



## **Cisco UCS C-Series Servers Integrated Management Controller CLI Configuration Guide, Release 1.5**

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# Preface

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This preface includes the following sections:

- [Audience, page xi](#)
- [Conventions, page xi](#)
- [New and Changed Information for this Release, page xiii](#)
- [Related Cisco UCS Documentation, page xv](#)

## Audience

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

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

## Conventions

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

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

**Note**

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

**Tip**

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

**Caution**

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

**Timesaver**

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

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

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

SAVE THESE INSTRUCTIONS

## 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.	<a href="#">Managing Network Adapters, on page 83</a>
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.	<a href="#">BIOS Parameters by Server Model, on page 183</a>

### **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.	<a href="#">Managing the Server, on page 13</a>
BIOS Properties	Support for additional BIOS properties for the Cisco UCS C220 M3 Server and the Cisco UCS C240 M3 Server.	<a href="#">BIOS Parameters by Server Model, on page 183</a>

### 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.	<a href="#">Release Notes for Cisco UCS C-Series Software, Release 1.4(4)</a>
BIOS Properties	Support for additional BIOS properties for the Cisco UCS C220 M3 Server and the Cisco UCS C240 M3 Server.	<a href="#">BIOS Parameters by Server Model, on page 183</a>

### 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 <i>Hardware Installation Guide</i> (HIG) for the type of server you are using. The C-Series HIGs are available at the following URL: <a href="http://www.cisco.com/en/US/products/ps10493/prod_installation_guides_list.html">http://www.cisco.com/en/US/products/ps10493/prod_installation_guides_list.html</a>
Technical support	Support added for downloading the tech support information file from a browser.	<a href="#">Server Utilities, on page 173</a>
BIOS parameters	Support added for additional BIOS properties.	<a href="#">BIOS Parameters by Server Model, on page 183</a>

### 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.	<a href="#">Release Notes for Cisco UCS C-Series Software, Release 1.4(2)</a>

Feature	Description	Where Documented
BIOS parameters	Support added for additional BIOS properties.	<a href="#">BIOS Parameters by Server Model, on page 183</a>

### 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.	<a href="#">Release Notes for Cisco UCS C-Series Software, Release 1.4(1)</a>
VM FEX	Support is added for virtual machine fabric extenders (VM FEX).	<a href="#">Managing Network Adapters, on page 83</a>
Create vHBAs	Support added in the CLI to create up to 16 vHBAs.	<a href="#">Managing Network Adapters, on page 83</a>
Active Directory groups	Support added for Active Directory authorization groups.	<a href="#">Managing User Accounts, on page 65</a>
Enhanced SNMP features	Enhanced SNMPv3 and SNMP trap configuration is relocated in the user interface.	<a href="#">Configuring Communication Services, on page 133</a>
XML API	Support added for CIMC control by an XML API.	<a href="#">Configuring Communication Services, on page 133</a>
HTTP redirect	Support added for redirection of HTTP requests to HTTPS.	<a href="#">Configuring Communication Services, on page 133</a>
BIOS parameters	Support added for additional BIOS properties.	<a href="#">BIOS Parameters by Server Model, on page 183</a>

## 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, page 1](#)
- [Overview of the Server Software, page 1](#)
- [Cisco Integrated Management Controller, page 2](#)
- [CIMC CLI, page 3](#)

## 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

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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](http://www.cisco.com/en/US/products/ps10739/prod_release_notes_list.html)

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## 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**

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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>.

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# Cisco Integrated Management Controller

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

**Note**

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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**

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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	<b>top</b> command from any mode	#
bios	<b>scope bios</b> command from EXEC mode	/bios #
advanced	<b>scope advanced</b> command from bios mode	/bios/advanced #
main	<b>scope main</b> command from bios mode	/bios/main #
server-management	<b>scope server-management</b> command from bios mode	/bios/server-management #
certificate	<b>scope certificate</b> command from EXEC mode	/certificate #
chassis	<b>scope chassis</b> command from EXEC mode	/chassis #
adapter	<b>scope adapter</b> <i>index</i> command from chassis mode	/chassis/adapter #
host-eth-if	<b>scope host-eth-if</b> command from adapter mode	/chassis/adapter/host-eth-if #
host-fc-if	<b>scope host-fc-if</b> command from adapter mode	/chassis/adapter/host-fc-if #
port-profiles	<b>scope port-profiles</b> command from adapter mode	/chassis/adapter/port-profiles #
vmfex	<b>scope vmfex</b> <i>index</i> command from adapter mode	/chassis/adapter/vmfex #
dimm-summary	<b>scope dimm-summary</b> <i>index</i> command from chassis mode	/chassis/dimm-summary #
flexflash	<b>scope flexflash</b> <i>index</i> command from chassis mode	/chassis/flexflash #
operational-profiles	<b>scope operational-profile</b> command from flexflash mode	/chassis/flexflash/operational-profile #

Mode Name	Command to Access	Mode Prompt
storageadapter	<b>scope storageadapter</b> <i>slot</i> command from chassis mode	/chassis/storageadapter #
physical-drive	<b>scope physical-drive</b> command from storageadapter mode	/chassis/storageadapter/physical-drive #
virtual-drive	<b>scope virtual-drive</b> command from storageadapter mode	/chassis/storageadapter/virtual-drive #
cimc	<b>scope cimc</b> command from EXEC mode	/cimc #
firmware	<b>scope firmware</b> command from cimc mode	/cimc/firmware #
import-export	<b>scope import-export</b> command from cimc mode	/cimc/import-export #
log	<b>scope log</b> command from cimc mode	/cimc/log #
server	<b>scope server</b> <i>index</i> command from log mode	/cimc/log/server #
network	<b>scope network</b> command from cimc mode	/cimc/network #
ipblocking	<b>scope ipblocking</b> command from network mode	/cimc/network/ipblocking #
tech-support	<b>scope tech-support</b> command from cimc mode	/cimc/tech-support #
fault	<b>scope fault</b> command from EXEC mode	/fault #
pef	<b>scope pef</b> command from fault mode	/fault/pef #
http	<b>scope http</b> command from EXEC mode	/http #
ipmi	<b>scope ipmi</b> command from EXEC mode	/ipmi #
kvm	<b>scope kvm</b> command from EXEC mode	/kvm #
ldap		/ldap #

Mode Name	Command to Access	Mode Prompt
	<b>scope ldap</b> command from EXEC mode	
role-group	<b>scope role-group</b> command from ldap mode	/ldap/role-group #
power-cap	<b>scope power-cap</b> command from EXEC mode	/power-cap #
sel	<b>scope sel</b> command from EXEC mode	/sel #
sensor	<b>scope sensor</b> command from EXEC mode	/sensor #
snmp	<b>scope snmp</b> command from EXEC mode	/snmp #
trap-destinations	<b>scope trap-destinations</b> command from snmp mode	/snmp/trap-destinations #
v3users	<b>scope v3users</b> command from snmp mode	/snmp/v3users #
sol	<b>scope sol</b> command from EXEC mode	/sol #
ssh	<b>scope ssh</b> command from EXEC mode	/ssh #
user	<b>scope user</b> <i>user-number</i> command from EXEC mode	/user #
user-session	<b>scope user-session</b> <i>session-number</i> command from EXEC mode	/user-session #
vmedia	<b>scope vmedia</b> command from EXEC mode	/vmedia #
xmlapi	<b>scope xmlapi</b> 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 press Enter.

## Committing, Discarding, and Viewing Pending Commands

When you enter a configuration command in the CLI, the command is not applied until you enter the **commit** command. Until committed, a configuration command is pending and can be discarded by entering a **discard** command. When any command is pending, an asterisk (\*) appears before the command prompt. The asterisk disappears when you enter the **commit** command, as shown in this example:

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

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



### Note

---

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

---

## Command Output Formats

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

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

This example shows command output in the default format:

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



```
Name HDD_02_STATUS:
  Status : present
Name HDD_03_STATUS:
  Status : present
Name HDD_04_STATUS:
  Status : present

Server /chassis #
```

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

This example shows command output in the YAML format:

```
Server /chassis # set cli output yaml
Server /chassis # show hdd detail
---
  name: HDD_01_STATUS
  hdd-status: present
---
  name: HDD_02_STATUS
  hdd-status: present
---
  name: HDD_03_STATUS
  hdd-status: present
---
  name: HDD_04_STATUS
  hdd-status: present
...
Server /chassis #
```

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

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

## 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, page 11](#)
- [KVM Console, page 11](#)
- [PXE Installation Servers, page 12](#)

## 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.

## 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.



## Managing the Server

This chapter includes the following sections:

- [Toggling the Locator LED, page 13](#)
- [Toggling the Locator LED for a Hard Drive, page 14](#)
- [Managing the Server Boot Order, page 14](#)
- [Resetting the Server, page 16](#)
- [Shutting Down the Server, page 17](#)
- [Managing Server Power, page 18](#)
- [Configuring Power Policies, page 20](#)
- [Managing the Flexible Flash Controller, page 24](#)
- [Configuring BIOS Settings, page 30](#)

### 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
<b>Step 1</b>	Server # <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>set locator-led {on   off}</b>	Enables or disables the chassis locator LED.
<b>Step 3</b>	Server /chassis # <b>commit</b>	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
<b>Step 1</b>	Server # <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server/chassis # <b>scope hdd</b>	Enters hard disk drive (HDD) command mode.
<b>Step 3</b>	Server /chassis/hdd # <b>set locateHDD drivenum {1   2}</b>	Where <i>drivenum</i> 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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters bios command mode.
<b>Step 2</b>	Server /bios # <b>set boot-order</b> <i>device1[,device2[,device3 [,device4[,device5]]]]</i>	Specifies the boot device options and order. You can select one or more of the following: <ul style="list-style-type: none"> <li>• cdrom—Bootable CD-ROM</li> <li>• fdd—Floppy disk drive</li> <li>• hdd—Hard disk drive</li> <li>• pxe—PXE boot</li> <li>• efi—Extensible Firmware Interface</li> </ul>
<b>Step 3</b>	Server /bios # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters bios command mode.
<b>Step 2</b>	Server /bios # <b>show actual-boot-order [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>power hard-reset</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis mode.
<b>Step 2</b>	Server /chassis # <b>power shutdown</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>power on</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>power off</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>power cycle</b>	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
<b>Step 1</b>	Server# <b>show power-cap [detail]</b>	Displays the server power consumption statistics and the power cap policy.

The displayed fields are described in the following table:

Name	Description
<b>Current Consumption</b>	The power currently being used by the server, in watts.
<b>Maximum Consumption</b>	The maximum number of watts consumed by the server since the last time it was rebooted.
<b>Minimum Consumption</b>	The minimum number of watts consumed by the server since the last time it was rebooted.
<b>Minimum Configurable Limit</b>	The minimum amount of power that can be specified as the peak power cap for this server, in watts.
<b>Maximum Configurable Limit</b>	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
<b>Enable Power Capping</b>	, the system monitors how much power is allocated to the server and takes the specified action if the server goes over its maximum allotment.
<b>Peak Power</b>	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 <b>Non-Compliance Action</b> field.  Enter a number of watts within the range defined by the <b>Minimum Configurable Limit</b> field and the <b>Maximum Configurable Limit</b> field.

Name	Description
<b>Non-Compliance Action</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• —The server is forced to reduce its power consumption by any means necessary. This option is available only on some C-Series servers.</li> <li>• —No action is taken and the server is allowed to use more power than specified in the <b>Peak Power</b> field.</li> <li>• —The server is shut down.</li> <li>• —Processes running on the server are throttled to bring the total power consumption down.</li> </ul>

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
<b>Step 1</b>	Server# <b>scope power-cap</b>	Enters the power cap command mode.
<b>Step 2</b>	Server /power-cap # <b>set enabled {yes   no}</b>	Enables or disables the capping of power to the server.
<b>Step 3</b>	Server /power-cap # <b>set peak-power watts</b>	Specifies the maximum number of watts that can be allocated to this server. Enter a number of <i>watts</i> within the range defined by the <b>Minimum Configurable Limit</b> field and the <b>Maximum Configurable Limit</b> field of the <b>show power-cap detail</b> 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 <b>set non-compliance-action</b> command.
<b>Step 4</b>	Server /power-cap # <b>set non-compliance-action {force-power-reduction   none   power-off-host   throttle}</b>	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: <ul style="list-style-type: none"> <li>• <b>force-power-reduction</b>—The server is forced to reduce its power consumption by any means necessary. This option is not available on some server models.</li> <li>• <b>none</b>—No action is taken and the server is allowed to use more power than specified in the peak power setting.</li> <li>• <b>power-off-host</b>—The server is shut down.</li> <li>• <b>throttle</b>—Processes running on the server are throttled to bring the total power consumption down.</li> </ul>
<b>Step 5</b>	Server /power-cap # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>set policy</b> { <b>power-off</b>   <b>power-on</b>   <b>restore-last-state</b> }	Specifies the action to be taken when chassis power is restored. Select one of the following: <ul style="list-style-type: none"> <li>• <b>power-off</b>—Server power will remain off until manually turned on. This is the default action.</li> <li>• <b>power-on</b>—Server power will be turned on when chassis power is restored.</li> <li>• <b>restore-last-state</b>—Server power will return to the state before chassis power was lost.</li> </ul> When the selected action is <b>power-on</b> , you can select a delay in the restoration of power to the server.
<b>Step 3</b>	Server /chassis # <b>set delay</b> { <b>fixed</b>   <b>random</b> }	(Optional) Specifies whether server power will be restored after a fixed or random time. The default is <b>fixed</b> . This command is accepted only if the power restore action is <b>power-on</b> .
<b>Step 4</b>	Server /chassis # <b>set delay-value</b> <i>delay</i>	(Optional) Specifies the delay time in seconds. The range is 0 to 240; the default is 0.
<b>Step 5</b>	Server /chassis # <b>commit</b>	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>

### Dual Card Management in the Cisco Flexible Flash Controller

The Cisco Flexible Flash controller supports management of two SD cards as a RAID-1 pair. With the introduction of dual card management, you can perform the following tasks:

Action	Description
<b>Reset Cisco Flex Flash</b>	Allows you to reset the controller.
<b>Reset Configuration</b>	Allows you to reset the configuration in the selected slot to the default configuration.
<b>Retain Configuration</b>	Allows you to retain the configuration for an SD card that supports firmware version 1.2.253.
<b>Configure Operational Profile</b>	Allows you to configure the SD cards on the selected Cisco Flexible Flash controller.

