to **Mirroring**.
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
Patrol Scrub Interval **set PatrolScrubDuration**	Controls the time interval between each patrol scrub memory access. A lower interval scrubs the memory more often but requires more memory bandwidth. Select a value between 5 and 23. The default value is 8. **Note** This option is used only if **Patrol Scrub** is enabled.
CKE Low Policy **set CkeLowPolicy**	Controls the DIMM power savings mode policy. This can be one of the following: • **Disabled**—DIMMs do not enter power saving mode. • **Slow**—DIMMs can enter power saving mode, but the requirements are higher. Therefore, DIMMs enter power saving mode less frequently. • **Fast**—DIMMs enter power saving mode as often as possible. • **Auto**—The BIOS controls when a DIMM enters power saving mode based on the DIMM configuration.

Serial Port Configuration Parameters

Name	Description
Serial A Enable **set Serial-PortA**	Whether serial port A is enabled or disabled. This can be one of the following: • **Disabled**—The serial port is disabled. • **Enabled**—The serial port is enabled.

USB Configuration Parameters

Name	Description
Make Device Non-Bootable **set MakeUSBDeviceNonBootable**	Whether the server can boot from a USB device. This can be one of the following: • **Disabled**—The server can boot from a USB device. • **Enabled**—The server cannot boot from a USB device.

PCI Configuration Parameters

Name	Description
Memory Mapped I/O Above 4GB **set MemoryMappedIOAbove4GB**	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: • **Disabled**—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.
Onboard NIC *n* ROM **set NIC-*n*-ROM**	Whether the system loads the embedded PXE option ROM for the onboard NIC designated by ***n***. This can be one of the following: • **Disabled**—PXE option ROM is not available for NIC ***n***. • **Enabled**—PXE option ROM is available for NIC ***n***.
PCIe OptionROMs **set PciOptRomsDisable**	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: • **Disabled**—PCIe Option ROMs are not available. • **Enabled**—PCIe Option ROMs are available.
PCIe Slot *n* ROM **set Slot-*n*-ROM**	Whether PCIe expansion slot ***n*** is available to the server. This can be one of the following: • **Disabled**—The expansion slot ***n*** is not available. • **Enabled**—The expansion slot ***n*** is available.

Server Management BIOS Parameters for C460 Servers

Name	Description
Assert NMI on SERR **set AssertNMIOnSERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a SERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable **Assert_NMI_on_PERR**.
Assert NMI on PERR **set AssertNMIOnPERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a PERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable **Assert_NMI_on_SERR** to use this setting.
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. • **Serial_Port_A**—Enables console redirection on serial port A during POST. **Note** If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.
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. • **RTS-CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.

Name	Description
Baud Rate **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 9600 BAUD rate is used. • **19.2k**—A 19200 BAUD rate is used. • **38.4k**—A 38400 BAUD rate is used. • **57.6k**—A 57600 BAUD rate is used. • **115.2k**—A 115200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.
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-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. **Note** This setting must match the setting on the remote terminal application.
OS Boot Watchdog Timer Timeout **set OSBootWatchdogTimerTimeOut**	What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following: • **5_Minutes**—The watchdog timer expires 5 minutes after the OS begins to boot. • **10_Minutes**—The watchdog timer expires 10 minutes after the OS begins to boot. • **15_Minutes**—The watchdog timer expires 15 minutes after the OS begins to boot. • **20_Minutes**—The watchdog timer expires 20 minutes after the OS begins to boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.

Name	Description
OS Boot Watchdog Policy **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.
Legacy OS Redirection **set LegacyOSRedir**	Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following: • **Disabled**—The serial port enabled for console redirection is hidden from the legacy operating system. • **Enabled**—The serial port enabled for console redirection is visible to the legacy operating system.
OS Boot 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 CIMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.

INDEX

D

E

F

H

I

K

L

M

N

O

P

R

S

T

U

V

X

Y