### RAID Partition Enumeration

Non-RAID partitions are always enumerated from the primary card and the enumeration does not depend on the status of the primary card.



Following is the behavior of the RAID partition enumeration when there are two cards in the Cisco Flexible Flash controller:

Scenario	Behavior
Single card	RAID partitions are enumerated if the card is healthy, and if the mode is either <b>Primary</b> or <b>Secondary-active</b> .
Dual paired cards	RAID partitions are enumerated if one of the cards is healthy.  When only one card is healthy, all read/write operations occur on this healthy card. You must use UCS SCU to synchronize the two RAID partitions.
Dual unpaired cards	If this scenario is detected when the server is restarting, then neither one of the RAID partitions is enumerated.  If this scenario is detected when the server is running, when a user connects a new SD card, then the cards are not managed by the Cisco Flexible Flash controller. This does not affect the host enumeration. You must pair the cards to manage them. You can pair the cards using the <b>Reset Configuration</b> or <b>Retain Configuration</b> options.

## 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope flexflash index</b>	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible <i>index</i> value is <b>FlexFlash-0</b> .
<b>Step 3</b>	Server /chassis/flexflash # <b>scope operational-profile</b>	Enters the operational profile command mode.
<b>Step 4</b>	Server /chassis/flexflash/operational-profile	Specifies the slot in which the primary copy of the data resides.

	Command or Action	Purpose
	<code># set raid-primary-member {slot1   slot2}</code>	<b>Important</b> Currently, Cisco Flexible Flash cards are supported in slot 1 and slot 2. Therefore, you can specify <b>slot1</b> or <b>slot2</b> .
<b>Step 5</b>	Server /chassis/flexflash/operational-profile <code># set raid-secondary-role {active   initializing}</code>	The role of the secondary RAID. The currently supported value is <b>active</b> .
<b>Step 6</b>	Server /chassis/flexflash/operational-profile <code># set read-error-count-threshold</code>	Specifies the number of read 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 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).
<b>Step 7</b>	Server /chassis/flexflash/operational-profile <code># set write-error-count-threshold</code>	Specifies the number of 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 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).
<b>Step 8</b>	Server /chassis/flexflash/operational-profile <code># set virtual-drives-enabled list</code>	Specifies a list of virtual drives to be made available to the server as a USB-style drive. The options are as follows: <ul style="list-style-type: none"> <li>• <b>SCU</b>—The server can access the Cisco UCS Server Configuration Utility.</li> <li>• <b>DRIVERS</b>—The server can access the Cisco drivers volume.</li> <li>• <b>HV</b>—The server can access a user-installed hypervisor.</li> <li>• <b>HUU</b>—The server can access the Cisco Host Upgrade Utility.</li> </ul> When specifying more than one option, you must enclose the list in quotation marks (").
<b>Step 9</b>	Server /chassis/adapter # <code>commit</code>	Commits the transaction to the system configuration.

This example shows how to configure the properties of the Flash controller:

```
Server# scope chassis
Server /chassis # scope flexflash FlexFlash-0
Server /chassis/flexflash # scope operational-profile
Server /chassis/flexflash/operational-profile # set read-error-count-threshold 100
```

```
Server /chassis/flexflash/operational-profile # set write-error-count-threshold 100
Server /chassis/flexflash/operational-profile *# set raid-primary-member slot1
Server /chassis/flexflash/operational-profile # set raid-secondary-role active
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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.
<b>Step 2</b>	Server /bios# <b>set boot-override</b> {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: <ul style="list-style-type: none"> <li>• <b>None</b>—The server uses the default boot order</li> <li>• <b>SCU</b>—The server boots from the Cisco UCS Server Configuration Utility</li> <li>• <b>HV</b>—The server boots from the hypervisor virtual drive</li> <li>• <b>HUU</b>—The server boots from the Cisco Host Upgrade Utility</li> </ul>
<b>Step 3</b>	Server /bios # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope flexflash</b> <i>index</i>	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible <i>index</i> value is <b>FlexFlash-0</b> .
<b>Step 3</b>	Server /chassis/flexflash # <b>reset</b>	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 #
```

## Resetting the Configuration of the Cards in the Cisco Flexible Flash Controller

You can reset the configuration of a selected slot in the Cisco Flexible Flash controller to the default configuration.

When you reset the configuration of the slots in the Cisco Flexible Flash card, the following situations occur:

- The card in the selected slot is marked as primary healthy.
- The card in the other slot is marked as secondary-active unhealthy.
- Three non-RAID partitions and one RAID partition are created.

- The card read/write error counts and read/write threshold are set to 0.
- Host connectivity could be disrupted.

**Before You Begin**

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported on your server.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope flexflash index</b>	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible <i>index</i> value is <b>FlexFlash-0</b> .
<b>Step 3</b>	Server /chassis/flexflash # <b>reset-config primary slot ID</b>	Resets the configuration of the selected slot to the default configuration.
<b>Step 4</b>	Server /chassis/flexflash # <b>commit</b>	Commits the transaction to the system configuration.

This example shows how to reset the configuration from a slot to the default configuration:

```

Server# scope chassis
Server /chassis # scope flexflash FlexFlash-0
Server /chassis/flexflash # reset-config slot1

This action will mark the slot1 as the healthy primary slot, and slot2 (if card exists)
as unhealthy secondary active.
This operation may disturb the host connectivity as well.
Continue? [y|N] y

Server /chassis/flexflash/operational-profile *# commit
Server /chassis/flexflash/operational-profile #
    
```

## Retaining the Configuration of the Flexible Flash Controller

You can copy the configuration of a given slot in the Cisco Flexible Flash card to the other slot. However, the slot from which the configuration is copied from must be of the SDK523 type. You can retain the configuration in the following situations:

- There are two unpaired SD cards
- The server is operating from a single SD card, and an unpaired SD card is in the other slot.
- One SD card supports firmware version 1.2.253, and the other SD card is either unpartitioned or supports firmware version 1.2.247.

**Before You Begin**

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

- Cisco Flexible Flash must be supported on your server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope flexflash index</b>	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible <i>index</i> value is <b>FlexFlash-0</b> .
<b>Step 3</b>	Server /chassis/flexflash # <b>retain config primary slot ID</b>	Copies the configuration from the primary slot to the secondary slot.
<b>Step 4</b>	Server /chassis/flexflash # <b>commit</b>	Commits the transaction to the system configuration.

This example shows how to copy the configuration from one slot to the other:

```
Server# scope chassis
Server /chassis # scope flexflash FlexFlash-0
Server /chassis/flexflash # retain-config slot1
```

```
This action will copy the config of slot1 to both the slots, mark slot1 as healthy,
primary slot and slot2 (card must be present) as unhealthy secondary active.
This operation may disturb the host connectivity as well.
Continue? [y|N] y
```

```
Server /chassis/flexflash/operational-profile *# commit
Server /chassis/flexflash/operational-profile #
```

## Configuring BIOS Settings

### Viewing BIOS Status

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.
<b>Step 2</b>	Server /bios # <b>show detail</b>	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.

Name	Description
Boot Order	The order of bootable target types that the server will attempt to use.
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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.
<b>Step 2</b>	Server /bios # <b>scope main</b>	Enters the main BIOS settings command mode.
<b>Step 3</b>	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: <ul style="list-style-type: none"> <li>• <a href="#">Main BIOS Parameters for C22 and C24 Servers</a> , on page 183</li> <li>• <a href="#">Main BIOS Parameters for C200 and C210 Servers</a></li> <li>• <a href="#">Main BIOS Parameters for C250 Servers</a></li> <li>• <a href="#">Main BIOS Parameters for C260 Servers</a> , on page 222</li> <li>• <a href="#">Main BIOS Parameters for C460 Servers</a> , on page 253</li> </ul>
<b>Step 4</b>	Server /bios/main # <b>commit</b>	Commits the transaction to the system configuration.

	Command or Action	Purpose
		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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.
<b>Step 2</b>	Server /bios # <b>scope advanced</b>	Enters the advanced BIOS settings command mode.
<b>Step 3</b>	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: <ul style="list-style-type: none"> <li>• <a href="#">Advanced BIOS Parameters for C22 and C24 Servers</a> , on page 184</li> <li>• <a href="#">Advanced BIOS Parameters for C200 and C210 Servers</a></li> <li>• <a href="#">Advanced BIOS Parameters for C250 Servers</a></li> <li>• <a href="#">Advanced BIOS Parameters for C260 Servers</a> , on page 222</li> <li>• <a href="#">Advanced BIOS Parameters for C460 Servers</a> , on page 253</li> </ul>
<b>Step 4</b>	Server /bios/advanced # <b>commit</b>	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.



	Command or Action	Purpose
--	-------------------	---------

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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.
<b>Step 2</b>	Server /bios # <b>scope server-management</b>	Enters the server management BIOS settings command mode.
<b>Step 3</b>	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: <ul style="list-style-type: none"> <li>• <a href="#">Server Management BIOS Parameters for C22 and C24 Servers</a> , on page 200</li> <li>• <a href="#">Server Management BIOS Parameters for C200 and C210 Servers</a></li> <li>• <a href="#">Server Management BIOS Parameters for C250 Servers</a></li> <li>• <a href="#">Server Management BIOS Parameters for C260 Servers</a> , on page 232</li> <li>• <a href="#">Server Management BIOS Parameters for C460 Servers</a> , on page 263</li> </ul>
<b>Step 4</b>	Server /bios/server-management # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.
<b>Step 2</b>	Server /bios # <b>bios-setup-default</b>	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
```

## Restoring BIOS Manufacturing Custom Defaults

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



### Note

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

### Before You Begin

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

## Procedure

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

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

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





# Viewing Server Properties

This chapter includes the following sections:

- [Viewing Server Properties, page 37](#)
- [Viewing CIMC Properties, page 38](#)
- [Viewing CPU Properties, page 38](#)
- [Viewing Memory Properties, page 39](#)
- [Viewing Power Supply Properties, page 40](#)
- [Viewing Storage Properties, page 40](#)
- [Viewing PCI Adapter Properties, page 46](#)
- [Viewing Network Related Properties, page 46](#)

## Viewing Server Properties

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>show chassis [detail]</b>	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-FFFFFFFFFFFFFFF
  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
<b>Step 1</b>	Server# <b>show cimc [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show cpu [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show dimm [detail]</b>	Displays memory properties.
<b>Step 3</b>	Server /chassis # <b>show dimm-summary</b>	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: 18JSE25672PY-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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show psu [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show storageadapter</b> [slot] [detail]	Displays installed storage cards.  <b>Note</b> 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.
<b>Step 3</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 4</b>	Server /chassis/storageadapter # <b>show bbu</b> [detail]	Displays battery backup unit information for the storage card.
<b>Step 5</b>	Server /chassis/storageadapter # <b>show capabilities</b> [detail]	Displays RAID levels supported by the storage card.
<b>Step 6</b>	Server /chassis/storageadapter # <b>show error-counters</b> [detail]	Displays number of errors seen by the storage card.
<b>Step 7</b>	Server /chassis/storageadapter # <b>show firmware-versions</b> [detail]	Displays firmware version information for the storage card.
<b>Step 8</b>	Server /chassis/storageadapter # <b>show hw-config</b> [detail]	Displays hardware information for the storage card.
<b>Step 9</b>	Server /chassis/storageadapter # <b>show mfg-data</b> [detail]	Displays manufacturer data for the storage card.
<b>Step 10</b>	Server /chassis/storageadapter # <b>show pci-info</b> [detail]	Displays adapter PCI information for the storage card.
<b>Step 11</b>	Server /chassis/storageadapter # <b>show running-firmware-images</b> [detail]	Displays running firmware information for the storage card.
<b>Step 12</b>	Server /chassis/storageadapter # <b>show settings</b> [detail]	Displays adapter firmware settings for the storage card.
<b>Step 13</b>	Server /chassis/storageadapter # <b>show startup-firmware-images</b> [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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show flexflash [detail]</b>	(Optional) Displays the available Cisco Flexible Flash controllers.
<b>Step 3</b>	Server /chassis # <b>scope flexflash index</b>	Enters the Cisco Flexible Flash controller command mode for the specified controller. At this time, the only permissible <i>index</i> value is <b>FlexFlash-0</b> .
<b>Step 4</b>	Server /chassis/flexflash # <b>show operational-profile [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>show physical-drive [drive-number] [detail]</b>	Displays physical drive information for the storage card.
<b>Step 4</b>	Server /chassis/storageadapter # <b>show physical-drive-count [detail]</b>	Displays the number of physical drives on the storage card.
<b>Step 5</b>	Server /chassis/storageadapter # <b>scope physical-drive drive-number</b>	Enters command mode for the specified physical drive.
<b>Step 6</b>	Server /chassis/storageadapter/physical-drive # <b>show general [detail]</b>	Displays general information about the specified physical drive.
<b>Step 7</b>	Server /chassis/storageadapter/physical-drive # <b>show inquiry-data [detail]</b>	Displays inquiry data about the specified physical drive.
<b>Step 8</b>	Server /chassis/storageadapter/physical-drive # <b>show status [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>show virtual-drive [drive-number] [detail]</b>	Displays virtual drive information for the storage card.
<b>Step 4</b>	Server /chassis/storageadapter # <b>show virtual-drive-count [detail]</b>	Displays the number of virtual drives configured on the storage card.
<b>Step 5</b>	Server /chassis/storageadapter # <b>scope virtual-drive drive-number</b>	Enters command mode for the specified virtual drive.
<b>Step 6</b>	Server /chassis/storageadapter/virtual-drive # <b>show physical-drive [detail]</b>	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

```

```
Server /chassis/storageadapter #
```

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

```

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

```

## Viewing Nvidia GPU Card Information

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

### Before You Begin

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

### Procedure

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

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

```

Server # scope chassis
Server /chassis # show gpu

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

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

```

```

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

Server /chassis/gpu #

```

## Viewing PCI Adapter Properties

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show pci-adapter [detail]</b>	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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters the network command mode.
<b>Step 3</b>	Server /cimc/network # <b>show lom-mac-list [detail]</b>	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 #
```







## Viewing Server Sensors

This chapter includes the following sections:

- [Viewing Power Supply Sensors, page 49](#)
- [Viewing Fan Sensors, page 50](#)
- [Viewing Temperature Sensors, page 50](#)
- [Viewing Voltage Sensors, page 51](#)
- [Viewing Current Sensors, page 52](#)
- [Viewing Storage Sensors, page 52](#)

## Viewing Power Supply Sensors

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope sensor</b>	Enters sensor command mode.
<b>Step 2</b>	Server /sensor # <b>show psu [detail]</b>	Displays power supply sensor statistics for the server.
<b>Step 3</b>	Server /sensor # <b>show psu-redundancy [detail]</b>	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
<b>Step 1</b>	Server# <b>scope sensor</b>	Enters sensor command mode.
<b>Step 2</b>	Server /sensor # <b>show fan [detail]</b>	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
<b>Step 1</b>	Server# <b>scope sensor</b>	Enters sensor command mode.
<b>Step 2</b>	Server /sensor # <b>show temperature [detail]</b>	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
<b>Step 1</b>	Server# scope sensor	Enters sensor command mode.
<b>Step 2</b>	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
<b>Step 1</b>	Server# <b>scope sensor</b>	Enters sensor command mode.
<b>Step 2</b>	Server /sensor # <b>show current [detail]</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show hdd [detail]</b>	Displays storage sensor information.

The displayed fields are described in the following table:

Name	Description
<b>Name</b> column	The name of the storage device.
<b>Status</b> column	A brief description of the storage device status.

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

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 #

```





## Managing Remote Presence

---

This chapter includes the following sections:

- [Managing the Virtual KVM, page 55](#)
- [Configuring Virtual Media, page 58](#)
- [Managing Serial over LAN, page 61](#)

### 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.

## 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
<b>Step 1</b>	Server# <b>scope kvm</b>	Enters KVM command mode.
<b>Step 2</b>	Server /kvm # <b>set enabled yes</b>	Enables the virtual KVM.
<b>Step 3</b>	Server /kvm # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 4</b>	Server /kvm # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope kvm</b>	Enters KVM command mode.
<b>Step 2</b>	Server /kvm # <b>set enabled no</b>	Disables the virtual KVM.  <b>Note</b> 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
<b>Step 3</b>	Server /kvm # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 4</b>	Server /kvm # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope kvm</b>	Enters KVM command mode.
<b>Step 2</b>	Server /kvm # <b>set enabled {yes   no}</b>	Enables or disables the virtual KVM.
<b>Step 3</b>	Server /kvm # <b>set encrypted {yes   no}</b>	If encryption is enabled, the server encrypts all video information sent through the KVM.
<b>Step 4</b>	Server /kvm # <b>set kvm-port port</b>	Specifies the port used for KVM communication.
<b>Step 5</b>	Server /kvm # <b>set local-video {yes   no}</b>	If local video is yes, the KVM session is also displayed on any monitor attached to the server.
<b>Step 6</b>	Server /kvm # <b>set max-sessions sessions</b>	Specifies the maximum number of concurrent KVM sessions allowed. The <i>sessions</i> argument is an integer between 1 and 4.
<b>Step 7</b>	Server /kvm # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 8</b>	Server /kvm # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope vmedia</b>	Enters virtual media command mode.
<b>Step 2</b>	Server /vmedia # <b>set enabled {yes   no}</b>	Enables or disables virtual media. By default, virtual media is disabled.  <b>Note</b> Disabling virtual media detaches the virtual CD, virtual floppy, and virtual HDD devices from the host.
<b>Step 3</b>	Server /vmedia # <b>set encryption {yes   no}</b>	Enables or disables virtual media encryption.
<b>Step 4</b>	Server /vmedia # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	Server /vmedia # <b>show [detail]</b>	(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.

**Configuring Network Mounted vMedia Mapping****Before You Begin**

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

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server # <b>scope vmedia</b>	Enters the virtual media command mode.
<b>Step 2</b>	Server /vmedia # <b>map-cifs</b> { <b>volume-name</b>   <b>remote-share</b>   <b>remote-file-path</b> [ <i>mount options</i> ]	Maps a CIFS file for vMedia. You must specify the following: <ul style="list-style-type: none"> <li>• Name of the volume to create</li> <li>• Remote share including IP address and the exported directory</li> <li>• Path of the remote file corresponding to the exported directory.</li> <li>• (Optional) Mapping options</li> <li>• Username and password to connect to the server</li> </ul>
<b>Step 3</b>	Server /vmedia # <b>map-nfs</b> { <b>volume-name</b>   <b>remote-share</b>   <b>remote-file-path</b> } [ <i>mount options</i> ]	Maps an NFS file for vMedia. You must specify the following: <ul style="list-style-type: none"> <li>• Name of the volume to create</li> <li>• Remote share including IP address and the exported directory</li> <li>• Path of the remote file corresponding to the exported directory.</li> <li>• (Optional) Mapping options</li> </ul>
<b>Step 4</b>	Server /vmedia # <b>map-www</b> { <b>volume-name</b>   <b>remote-share</b>   <b>remote-file-path</b> [ <i>mount options</i> ]	Maps an HTTPS file for vMedia. You must specify the following: <ul style="list-style-type: none"> <li>• Name of the volume to create</li> <li>• Remote share including IP address and the exported directory</li> <li>• Path of the remote file corresponding to the exported directory.</li> <li>• (Optional) Mapping options</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• Username and password to connect to the server</li> </ul>

This example shows how to create a CIFS network mounted vMedia mapping:

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

Server /vmedia #
```

## Viewing Network Mount vMedia Mapping Properties

### Before You Begin

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

### Procedure

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

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

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

Volume	Map-status	Drive-type	remote-share	remote-file	mount-type
Huu	OK	removable	http://10.104.236.99/	rhel-server-6.1-x86_64.iso	www
Rhel	OK	CD	http://10.104.236.99/	rhel-server-6.1-x86_64.iso	www

## Removing Network Mounted vMedia Mapping

### Before You Begin

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

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	Server # <b>scope vmedia</b>	Enters the virtual media command mode.
<b>Step 2</b>	Server /vmedia # <b>unmap volume_name</b>	Specifies the volume name to unmap.

This example shows how to unmap a local vmedia volume:

```

Server # scope vmedia
Server /vmedia # show mappings
-----
Volume  Map-status  Drive-type  remote-share  remote-file  mount-type
-----
Huu     OK           removable  http://10.104.236.99/  rhel-server-6.1-x86_6.iso  www
Rhel    OK           CD         http://10.104.236.99/  rhel-server-6.1-x86_6.iso  www

Server /vmedia # unmap huu
Server /vmedia # show mappings
-----
Volume  Map-status  Drive-type  remote-share  remote-file  mount-type
-----
Rhel    OK           CD         http://10.104.236.99/  rhel-server-6.1-x86_6.iso  www

Server /vmedia #
    
```

# 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
<b>Step 1</b>	Server# <b>scope sol</b>	Enters SoL command mode.
<b>Step 2</b>	Server /sol # <b>set enabled</b> { <b>yes</b>   <b>no</b> }	Enables or disables SoL on this server.
<b>Step 3</b>	Server /sol # <b>set baud-rate</b> { <b>9600</b>   <b>19200</b>   <b>38400</b>   <b>57600</b>   <b>115200</b> }	Sets the serial baud rate the system uses for SoL communication. <b>Note</b> The baud rate must match the baud rate configured in the server serial console.
<b>Step 4</b>	Server /sol # <b>set comport</b> { <b>com0</b>   <b>com1</b> }	(Optional) Sets the serial port through which the system routes SoL communications. <b>Note</b> 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: <ul style="list-style-type: none"> <li>• <b>com0</b>—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.</li> <li>• <b>com1</b>—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.</li> </ul> <b>Note</b> Changing the comport setting disconnects any existing SoL sessions.
<b>Step 5</b>	Server /sol # <b>commit</b>	Commits the transaction to the system configuration.

	Command or Action	Purpose
<b>Step 6</b>	Server /sol # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>connect host</b>	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.







# Managing User Accounts

This chapter includes the following sections:

- [Configuring Local Users, page 65](#)
- [Configuring Active Directory, page 66](#)
- [Viewing User Sessions, page 71](#)
- [Terminating a User Session, page 71](#)

## 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
<b>Step 1</b>	Server# <b>scope user</b> <i>usernumber</i>	Enters user command mode for user number <i>usernumber</i> .
<b>Step 2</b>	Server /user # <b>set enabled</b> { <b>yes</b>   <b>no</b> }	Enables or disables the user account on the CIMC.
<b>Step 3</b>	Server /user # <b>set name</b> <i>username</i>	Specifies the username for the user.
<b>Step 4</b>	Server /user # <b>set password</b>	You are prompted to enter the password twice.
<b>Step 5</b>	Server /user # <b>set role</b> { <b>readonly</b>   <b>user</b>   <b>admin</b> }	Specifies the role assigned to the user. The roles are as follows: <ul style="list-style-type: none"><li>• <b>readonly</b>—This user can view information but cannot make any changes.</li><li>• <b>user</b>—This user can do the following:<ul style="list-style-type: none"><li>• View all information</li></ul></li></ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• Manage the power control options such as power on, power cycle, and power off</li> <li>• Launch the KVM console and virtual media</li> <li>• Clear all logs</li> <li>• Toggle the locator LED</li> </ul> <ul style="list-style-type: none"> <li>• admin—This user can perform all actions available through the GUI, CLI, and IPMI.</li> </ul>
<b>Step 6</b>	Server /user # <b>commit</b>	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.

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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope ldap</b>	Enters the LDAP command mode for AD configuration.
<b>Step 2</b>	Server /ldap # <b>set enabled</b> { <b>yes</b>   <b>no</b> }	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.
<b>Step 3</b>	Server /ldap # <b>set dcn</b> <i>dc-host</i>	Specifies an Active Directory domain controller (DC) host name or IP address. You can specify up to three DCs using index <i>n</i> values from 1 to 3.
<b>Step 4</b>	Server /ldap # <b>set gcn</b> <i>gc-host</i>	Specifies an Active Directory global catalog (GC) server host name or IP address. You can specify up to three GCs using index <i>n</i> values from 1 to 3.
<b>Step 5</b>	Server /ldap # <b>set timeout</b> <i>seconds</i>	Specifies the number of seconds the CIMC waits until the LDAP search operation times out.
<b>Step 6</b>	Server /ldap # <b>set encrypted</b> { <b>yes</b>   <b>no</b> }	If encryption is enabled, the server encrypts all information sent to AD.
<b>Step 7</b>	Server /ldap # <b>set base-dn</b> <i>domain-name</i>	Specifies the domain that all users must be in.
<b>Step 8</b>	Server /ldap # <b>set attribute</b> <i>name</i>	<p>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.</p> <p>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:</p> <p>1.3.6.1.4.1.9.287247.1</p> <p><b>Note</b> If you do not specify this property, user access is restricted to read-only.</p>

	Command or Action	Purpose
<b>Step 9</b>	Server /ldap # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 10</b>	Server /ldap # <b>show [detail]</b>	(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 gcl 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
<b>Step 1</b>	Server# <b>scope ldap</b>	Enters the LDAP command mode for AD configuration.
<b>Step 2</b>	Server /ldap # <b>set group-auth</b> {yes   no}	Enables or disables AD group authorization.
<b>Step 3</b>	Server /ldap # <b>scope role-group</b> <i>index</i>	Selects one of the five available group profiles for configuration, where <i>index</i> is a number between 1 and 5.
<b>Step 4</b>	Server /ldap/role-group # <b>set name</b> <i>group-name</i>	Specifies the name of the group in the AD database that is authorized to access the server.
<b>Step 5</b>	Server /ldap/role-group # <b>set domain</b> <i>domain-name</i>	Specifies the AD domain the group must reside in.
<b>Step 6</b>	Server /ldap/role-group # <b>set role</b> {admin   user   readonly}	Specifies the permission level (role) assigned to all users in this AD group. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>admin</b>—The user can perform all actions available.</li> <li>• <b>user</b>—The user can perform the following tasks: <ul style="list-style-type: none"> <li>◦ View all information</li> <li>◦ Manage the power control options such as power on, power cycle, and power off</li> <li>◦ Launch the KVM console and virtual media</li> <li>◦ Clear all logs</li> <li>◦ Toggle the locator LED</li> </ul> </li> <li>• <b>readonly</b>—The user can view information but cannot make any changes.</li> </ul>
<b>Step 7</b>	Server /ldap/role-group # <b>commit</b>	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
<b>Step 1</b>	Server# <b>show user-session</b>	Displays information about current user sessions.

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

Name	Description
<b>Session ID</b> column	The unique identifier for the session.
<b>Username</b> column	The username for the user.
<b>IP Address</b> column	The IP address from which the user accessed the server.
<b>Type</b> column	The method by which the user accessed the server.
<b>Action</b> column	If your user account is assigned the <b>admin</b> user role, this column displays <b>Terminate</b> if you can force the associated user session to end. Otherwise it displays <b>N/A</b> .  <b>Note</b> 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>show user-session</b>	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.
<b>Step 2</b>	Server /user-session # <b>scope user-session <i>session-number</i></b>	Enters user session command mode for the numbered user session that you want to terminate.
<b>Step 3</b>	Server /user-session # <b>terminate</b>	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 #

```





# Configuring Network-Related Settings

This chapter includes the following sections:

- [Server NIC Configuration, page 73](#)
- [Configuring Common Properties, page 75](#)
- [Configuring IPv4, page 76](#)
- [Configuring the Server VLAN, page 77](#)
- [Connecting to a Port Profile, page 78](#)
- [Network Security Configuration, page 80](#)
- [Network Time Protocol Configuration, page 81](#)

## 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](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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters the CIMC network command mode.
<b>Step 3</b>	Server /cimc/network # <b>set mode {dedicated   shared_lom   shared_lom_10g   shipping   cisco_card}</b>	Sets the NIC mode to one of the following: <ul style="list-style-type: none"> <li>• <b>Dedicated</b>—The management Ethernet port is used to access the CIMC.</li> <li>• <b>Shared LOM</b>—The LAN On Motherboard (LOM) Ethernet host ports are used to access the CIMC. <p><b>Note</b> If you select Shared LOM, make sure that all host ports belong to the same subnet.</p> </li> <li>• <b>Shared LOM 10G</b>—The 10G LOM Ethernet host ports are used to access the CIMC.</li> <li>• <b>Shipping</b>—A limited configuration for initial connection. Select another mode for normal operation.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• Cisco card—The ports on the adapter card are used to access the CIMC.</li> </ul>
<b>Step 4</b>	<pre>Server /cimc/network # set redundancy {none   active-active   active-standby}</pre>	<p>Sets the NIC redundancy mode when the NIC mode is Shared LOM. The redundancy mode can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>none</b>—The LOM Ethernet ports operate independently and do not fail over if there is a problem.</li> <li>• <b>active-active</b>—If supported, all LOM Ethernet ports are utilized.</li> <li>• <b>active-standby</b>—If one LOM Ethernet port fails, traffic fails over to another LOM port.</li> </ul>
<b>Step 5</b>	<pre>Server /cimc/network # commit</pre>	<p>Commits the transaction to the system configuration.</p> <p><b>Note</b> 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.</p>

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
<b>Step 1</b>	<pre>Server# scope cimc</pre>	Enters the CIMC command mode.
<b>Step 2</b>	<pre>Server /cimc # scope network</pre>	Enters the CIMC network command mode.
<b>Step 3</b>	<pre>Server /cimc/network # set hostname host-name</pre>	Specifies the name of the host.

	Command or Action	Purpose
<b>Step 4</b>	Server /cimc/network # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters the CIMC network command mode.
<b>Step 3</b>	Server /cimc/network # <b>set dhcp-enabled</b> {yes   no}	Selects whether the CIMC uses DHCP. <b>Note</b> 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.
<b>Step 4</b>	Server /cimc/network # <b>set v4-addr</b> <i>ipv4-address</i>	Specifies the IP address for the CIMC.
<b>Step 5</b>	Server /cimc/network # <b>set v4-netmask</b> <i>ipv4-netmask</i>	Specifies the subnet mask for the IP address.
<b>Step 6</b>	Server /cimc/network # <b>set v4-gateway</b> <i>gateway-ipv4-address</i>	Specifies the gateway for the IP address.
<b>Step 7</b>	Server /cimc/network # <b>set dns-use-dhcp</b> {yes   no}	Selects whether the CIMC retrieves the DNS server addresses from DHCP.
<b>Step 8</b>	Server /cimc/network # <b>set preferred-dns-server</b> <i>dns1-ipv4-address</i>	Specifies the IP address of the primary DNS server.

	Command or Action	Purpose
<b>Step 9</b>	Server /cimc/network # <b>set alternate-dns-server</b> <i>dns2-ipv4-address</i>	Specifies the IP address of the secondary DNS server.
<b>Step 10</b>	Server /cimc/network # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 11</b>	Server /cimc/network # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters the CIMC network command mode.

	Command or Action	Purpose
<b>Step 3</b>	Server /cimc/network # <b>set vlan-enabled</b> {yes   no}	Selects whether the CIMC is connected to a VLAN.
<b>Step 4</b>	Server /cimc/network # <b>set vlan-id</b> <i>id</i>	Specifies the VLAN number.
<b>Step 5</b>	Server /cimc/network # <b>set vlan-priority</b> <i>priority</i>	Specifies the priority of this system on the VLAN.
<b>Step 6</b>	Server /cimc/network # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 7</b>	Server /cimc/network # <b>show</b> [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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters the CIMC network command mode.
<b>Step 3</b>	Server /cimc/network # <b>set port-profile port_profile_name</b>	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.  <b>Note</b> The port profile must be defined on the switch to which this server is connected.
<b>Step 4</b>	Server /cimc/network # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	Server /cimc/network # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters the CIMC network command mode.
<b>Step 3</b>	Server /cimc/network # <b>scope ipblocking</b>	Enters the IP blocking command mode.
<b>Step 4</b>	Server /cimc/network/ipblocking # <b>set enabled {yes   no}</b>	Enables or disables IP blocking.
<b>Step 5</b>	Server /cimc/network/ipblocking # <b>set fail-count fail-count</b>	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.
<b>Step 6</b>	Server /cimc/network/ipblocking # <b>set fail-window fail-seconds</b>	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.
<b>Step 7</b>	Server /cimc/network/ipblocking # <b>set penalty-time penalty-seconds</b>	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.
<b>Step 8</b>	Server /cimc/network/ipblocking # <b>commit</b>	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 #
```

# Network Time Protocol Configuration

## Configuring Network Time Protocol Settings

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



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

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server # <b>scope cimc</b>	Enters CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope network</b>	Enters network command mode.
<b>Step 3</b>	Server /cimc/network # <b>scope ntp</b>	Enters NTP service command mode.
<b>Step 4</b>	Server /cimc/network/ntp # <b>set enabled yes</b>	Enables the NTP service on the server.

	Command or Action	Purpose
<b>Step 5</b>	Server /cimc/network/ntp* # <b>commit</b>	Commits the transaction.
<b>Step 6</b>	Server /cimc/network/ntp # <b>set server-1 10.120.33.44</b>	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
<b>Step 7</b>	Server /cimc/network/ntp # <b>set server-2 10.120.34.45</b>	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
<b>Step 8</b>	Server /cimc/network/ntp # <b>set server-3 10.120.35.46</b>	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
<b>Step 9</b>	Server /cimc/network/ntp # <b>set server-4 10.120.36.48</b>	Specifies the IP/DNS address of one of the four servers that act as an NTP server or the time source server.
<b>Step 10</b>	Server /cimc/network/ntp # <b>commit</b>	Commits the transaction.

This example shows how to configure the NTP service:

```

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

```



## CHAPTER 9

# Managing Network Adapters

This chapter includes the following sections:

- [Overview of the Cisco UCS C-Series Network Adapters, page 83](#)
- [Viewing Network Adapter Properties, page 85](#)
- [Configuring Network Adapter Properties, page 85](#)
- [Managing vHBAs, page 86](#)
- [Managing vNICs, page 99](#)
- [Managing VM FEX, page 109](#)
- [Managing Storage Adapters, page 115](#)
- [Backing Up and Restoring the Adapter Configuration, page 127](#)
- [Managing Adapter Firmware, page 130](#)
- [Resetting the Adapter, page 131](#)

## 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 policies 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b> [ <i>index</i> ] [ <b>detail</b> ]	Displays adapter properties. To display the properties of a single adapter, specify the PCI slot number as the <i>index</i> 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis/adapter # <b>set fip-mode</b> { <b>disable</b>   <b>enable</b> }	Enables or disables FCoE Initialization Protocol (FIP) on the adapter card. FIP is enabled by default.  <b>Note</b> We recommend that you disable this option only when explicitly directed to do so by a technical support representative.
<b>Step 5</b>	Server /chassis/adapter # <b>set niv-mode</b> { <b>disable</b>   <b>enable</b> }	Enables or disables Network Interface Virtualization (NIV) on the adapter card. NIV is disabled by default. If NIV mode is enabled, vNICs: <ul style="list-style-type: none"> <li>• Can be assigned to a specific channel</li> <li>• Can be associated with a port profile</li> <li>• Can fail over to another vNIC if there are communication problems</li> </ul>
<b>Step 6</b>	Server /chassis/adapter # <b>configure-vmfex</b> <i>port-count</i>	If NIV mode is enabled, <i>port-count</i> specifies the number of VM FEX interfaces you want CIMC to create, from 0 to 112.
<b>Step 7</b>	Server /chassis/adapter # <b>commit</b>	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 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>show host-fc-if</b> [ <b>fc0</b>   <b>fc1</b>   <i>name</i> ] [ <b>detail</b> ]	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>set wwnn wwnn</b>	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.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if # <b>set wwpn wwpn</b>	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.
<b>Step 7</b>	Server /chassis/adapter/host-fc-if # <b>set boot</b> { <b>disable</b>   <b>enable</b> }	Enables or disables FC SAN boot. The default is disable.
<b>Step 8</b>	Server /chassis/adapter/host-fc-if # <b>set persistent-lun-binding</b> { <b>disable</b>   <b>enable</b> }	Enables or disables persistent LUN binding. The default is disable.
<b>Step 9</b>	Server /chassis/adapter/host-fc-if # <b>set mac-addr mac-addr</b>	Specifies a MAC address for the vHBA.
<b>Step 10</b>	Server /chassis/adapter/host-fc-if # <b>set vlan</b> { <b>none</b>   <i>vlan-id</i> }	Specifies the default VLAN for this vHBA. Valid VLAN numbers are 1 to 4094; the default is none.
<b>Step 11</b>	Server /chassis/adapter/host-fc-if # <b>set cos cos-value</b>	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
<b>Step 12</b>	Server /chassis/adapter/host-fc-if # <b>set rate-limit</b> {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.
<b>Step 13</b>	Server /chassis/adapter/host-fc-if # <b>set order</b> {any   0-99}	Specifies the relative order of this device for PCIe bus device number assignment; the default is any.
<b>Step 14</b>	Server /chassis/adapter/host-fc-if # <b>set error-detect-timeout</b> 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.
<b>Step 15</b>	Server /chassis/adapter/host-fc-if # <b>set resource-allocation-timeout</b> 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.
<b>Step 16</b>	Server /chassis/adapter/host-fc-if # <b>set max-field-size</b> 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.
<b>Step 17</b>	Server /chassis/adapter/host-fc-if # <b>scope error-recovery</b>	Enters the Fibre Channel error recovery command mode.
<b>Step 18</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set fcp-error-recovery</b> {disable   enable}	Enables or disables FCP Error Recovery. The default is disable.
<b>Step 19</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set link-down-timeout</b> 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.
<b>Step 20</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set port-down-io-retry-count</b> 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.
<b>Step 21</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>set port-down-timeout</b> 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.
<b>Step 22</b>	Server /chassis/adapter/host-fc-if/error-recovery # <b>exit</b>	Exits to the host Fibre Channel interface command mode.

	Command or Action	Purpose
<b>Step 23</b>	Server /chassis/adapter/host-fc-if# <b>scope interrupt</b>	Enters the interrupt command mode.
<b>Step 24</b>	Server /chassis/adapter/host-fc-if/interrupt # <b>set interrupt-mode {intx   msi   msix}</b>	Specifies the Fibre Channel interrupt mode. The modes are as follows: <ul style="list-style-type: none"> <li>• <b>intx</b> —Line-based interrupt (INTx)</li> <li>• <b>msi</b> —Message-Signaled Interrupt (MSI)</li> <li>• <b>msix</b> —Message Signaled Interrupts with the optional extension (MSIx). This is the recommended and default option.</li> </ul>
<b>Step 25</b>	Server /chassis/adapter/host-fc-if/interrupt # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 26</b>	Server /chassis/adapter/host-fc-if# <b>scope port</b>	Enters the Fibre Channel port command mode.
<b>Step 27</b>	Server /chassis/adapter/host-fc-if/port # <b>set outstanding-io-count count</b>	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.
<b>Step 28</b>	Server /chassis/adapter/host-fc-if/port # <b>set max-target-luns count</b>	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.
<b>Step 29</b>	Server /chassis/adapter/host-fc-if/port # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 30</b>	Server /chassis/adapter/host-fc-if# <b>scope port-f-logs</b>	Enters the Fibre Channel fabric login command mode.
<b>Step 31</b>	Server /chassis/adapter/host-fc-if/port-f-logs # <b>set flogi-retries {infinite   count}</b>	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 <b>infinite</b> ; the default is infinite retries.
<b>Step 32</b>	Server /chassis/adapter/host-fc-if/port-f-logs # <b>set flogi-timeout msec</b>	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.
<b>Step 33</b>	Server /chassis/adapter/host-fc-if/port-f-logs # <b>exit</b>	Exits to the host Fibre Channel interface command mode.

	Command or Action	Purpose
<b>Step 34</b>	Server /chassis/adapter/host-fc-if # <b>scope port-p-logi</b>	Enters the Fibre Channel port login command mode.
<b>Step 35</b>	Server /chassis/adapter/host-fc-if/port-p-logi # <b>set plogi-retries count</b>	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.
<b>Step 36</b>	Server /chassis/adapter/host-fc-if/port-p-logi # <b>set plogi-timeout msec</b>	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.
<b>Step 37</b>	Server /chassis/adapter/host-fc-if/port-p-logi # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 38</b>	Server /chassis/adapter/host-fc-if # <b>scope scsi-io</b>	Enters the SCSI I/O command mode.
<b>Step 39</b>	Server /chassis/adapter/host-fc-if/scsi-io # <b>set cdb-wq-count count</b>	The number of command descriptor block (CDB) transmit queue resources to allocate. The range is 1 to 8; the default is 1.
<b>Step 40</b>	Server /chassis/adapter/host-fc-if/scsi-io # <b>set cdb-wq-ring-size size</b>	The number of descriptors in the command descriptor block (CDB) transmit queue. The range is 64 to 512; the default is 512.
<b>Step 41</b>	Server /chassis/adapter/host-fc-if/scsi-io # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 42</b>	Server /chassis/adapter/host-fc-if # <b>scope trans-queue</b>	Enters the Fibre Channel transmit queue command mode.
<b>Step 43</b>	Server /chassis/adapter/host-fc-if/trans-queue # <b>set fc-wq-ring-size size</b>	The number of descriptors in the Fibre Channel transmit queue. The range is 64 to 128; the default is 64.
<b>Step 44</b>	Server /chassis/adapter/host-fc-if/trans-queue # <b>exit</b>	Exits to the host Fibre Channel interface command mode.
<b>Step 45</b>	Server /chassis/adapter/host-fc-if # <b>scope recv-queue</b>	Enters the Fibre Channel receive queue command mode.
<b>Step 46</b>	Server /chassis/adapter/host-fc-if/recv-queue # <b>set fc-rq-ring-size size</b>	The number of descriptors in the Fibre Channel receive queue. The range is 64 to 128; the default is 64.
<b>Step 47</b>	Server /chassis/adapter/host-fc-if/recv-queue # <b>exit</b>	Exits to the host Fibre Channel interface command mode.

	Command or Action	Purpose
<b>Step 48</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> 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 fcl
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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>create</b> <b>host-fc-if</b> <i>name</i>	Creates a vHBA and enters the host Fibre Channel interface command mode. The <i>name</i> argument can be up to 32 ASCII characters.

	Command or Action	Purpose
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>set channel-number</b> <i>number</i>	(Optional) If NIV mode is enabled for the adapter, you must assign a channel number to this vHBA. The range is 1 to 1000.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> 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 88](#).

## Deleting a vHBA

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>delete host-fc-if</b> <i>name</i>	Deletes the specified vHBA. <b>Note</b> You cannot delete either of the two default vHBAs, fc0 or fc1.
<b>Step 4</b>	Server /chassis/adapter # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>show boot</b>	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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> { <b>fc0</b>   <b>fc1</b>   <i>name</i> }	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>create-boot-entry</b> <i>wwpn lun-id</i>	Creates a boot table entry.  <ul style="list-style-type: none"> <li>• <i>wwpn</i> — The World Wide Port Name (WWPN) for the boot target in the form hh:hh:hh:hh:hh:hh:hh:hh.</li> <li>• <i>lun-id</i> —The LUN ID of the boot LUN. The range is 0 to 255.</li> </ul>
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> 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**

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

	Command or Action	Purpose
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> {fc0   fc1   name}	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>show boot</b>	Displays the boot table. From the Boot Table Entry field, locate the number of the entry to be deleted.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if # <b>delete boot entry</b>	Deletes the boot table entry at the specified position in the table. The range of <i>entry</i> is 0 to 3. The change will take effect upon the next server reset.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if {fc0   fc1   name}</b>	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>scope perbi</b>	Enters the persistent binding command mode for the vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if/perbi # <b>set persistent-lun-binding enable</b>	Enables persistent binding for the vHBA.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if/perbi # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.

	Command or Action	Purpose
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> {fc0   fc1   name}	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>scope perbi</b>	Enters the persistent binding command mode for the vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if/perbi # <b>set persistent-lun-binding disable</b>	Disables persistent binding for the vHBA.
<b>Step 6</b>	Server /chassis/adapter/host-fc-if/perbi # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> index	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-fc-if</b> {fc0   fc1   name}	Enters the host Fibre Channel interface command mode for the specified vHBA.
<b>Step 4</b>	Server /chassis/adapter/host-fc-if # <b>scope perbi</b>	Enters the persistent binding command mode for the vHBA.
<b>Step 5</b>	Server /chassis/adapter/host-fc-if/perbi # <b>rebuild</b>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>show host-eth-if</b> [ <b>eth0</b>   <b>eth1</b>   <i>name</i> ] [ <b>detail</b> ]	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>show adapter</b>	(Optional) Displays the available adapter devices.
<b>Step 3</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 4</b>	Server /chassis/adapter # <b>scope host-eth-if {eth0   eth1   name}</b>	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if # <b>set mtu mtu-value</b>	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.
<b>Step 6</b>	Server /chassis/adapter/host-eth-if # <b>set uplink {0   1}</b>	Specifies the uplink port associated with this vNIC. All traffic for this vNIC goes through this uplink port.
<b>Step 7</b>	Server /chassis/adapter/host-eth-if # <b>set mac-addr mac-addr</b>	Specifies a MAC address for the vNIC in the form hh:hh:hh:hh:hh:hh or hhhh:hhhh:hhhh.
<b>Step 8</b>	Server /chassis/adapter/host-eth-if # <b>set cos cos-value</b>	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
		<b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.
<b>Step 9</b>	Server /chassis/adapter/host-eth-if# <b>set trust-host-cos</b> { <b>disable</b>   <b>enable</b> }	Specifies whether the vNIC will trust host CoS or will remark packets. The behavior is as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —Received packets are remarked with the configured CoS. This is the default.</li> <li>• <b>enable</b> —The existing CoS value of received packets (host CoS) is preserved.</li> </ul>
<b>Step 10</b>	Server /chassis/adapter/host-eth-if# <b>set order</b> { <b>any</b>   <i>0-99</i> }	Specifies the relative order of this device for PCI bus device number assignment; the default is any.
<b>Step 11</b>	Server /chassis/adapter/host-eth-if# <b>set vlan</b> { <b>none</b>   <i>vlan-id</i> }	Specifies the default VLAN for this vNIC. Valid VLAN numbers are 1 to 4094; the default is none. <p><b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.</p>
<b>Step 12</b>	Server /chassis/adapter/host-eth-if# <b>set vlan-mode</b> { <b>access</b>   <b>trunk</b> }	Specifies the VLAN mode for the vNIC. The modes are as follows: <ul style="list-style-type: none"> <li>• <b>access</b> —The vNIC belongs to only one VLAN.</li> <li>• <b>trunk</b> —The vNIC can belong to more than one VLAN. This is the default.</li> </ul> <p><b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.</p>
<b>Step 13</b>	Server /chassis/adapter/host-eth-if# <b>set rate-limit</b> { <b>off</b>   <i>rate</i> }	Specifies a maximum data rate for the vNIC. The range is 1 to 10000 Mbps; the default is off. <p><b>Note</b> If NIV is enabled, this setting is determined by the switch, and the command is ignored.</p>
<b>Step 14</b>	Server /chassis/adapter/host-eth-if# <b>set boot</b> { <b>disable</b>   <b>enable</b> }	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.
<b>Step 15</b>	Server /chassis/adapter/host-eth-if# <b>set channel-number</b> <i>number</i>	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.
<b>Step 16</b>	Server /chassis/adapter/host-eth-if# <b>set port-profile</b> <i>name</i>	If NIV mode is enabled for the adapter, select the port profile that should be associated with the vNIC. <p><b>Note</b> The <i>name</i> must be a port profile defined on the switch to which this server is connected.</p>
<b>Step 17</b>	Server /chassis/adapter/host-eth-if# <b>set uplink-failover</b> { <b>disable</b>   <b>enable</b> }	If NIV mode is enabled for the adapter, enable this setting if traffic on this vNIC should fail over to the

	Command or Action	Purpose
		secondary interface if there are communication problems.
<b>Step 18</b>	Server /chassis/adapter/host-eth-if # <b>set uplink-failback-timeout</b> <i>seconds</i>	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 <i>seconds</i> between 0 and 600.
<b>Step 19</b>	Server /chassis/adapter/host-eth-if # <b>scope interrupt</b>	Enters the interrupt command mode.
<b>Step 20</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set interrupt-count</b> <i>count</i>	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.
<b>Step 21</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set coalescing-time</b> <i>usec</i>	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).
<b>Step 22</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set coalescing-type</b> { <i>idle</i>   <i>min</i> }	The coalescing types are as follows: <ul style="list-style-type: none"> <li>• <b>idle</b> —The system does not send an interrupt until there is a period of no activity lasting as long as the time specified in the coalescing time configuration.</li> <li>• <b>min</b> —The system waits for the time specified in the coalescing time configuration before sending another interrupt event. This is the default.</li> </ul>
<b>Step 23</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>set interrupt-mode</b> { <i>intx</i>   <i>msi</i>   <i>msix</i> }	Specifies the Ethernet interrupt mode. The modes are as follows: <ul style="list-style-type: none"> <li>• <b>intx</b> —Line-based interrupt (PCI INTx)</li> <li>• <b>msi</b> —Message-Signaled Interrupt (MSI)</li> <li>• <b>msix</b> —Message Signaled Interrupts with the optional extension (MSI-X). This is the recommended and default option.</li> </ul>
<b>Step 24</b>	Server /chassis/adapter/host-eth-if/interrupt # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 25</b>	Server /chassis/adapter/host-eth-if # <b>scope rcv-queue</b>	Enters receive queue command mode.

	Command or Action	Purpose
Step 26	Server /chassis/adapter/host-eth-if/recv-queue # <b>set rq-count</b> <i>count</i>	The number of receive queue resources to allocate. The range is 1 to 256; the default is 4.
Step 27	Server /chassis/adapter/host-eth-if/recv-queue # <b>set rq-ring-size</b> <i>size</i>	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 # <b>exit</b>	Exits to the host Ethernet interface command mode.
Step 29	Server /chassis/adapter/host-eth-if # <b>scope trans-queue</b>	Enters transmit queue command mode.
Step 30	Server /chassis/adapter/host-eth-if/trans-queue # <b>set wq-count</b> <i>count</i>	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 # <b>set wq-ring-size</b> <i>size</i>	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 # <b>exit</b>	Exits to the host Ethernet interface command mode.
Step 33	Server /chassis/adapter/host-eth-if # <b>scope comp-queue</b>	Enters completion queue command mode.
Step 34	Server /chassis/adapter/host-eth-if/comp-queue # <b>set cq-count</b> <i>count</i>	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 # <b>exit</b>	Exits to the host Ethernet interface command mode.
Step 36	Server /chassis/adapter/host-eth-if # <b>scope offload</b>	Enters TCP offload command mode.
Step 37	Server /chassis/adapter/host-eth-if/offload # <b>set tcp-segment-offload</b> { <b>disable</b>   <b>enable</b> }	Enables or disables TCP Segmentation Offload as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU segments large TCP packets.</li> <li>• <b>enable</b> —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.</li> </ul> <p><b>Note</b> This option is also known as Large Send Offload (LSO).</p>

	Command or Action	Purpose
<b>Step 38</b>	Server /chassis/adapter/host-eth-if/offload # <b>set tcp-rx-checksum-offload {disable   enable}</b>	Enables or disables TCP Receive Offload Checksum Validation as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU validates all packet checksums.</li> <li>• <b>enable</b> —The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. This is the default.</li> </ul>
<b>Step 39</b>	Server /chassis/adapter/host-eth-if/offload # <b>set tcp-tx-checksum-offload {disable   enable}</b>	Enables or disables TCP Transmit Offload Checksum Validation as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU validates all packet checksums.</li> <li>• <b>enable</b> —The CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. This is the default.</li> </ul>
<b>Step 40</b>	Server /chassis/adapter/host-eth-if/offload # <b>set tcp-large-receive-offload {disable   enable}</b>	Enables or disables TCP Large Packet Receive Offload as follows: <ul style="list-style-type: none"> <li>• <b>disable</b> —The CPU processes all large packets.</li> <li>• <b>enable</b> —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.</li> </ul>
<b>Step 41</b>	Server /chassis/adapter/host-eth-if/offload # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 42</b>	Server /chassis/adapter/host-eth-if # <b>scope rss</b>	Enters Receive-side Scaling (RSS) command mode.
<b>Step 43</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss {disable   enable}</b>	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.
<b>Step 44</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-ipv4 {disable   enable}</b>	Enables or disables IPv4 RSS. The default is enable.
<b>Step 45</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-tcp-ipv4 {disable   enable}</b>	Enables or disables TCP/IPv4 RSS. The default is enable.
<b>Step 46</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-ipv6 {disable   enable}</b>	Enables or disables IPv6 RSS. The default is enable.



	Command or Action	Purpose
<b>Step 47</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-tcp-ipv6 {disable   enable}</b>	Enables or disables TCP/IPv6 RSS. The default is enable.
<b>Step 48</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-ipv6-ex {disable   enable}</b>	Enables or disables IPv6 Extension RSS. The default is disable.
<b>Step 49</b>	Server /chassis/adapter/host-eth-if/rss # <b>set rss-hash-tcp-ipv6-ex {disable   enable}</b>	Enables or disables TCP/IPv6 Extension RSS. The default is disable.
<b>Step 50</b>	Server /chassis/adapter/host-eth-if/rss # <b>exit</b>	Exits to the host Ethernet interface command mode.
<b>Step 51</b>	Server /chassis/adapter/host-eth-if # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>create</b> <b>host-eth-if</b> <i>name</i>	Creates a vNIC and enters the host Ethernet interface command mode. The <i>name</i> argument can be up to 32 ASCII characters.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>set channel-number</b> <i>number</i>	(Optional) If NIV mode is enabled for the adapter, you must assign a channel number to this vNIC. The range is 1 to 1000.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if # <b>commit</b>	Commits the transaction to the system configuration.  <b>Note</b> 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>delete</b> <b>host-eth-if</b> <i>name</i>	Deletes the specified vNIC.  <b>Note</b> You cannot delete either of the two default vNICs, eth0 or eth1.
<b>Step 4</b>	Server /chassis/adapter # <b>commit</b>	Commits the transaction to the system configuration.

	Command or Action	Purpose
		<b>Note</b> 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 #
```

## Configuring iSCSI Boot Capability

### Configuring iSCSI Boot Capability for vNICs

When the rack-servers are configured in a standalone mode, and when the VIC adapters are directly attached to the Nexus 5000 family of switches, you can configure these VIC adapters to boot the servers remotely from iSCSI storage targets. You can configure Ethernet vNICs to enable a rack server to load the host OS image from remote iSCSI target devices.

To configure the iSCSI boot capability on a vNIC:

- You must log in with admin privileges to perform this task.
- To configure a vNIC to boot a server remotely from an iSCSI storage target, you must enable the PXE boot option on the vNIC.



**Note** You can configure a maximum of 2 iSCSI vNICs for each host.

### Configuring iSCSI Boot Capability on a vNIC

You can configure a maximum of 2 iSCSI vNICs for each host.

#### Before You Begin

- To configure a vNIC to boot a server remotely from an iSCSI storage target, you must enable the PXE boot option on the vNIC.
- You must log in with admin privileges to perform this task.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-eth-if {eth0   eth1   name}</b>	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>create iscsi-boot index</b>	Creates the iSCSI boot index for the vNIC. At this moment, only 0 is allowed as the index.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>create iscsi-target index</b>	Creates an iSCSI target for the vNIC. The value can either be 0 or 1.
<b>Step 6</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>set dhcp-net-settings enabled</b>	Enables the DHCP network settings for the iSCSI boot.
<b>Step 7</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>set initiator-name string</b>	Sets the initiator name. It cannot be more than 223 characters.
<b>Step 8</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>set dhcp-iscsi-settings enabled</b>	Enables the DHCP iSCSI settings.
<b>Step 9</b>	Server /chassis/adapter/host-eth-if/iscsi-boot* # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> The changes will take effect upon the next server reboot.

This example shows how to configure the iSCSI boot capability for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # create iscsi-boot 0
Server /adapter/host-eth-if/iscsi-boot *# set dhcp-net-settings enabled
Server /adapter/host-eth-if/iscsi-boot *# set initiator-name iqn.2012-01.com.adser:abcde
Server /adapter/host-eth-if/iscsi-boot *# set dhcp-iscsi-settings enabled
Server /adapter/host-eth-if/iscsi-boot *# commit
```

New host-eth-if settings will take effect upon the next server reset  
Server /adapter/host-eth-if/iscsi-boot #

## Deleting an iSCSI Boot Configuration for a vNIC

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> . <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>scope host-eth-if</b> { <i>eth0</i>   <i>eth1</i>   <i>name</i> }	Enters the host Ethernet interface command mode for the specified vNIC.
<b>Step 4</b>	Server /chassis/adapter/host-eth-if # <b>delete iscsi-boot 0</b>	Deletes the iSCSI boot capability for the vNIC.
<b>Step 5</b>	Server /chassis/adapter/host-eth-if* # <b>commit</b>	Commits the transaction to the system configuration. <b>Note</b> The changes will take effect upon the next server reboot.

This example shows how to delete the iSCSI boot capability for a vNIC:

```
Server # scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # scope host-eth-if eth0
Server /chassis/adapter/host-eth-if # delete iscsi-boot 0
Server /adapter/host-eth-if/iscsi-boot *# commit
New host-eth-if settings will take effect upon the next server reset

Server /adapter/host-eth-if/iscsi-boot #
```

## 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter index</b>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>show vmfex [detail]</b>	Displays the general VM FEX properties. For field descriptions, see <a href="#">General Properties Settings</a> , on page 111.
<b>Step 4</b>	Server /chassis/adapter # <b>scope vmfex name</b>	Enters the command mode for the specified VM FEX interface.
<b>Step 5</b>	Server /chassis/adapter/vmfex # <b>show interrupt [detail]</b>	Displays Ethernet interrupt settings. For field descriptions, see <a href="#">Ethernet Interrupt Settings</a> , on page 112.
<b>Step 6</b>	Server /chassis/adapter/vmfex # <b>show recv-queue [detail]</b>	Displays Ethernet receive queue settings. For field descriptions, see <a href="#">Ethernet Receive Queue Settings</a> , on page 113.
<b>Step 7</b>	Server /chassis/adapter/vmfex # <b>show trans-queue [detail]</b>	Displays Ethernet transmit queue settings. For field descriptions, see <a href="#">Ethernet Transmit Queue Settings</a> , on page 113.
<b>Step 8</b>	Server /chassis/adapter/vmfex # <b>show comp-queue [detail]</b>	Displays completion queue settings. For field descriptions, see <a href="#">Completion Queue Settings</a> , on page 113.
<b>Step 9</b>	Server /chassis/adapter/vmfex # <b>show offload [detail]</b>	Displays TCP offload settings. For field descriptions, see <a href="#">TCP Offload Settings</a> , on page 114.
<b>Step 10</b>	Server /chassis/adapter/vmfex # <b>show rss [detail]</b>	Displays RSS settings. For field descriptions, see <a href="#">Receive Side Scaling Settings</a> , on page 114.

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.

Name	Description
<b>Uplink Port</b>	The uplink port associated with this VM FEX. All traffic for this VM FEX goes through this uplink port.
<b>MAC Address</b>	The MAC address associated with the VM FEX.
<b>Class of Service</b>	The class of service to associate with traffic from this VM FEX.
<b>Trust Host CoS</b>	Whether the VM FEX can use the class of service provided by the host operating system.
<b>PCI Order</b>	The order in which this VM FEX will be used.
<b>Default VLAN</b>	The default VLAN for this VM FEX.
<b>VLAN Mode</b>	Whether VLAN trunking or access is configured.
<b>Rate Limit</b>	If rate limiting is configured, the maximum rate.
<b>Enable PXE Boot</b>	Whether the VM FEX can be used to perform a PXE boot.
<b>Channel Number</b>	If NIV mode is enabled for the adapter, the channel number assigned to this VM FEX.
<b>Port Profile</b>	If NIV mode is enabled for the adapter, the port profile associated with the VM FEX.  <b>Note</b> This field displays the port profiles defined on the switch to which this server is connected.
<b>Enable Uplink Failover</b>	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.
<b>Failback Timeout</b>	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
<b>Interrupt Count field</b>	The number of interrupt resources allocated to this VM FEX.
<b>Coalescing Time field</b>	The time CIMC waits between interrupts or the idle period that must be encountered before an interrupt is sent.



Name	Description
<b>Coalescing Type</b> field	This can be one of the following: <ul style="list-style-type: none"> <li>• <b>MIN</b>—The system waits for the time specified in the <b>Coalescing Time</b> field before sending another interrupt event.</li> <li>• <b>IDLE</b>—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 <b>Coalescing Time</b> field.</li> </ul>
<b>Interrupt Mode</b> field	The preferred driver interrupt mode. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>MSIx</b>—Message Signaled Interrupts (MSI) with the optional extension.</li> <li>• <b>MSI</b>—MSI only.</li> <li>• <b>INTx</b>—PCI INTx interrupts.</li> </ul>

#### Ethernet Receive Queue Settings

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

#### Ethernet Transmit Queue Settings

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

#### Completion Queue Settings

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

**TCP Offload Settings**

Name	Description
<b>Enable TCP Segmentation Offload</b> field	If enabled, the CPU sends large TCP packets to the hardware to be segmented. If disabled, the CPU segments large packets.  <b>Note</b> This option is also known as Large Send Offload (LSO).
<b>Enable TCP Rx Offload Checksum Validation</b> field	If enabled, the CPU sends all packet checksums to the hardware for validation. If disabled, the CPU validates all packet checksums.
<b>Enable TCP Tx Offload Checksum Generation</b> 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.
<b>Enable Large Receive</b> 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
<b>Enable TCP Receive Side Scaling</b> 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.
<b>Enable IPv4 RSS</b> field	If enabled, RSS is enabled on IPv4 networks.
<b>Enable TCP-IPv4 RSS</b> field	If enabled, RSS is enabled for TCP transmissions across IPv4 networks.
<b>Enable IPv6 RSS</b> field	If enabled, RSS is enabled on IPv6 networks.
<b>Enable TCP-IPv6 RSS</b> field	If enabled, RSS is enabled for TCP transmissions across IPv6 networks.
<b>Enable IPv6 Extension RSS</b> field	If enabled, RSS is enabled for IPv6 extensions.
<b>Enable TCP-IPv6 Extension RSS</b> field	If enabled, RSS is enabled for TCP transmissions across IPv6 networks.

# Managing Storage Adapters

## Create Virtual Drive from Unused Physical Drives

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>create virtual-drive</b>	At this point, you are prompted to enter information corresponding to the RAID level, the physical drives to be used, the size and the write policy for the new virtual drive. Enter the appropriate information at each prompt.  When you have finished specifying the virtual drive information, you are prompted to confirm that the information is correct. Enter <b>y</b> (yes) to confirm, or <b>n</b> (no) to cancel the operation.
<b>Step 4</b>	Server /chassis/storageadapter # <b>show virtual-drive</b>	Displays the existing virtual drives.

This example shows how to create a new virtual drive that spans two unused physical drives.

```

Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # create-virtual-drive
Please enter RAID level
(0, 1, 5, 6, 10, 50, 60) --> 1

Please choose from the following 2 unused physical drives:
    Slot 6: size 68664 MB
    Slot 7: size 68664 MB

Specify physical disks for span 0:
    Enter comma-separated PDs from above list--> 6,7
Please enter Virtual Drive name (15 characters maximum)--> test_v_drive
Please enter Virtual Drive size in MB, GB, or TB
Example format: '400 GB' --> 1000 MB

Optional attribute:
    Write Policy: defaults to Write Back
    OK? (y or n)--> n
    0: Write Through
    1: Write Back
    2: Write Back with Bad BBU
    3: Write Back Adaptive
    Choose number from above options--> 2
    
```

```

Write Policy will be set to Write Back with Bad BBU (2 and 'write-policy\:2')

New virtual drive will have the following characteristics:
- Spans: '[6.7]'
- RAID level: '1'
- Name: 'test_v_drive'
- Size: 1000 MB
- Write Policy: Write Back with Bad BBU
OK? (y or n)--> y

Server /chassis/storageadapter # show virtual-drive
Virtual Drive Health      Status      Name          Size      RAID Level
Boot Drive
-----
-----
0                          Good        Optimal          150528 MB RAID 0
false
1                          Good        Optimal          20480 MB  RAID 0
true
2                          Good        Optimal          114140 MB RAID 0
false
3                          Good        Optimal          1000 MB   RAID 1
false          test_v_drive
4                          Good        Optimal          500 MB   RAID 1
false          new_from_test

Server /chassis/storageadapter #

```

## Create Virtual Drive from an Existing Drive Group

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>carve-virtual-drive</b>	At this point, you are prompted to enter information corresponding to the virtual drives to be used, and the size and the write policy for the new virtual drive. Enter the appropriate information at each prompt.  When you have finished specifying the virtual drive information, you are prompted to confirm that the information is correct. Enter <b>y</b> (yes) to confirm, or <b>n</b> (no) to cancel the operation.
<b>Step 4</b>	Server /chassis/storageadapter # <b>show virtual-drive</b>	Displays the existing virtual drives.

This example shows how to carve a new virtual drive out of unused space in an existing RAID 1 drive group:

```

Server# scope chassis
Server /chassis # scope storageadapter SLOT-3

```

```

Server /chassis/storageadapter # carve-virtual-drive
< Fetching virtual drives...>

ID  Name                RL  VDSize          MaxPossibleSize PD(s)
-----
 3  test_v_drive         1   1000 MB         67664 MB         6,7

Please choose from the above list the virtual drive number
whose space the new virtual drive will share--> 3
New virtual drive will share space with VD 3

Please enter Virtual Drive name (15 characters maximum)--> new_from_test
Please enter Virtual Drive size in MB, GB, or TB (maximum: 67664 MB)
Example format: '400 GB' --> 500 MB

Optional attribute:
Write Policy: defaults to Write Back
OK? (y or n)--> y

New virtual drive will have the following characteristics:
- It will share space with virtual drive 3
- Name: 'new_from_test'
- Size: 500 MB

OK? (y or n)--> y
Server /chassis/storageadapter # show virtual-drive
Virtual Drive Health      Status      Name              Size      RAID Level
Boot Drive
-----
0                          Optimal
false                      150528 MB  RAID 0
1                          Optimal
true                       20480 MB   RAID 0
2                          Optimal
false                      114140 MB RAID 0
3                          Optimal
false                      test_v_drive 1000 MB     RAID 1
4                          Optimal
false                      new_from_test 500 MB     RAID 1

Server /chassis/storageadapter #
    
```

## Clearing Foreign Configuration



**Important**

This task clears all foreign configuration on the controller. Also, all configuration information from all physical drives hosting foreign configuration is deleted. This action cannot be reverted.

**Before You Begin**

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

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter</b> <i>slot</i>	Enters command mode for an installed storage card.

	Command or Action	Purpose
<b>Step 3</b>	Server /chassis/storageadapter # <b>clear-foreign-config</b>	You are prompted to confirm the action. Enter <b>yes</b> to confirm.  <b>Note</b> If you do not enter <b>yes</b> , the action is aborted.

This example shows how to clear all foreign configurations on the MegaRAID controller in slot 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # clear-foreign-config
Are you sure you want to clear all foreign configurations on this controller?
All data on the drive(s) will be lost.
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter #
```

## Deleting a Virtual Drive



### Important

This task deletes a virtual drive, including the drives that run the booted operating system. So back up any data that you want to retain before you delete a virtual drive.

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope virtual-drive drive-number</b>	Enters command mode for the specified virtual drive.
<b>Step 4</b>	Server /chassis/storageadapter/virtual-drive # <b>delete-virtual-drive</b>	You are prompted to confirm the action. Enter <b>yes</b> to confirm.  <b>Note</b> If you do not enter <b>yes</b> , the action is aborted.

This example shows how to delete virtual drive 3.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # delete-virtual-drive
```

```
Are you sure you want to delete virtual drive 3?
All data on the drive will be lost. Enter 'yes' to confirm -> yes
Server /chassis/storageadapter/virtual-drive #
```

## Initializing a Virtual Drive

All data on a virtual drive is lost when you initialize the drive. Before you run an initialization, back up any data on the virtual drive that you want to save.

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope virtual-drive drive-number</b>	Enters command mode for the specified virtual drive.
<b>Step 4</b>	Server /chassis/storageadapter/virtual-drive # <b>start-initialization</b>	Initializes the specified virtual drive.
<b>Step 5</b>	Server /chassis/storageadapter/virtual-drive # <b>cancel-initialization</b>	(Optional) Cancels the initialization of the specified virtual drive.
<b>Step 6</b>	Server /chassis/storageadapter/physical-drive # <b>get-operation-status</b>	Displays the status of the task that is in progress on the drive.

This example shows how to initialize virtual drive 3 using fast initialization:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # start-initialization
Are you sure you want to initialize virtual drive 3?
All data on the drive will be lost. Enter 'yes' to confirm -> yes
Fast (0) or full (1) initialization? -> 0
Server /chassis/storageadapter/virtual-drive # get-operation-status

progress-percent: 20%
elapsed -seconds: 30
operation-in-progress: initializing virtual drive

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

## Set as Boot Drive

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope virtual-drive drive-number</b>	Enters command mode for the specified virtual drive.
<b>Step 4</b>	Server /chassis/storageadapter # <b>set-boot-drive</b>	Specifies the controller to boot from this virtual drive.

This example shows how to specify the controller to boot from virtual drive 3:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive 3
Server /chassis/storageadapter/virtual-drive # set-boot-drive
Are you sure you want to set virtual drive 3 as the boot drive?
Enter 'yes' to confirm -> yes
Server /chassis/storageadapter/virtual-drive #
```

## Modifying Attributes of a Virtual Drive

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope virtual-drive 3</b>	Enters the command mode for the virtual drive.



	Command or Action	Purpose
<b>Step 4</b>	Server /chassis/storageadapter/virtual-drive # <b>modify-attributes</b>	Prompts you to select a different current policy.

This example shows how to carve a new virtual drive out of unused space in an existing RAID 1 drive group:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope virtual-drive
Server /chassis/storageadapter/virtual-drive # modify-attributes

Current write policy: Write Back

    0: Write Through
    1: Write Back
    2: Write Back even if Bad BBU

Choose number from above options --> 0

The following attribute will be modified:

- Write policy: Write Through

OK? (y or n) --> y

operation in progress.

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

## Making a Dedicated Hot Spare

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope physical-drive drive-number</b>	Enters command mode for the specified physical drive.
<b>Step 4</b>	Server /chassis/storageadapter/physical-drive # <b>make-dedicated-hot-spare</b>	You are prompted to choose a virtual drive for which the dedicated hot spare is being created.

This example shows how to make physical drive 3 a dedicated hot spare for virtual drive 6:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
```

```

Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # make-dedicated-hot-spare
  5: VD_OS_1, RAID 0, 102400 MB, physical disks: 1
  6: VD_OS_2, RAID 0, 12288 MB, physical disks: 1
  7: VD_OS_3, RAID 0, 12288 MB, physical disks: 1
  8: VD_DATA_1, RAID 0, 12512 MB, physical disks: 1
  9: RAID1_2358, RAID 1, 40000 MB, physical disks: 2,3,5,8
 11: JFB_RAID1_67, RAID 1, 20000 MB, physical disks: 6,7
 12: JFB_Crv_R1_40, RAID 1, 40000 MB, physical disks: 6,7
 13: JFB_R1_10GB, RAID 1, 10000 MB, physical disks: 6,7

Please choose from the above 8 virtual drives-->6

Server /chassis/storageadapter/physical-drive #

```

## Making a Global Hot Spare

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope physical-drive drive-number</b>	Enters command mode for the specified physical drive.
<b>Step 4</b>	Server /chassis/storageadapter/physical-drive # <b>make-global-hot-spare</b>	
<b>Step 5</b>	Server /chassis/storageadapter/physical-drive # <b>get-operation-status</b>	Displays the status of the task that is in progress on the drive.

This example shows how to make physical drive 3 a global hot spare:

```

Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # make-global-hot-spare
Server /chassis/storageadapter/physical-drive #

```

## Preparing a Drive for Removal

You can confirm this task only on physical drives that display the **Unconfigured Good** status.

### Before You Begin

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

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope physical-drive drive-number</b>	Enters command mode for the specified physical drive.
<b>Step 4</b>	Server /chassis/storageadapter/physical-drive # <b>prepare-for-removal</b>	

This example shows how to prepare physical drive 3 for removal.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # prepare-for-removal
Server /chassis/storageadapter/physical-drive #
```

## Removing a Drive from Hot Spare Pools

**Before You Begin**

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

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope physical-drive drive-number</b>	Enters command mode for the specified physical drive.
<b>Step 4</b>	Server /chassis/storageadapter/physical-drive # <b>remove-hot-spare</b>	Removes a drive from the host spare pool.

This example shows how to remove physical drive 3 from the hot spare pools:

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # remove-hot-spare
Server /chassis/storageadapter/physical-drive #
```

## Undo Preparing a Drive for Removal

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope physical-drive drive-number</b>	Enters command mode for the specified physical drive.
<b>Step 4</b>	Server /chassis/storageadapter/physical-drive # <b>undo-prepare-for-removal</b>	

This example shows how to respin physical drive 3 after preparing the drive for removal.

```
Server# scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # undo-prepare-for-removal
Server /chassis/storageadapter/physical-drive #
```

## Enabling Auto Learn Cycles for the Battery Backup Unit

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope bbu</b>	Enter the battery backup unit command mode.
<b>Step 4</b>	Server /chassis/storageadapter # <b>enable-auto-learn</b>	Enables the battery auto-learn cycles

This example shows how to enable the battery auto-learn cycles:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope bbu
Server /chassis/storageadapter/bbu # enable-auto-learn
Automatic BBU learn cycles will occur without notice if enabled.
Are you sure? [y/n] --> y
enable-auto-learn initiated
Server /chassis/storageadapter/bbu #
```

## Disabling Auto Learn Cycles for the Battery Backup Unit

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope bbu</b>	Enter the battery backup unit command mode.
<b>Step 4</b>	Server /chassis/storageadapter # <b>disable-auto-learn</b>	Disables the battery auto-learn cycles

This example shows how to disables the battery auto-learn cycles:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope bbu
Server /chassis/storageadapter/bbu # disable-auto-learn
Automatic BBU learn cycles will no longer occur if disabled.
Are you sure? [y/n] --> y
disable-auto-learn initiated

Server /chassis/storageadapter/bbu #
```

## Starting a Learn Cycle for a Battery Backup Unit

### Before You Begin

You must be logged in as an admin to use this command.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope bbu</b>	Enter the battery backup unit command mode.
<b>Step 4</b>	Server /chassis/storageadapter # <b>start-learn-cycle</b>	Starts the learn cycle for the battery.

This example shows how to initiate the learn cycles for a battery:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope bbu
Server /chassis/storageadapter/bbu # start-learn-cycle
Server /chassis/storageadapter/bbu #
```

## Toggling the Locator LED for a Physical Drive

**Before You Begin**

You must be logged in as an admin to perform this task.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>scope physical-drive 3</b>	Enters the physical drive command mode.
<b>Step 4</b>	Server /chassis/storageadapter/physical-drive # <b>locator-led {on   off}</b>	Enables or disables the physical drive locator LED.

This example shows how to enable the locator LED for physical drive 3:

```
Server # scope chassis
Server /chassis # scope storageadapter SLOT-2
Server /chassis/storageadapter # scope physical-drive 3
Server /chassis/storageadapter/physical-drive # locator-led on
Server /chassis/storageadapter/physical-drive* # commit
Server /chassis/storageadapter/physical-drive #
```

## Viewing Storage Controller Logs

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope storageadapter slot</b>	Enters command mode for an installed storage card.
<b>Step 3</b>	Server /chassis/storageadapter # <b>show log</b>	Displays the storage controller logs.

This example shows how to display storage controller logs:

```

Server # scope chassis
Server /chassis # scope storageadapter SLOT-3
Server /chassis/storageadapter # show log

Time                               Severity      Description
----                               -
Fri March 1 09:52:19 2013      Warning      Predictive Failure
Fri March 1 07:50:19 2013      Info         Battery charge complete
Fri March 1 07:50:19 2013      Info         Battery charge started
Fri March 1 07:48:19 2013      Info         Battery relearn complete
Fri March 1 07:47:19 2013      Info         Battery is discharging
Fri March 1 07:45:19 2013      Info         Battery relearn started

Server /chassis/storageadapter #
    
```

## 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .  <b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>export-vnic protocol remote</b> <i>server IP address</i>	Starts the export operation. The adapter configuration file will be stored at the specified path and filename on the remote server at the specified IP address. The protocol can be one of the following: <ul style="list-style-type: none"> <li>• TFTP</li> <li>• FTP</li> <li>• SFTP</li> <li>• SCP</li> <li>• HTTP</li> </ul>

This example exports the configuration of adapter 1:

```
Server# scope chassis
Server /chassis # scope adapter 1
Server /chassis/adapter # export-vnic ftp 192.0.20.34 //test/dnld-ucs-k9-bundle.1.0.2h.bin
Server /chassis/adapter #
```

## Importing the Adapter Configuration

**Important**

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

**Before You Begin**

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

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>scope adapter</b> <i>index</i>	Enters the command mode for the adapter card at the PCI slot number specified by <i>index</i> .



	Command or Action	Purpose
		<b>Note</b> The server must be powered on before you can view or change adapter settings.
<b>Step 3</b>	Server /chassis/adapter # <b>import-vnic</b> <i>tftp-ip-address path-and-filename</i>	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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>adapter-reset-defaults</b> <i>index</i>	Restores factory default settings for the adapter at the PCI slot number specified by the <i>index</i> 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>update-adapter-fw</b> <i>tftp-ip-address path-and-filename</i> { <b>activate</b>   <b>no-activate</b> } [ <i>pci-slot</i> ] [ <i>pci-slot</i> ]	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 <b>activate</b> keyword is specified, the new firmware is activated after installation.
<b>Step 3</b>	Server /chassis # <b>recover-adapter-update</b> [ <i>pci-slot</i> ] [ <i>pci-slot</i> ]	(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 131](#).

# 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
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server /chassis # <b>activate-adapter-fw</b> <i>pci-slot</i> { <b>1</b>   <b>2</b> }	Activates adapter firmware image 1 or 2 on the adapter in the specified PCI slot.  <b>Note</b> 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 succeeded
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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope chassis</b>	Enters the chassis command mode.
<b>Step 2</b>	Server/chassis # <b>adapter-reset index</b>	Resets the adapter at the PCI slot number specified by the <i>index</i> argument.  <b>Note</b> 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, page 133](#)
- [Configuring SSH, page 134](#)
- [Configuring XML API, page 135](#)
- [Configuring IPMI, page 136](#)
- [Configuring SNMP, page 137](#)

## Configuring HTTP

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope http</b>	Enters the HTTP command mode.
<b>Step 2</b>	Server /http # <b>set enabled {yes   no}</b>	Enables or disables HTTP and HTTPS service on the CIMC.
<b>Step 3</b>	Server /http # <b>set http-port number</b>	Sets the port to use for HTTP communication. The default is 80.
<b>Step 4</b>	Server /http # <b>set https-port number</b>	Sets the port to use for HTTPS communication. The default is 443.
<b>Step 5</b>	Server /http # <b>set http-redirect {yes   no}</b>	Enables or disables the redirection of an HTTP request to HTTPS.

	Command or Action	Purpose
<b>Step 6</b>	Server /http # <b>set timeout</b> <i>seconds</i>	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.
<b>Step 7</b>	Server /http # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope ssh</b>	Enters the SSH command mode.
<b>Step 2</b>	Server /ssh # <b>set enabled</b> {yes   no}	Enables or disables SSH on the CIMC.
<b>Step 3</b>	Server /ssh # <b>set ssh-port</b> <i>number</i>	Sets the port to use for secure shell access. The default is 22.
<b>Step 4</b>	Server /ssh # <b>set timeout</b> <i>seconds</i>	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.
<b>Step 5</b>	Server /ssh # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 6</b>	Server /ssh # <b>show</b> [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
<b>Step 1</b>	Server# <b>scope xmlapi</b>	Enters XML API command mode.
<b>Step 2</b>	Server /xmlapi # <b>set enabled {yes   no}</b>	Enables or disables XML API control of CIMC.
<b>Step 3</b>	Server /xmlapi # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope ipmi</b>	Enters the IPMI command mode.
<b>Step 2</b>	Server /ipmi # <b>set enabled</b> {yes   no}	Enables or disables IPMI access on this server.
<b>Step 3</b>	Server /ipmi # <b>set</b> <b>privilege-level</b> {readonly   <b>user</b>   <b>admin</b> }	Specifies the highest privilege level that can be assigned to an IPMI session on this server. This can be: <ul style="list-style-type: none"> <li>• <b>readonly</b> — 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.</li> <li>• <b>user</b> — 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.</li> <li>• <b>admin</b> — 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.</li> </ul>



	Command or Action	Purpose
<b>Step 4</b>	Server /ipmi # <b>set encryption-key</b> <i>key</i>	Sets the IPMI encryption key to use for IPMI communications. The key value must be 40 hexadecimal numbers.
<b>Step 5</b>	Server /ipmi # <b>commit</b>	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](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
<b>Step 1</b>	Server# <b>scope snmp</b>	Enters SNMP command mode.
<b>Step 2</b>	Server /snmp # <b>set enabled</b> { <b>yes</b>   <b>no</b> }	Enables or disables SNMP. <b>Note</b> SNMP must be enabled and saved before additional SNMP configuration commands are accepted.
<b>Step 3</b>	Server /snmp # <b>commit</b>	Commits the transaction to the system configuration.

	Command or Action	Purpose
<b>Step 4</b>	Server /snmp # <b>set community-str</b> <i>community</i>	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.
<b>Step 5</b>	Server /snmp # <b>setcommunity-access</b>	This can be one of the following : Disabled, Limited, or Full.
<b>Step 6</b>	Server /snmp # <b>settrap-community-str</b>	Specifies the SNMP community group to which trap information should be sent. The name can be up to 18 characters
<b>Step 7</b>	Server /snmp # <b>set sys-contact</b> <i>contact</i>	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.
<b>Step 8</b>	Server /snmp # <b>set sys-location</b> <i>location</i>	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.
<b>Step 9</b>	Server /snmp # <b>commit</b>	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 cimcpbublic
Server /snmp # set community-access Full
Server /snmp # set trap-community-str public
Server /snmp *# set sys-contact "User Name <username@example.com> +1-408-555-1212"
Server /snmp *# set sys-location "San Jose, California"
Server /snmp *# commit
Server /snmp # show detail
SNMP Settings:
  SNMP Port: 161
  System Contact: User Name <username@example.com> +1-408-555-1212
  System Location: San Jose, California
  SNMP Community: cimcpbublic
  SNMP Trap community: public
  SNMP Community access: Full
  Enabled: yes

Server /snmp #

```

### What to Do Next

Configure SNMP trap settings as described in [Configuring SNMP Trap Settings](#), on page 139.

## 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
<b>Step 1</b>	Server# <b>scope snmp</b>	Enters the SNMP command mode.
<b>Step 2</b>	Server /snmp # <b>scope trap-destinations number</b>	Enters the SNMP trap destination command mode for the specified destination. Four SNMP trap destinations are available. The destination <i>number</i> is an integer between 1 and 15.
<b>Step 3</b>	Server /snmp/trap-destinations # <b>set enabled {yes   no}</b>	Enables or disables the SNMP trap destination.
<b>Step 4</b>	Server /snmp/trap-destinations # <b>set version {1   2   3}</b>	Specify the desired SNMP version of the trap message. <b>Note</b> SNMPv3 traps will be delivered only to locations where the SNMPv3 user and key values are configured correctly.
<b>Step 5</b>	Server /snmp/trap-destinations # <b>set type {trap   inform}</b>	Specifies whether SNMP notification messages are sent as simple traps or as inform requests requiring acknowledgment by the receiver. <b>Note</b> The inform option can be chosen only for V2 users.
<b>Step 6</b>	Server /snmp/trap-destinations # <b>set user user</b>	
<b>Step 7</b>	Server /snmp/trap-destination # <b>set v4-addr ip-address</b>	Specifies the destination IP address to which SNMP trap information is sent.
<b>Step 8</b>	Server /snmp/trap-destination # <b>commit</b>	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 # Scope trap-destinations 1
Server /snmp/trap-destination *# set enabled yes
Server /snmp/trap-destination *# set version 2
Server /snmp/trap-destination *# set type inform
Server /snmp/trap-destination *# set user user1
Server /snmp/trap-destination *# set v4-addr 192.2.3.4
Server /snmp/trap-destination *# commit
Server /snmp/trap-destination # show detail
Trap Destination 1:
```

```

Enabled: yes
SNMP version: 2
Trap type: inform
SNMP user: user1
IPv4 Address: 192.2.3.4
Delete Trap: no
Server /snmp/trap-destination #

```

## Sending a Test SNMP Trap Message

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope snmp</b>	Enters the SNMP command mode.
<b>Step 2</b>	Server /snmp # <b>sendSNMPtrap</b>	Sends an SNMP test trap to the configured SNMP trap destination that are enabled.  <b>Note</b> The trap must be configured and enabled in order to send a test message.

This example sends a test message to all the enabled SNMP trap destinations:

```

Server# scope snmp
Server /snmp # sendSNMPtrap
SNMP Test Trap sent to the destination.
Server /snmp #

```

## Configuring SNMPv3 Users

### Before You Begin

- You must log in as a user with admin privileges to perform this task.
- SNMP must be enabled and saved before these configuration commands are accepted.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope snmp</b>	Enters the SNMP command mode.
<b>Step 2</b>	Server /snmp # <b>scope v3users</b> <i>number</i>	Enters the SNMPv3 users command mode for the specified user number.
<b>Step 3</b>	Server /snmp/v3users # <b>set v3add</b> {yes   no}	Adds or deletes an SNMPv3 user. This can be one of the following:

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>yes</b>—This user is enabled as an SNMPv3 user and is allowed to access the SNMP OID tree.</li> </ul> <p><b>Note</b> The security name and security level must also be configured at this time or the user addition will fail.</p> <ul style="list-style-type: none"> <li>• <b>no</b>—This user configuration is deleted.</li> </ul>
<b>Step 4</b>	Server /snmp/v3users # set v3security-name security-name	Enter an SNMP username for this user.
<b>Step 5</b>	Server /snmp/v3users # set v3security-level {noauthnopriv   authnopriv   authpriv}	<p>Select a security level for this user. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>noauthnopriv</b>—The user does not require an authorization or privacy password.</li> <li>• <b>authnopriv</b>—The user requires an authorization password but not a privacy password. If you select this option, you must configure an authentication key.</li> <li>• <b>authpriv</b>—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.</li> </ul>
<b>Step 6</b>	Server /snmp/v3users # set v3proto {MD5   SHA}	Select an authentication protocol for this user.
<b>Step 7</b>	Server /snmp/v3users # set v3auth-key auth-key	Enter an authorization password for this user.
<b>Step 8</b>	Server /snmp/v3users # set v3priv-proto {DES   AES}	Select an encryption protocol for this user.
<b>Step 9</b>	Server /snmp/v3users # set v3priv-auth-key priv-auth-key	Enter a private encryption key (privacy password) for this user.
<b>Step 10</b>	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:ex4mplek3y
Please confirm v3auth-key:ex4mplek3y
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 #
```



## Managing Certificates

---

This chapter includes the following sections:

- [Managing the Server Certificate, page 143](#)
- [Generating a Certificate Signing Request, page 143](#)
- [Creating a Self-Signed Certificate, page 145](#)
- [Uploading a Server Certificate, page 147](#)

### 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
<b>Step 1</b>	Server# <b>scope certificate</b>	Enters the certificate command mode.
<b>Step 2</b>	Server /certificate # <b>generate-csr</b>	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/zCCAwgCAQAwgZkxCzAJBgNVBAYTA1VTMQswCQYDVQQIEwJDQTEVMBMGA1UE
BxMMU2FuIEpvc2UsIENBMRUwEwYDVQQKEwxFeGFtcGx1IEluYy4xEzARBgNVBASt
ClRlc3QgR3JvdXAxGTAXBgNVBAMTEHRlc3QuZXhhbXBsZS5jb20xHzAdBgkqhkiG
9w0BCQEWEHVzZXJAZXhhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
AoGBAMZw4nTepNIDhVzb0j7Z2Je4xAG56zmSHRMQeOGHemdh66u2/XAoLx7YccYU
ZgAMivYCsKgb/6CjQtsofvzxmC/eAehuK3/SINv7wd6Vv2pBt6ZpXgD4VBNKOND1
GMbkPayVlQjbg4MD2dx2+H8EH3LMtdZrgKvPxPTE+bf5wZVNAgMBAAGgJTAjBgkq
hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcnQwDQYJKoZIhvcNAQEFBQAD

```



```
gYEAG61CaJoJaVMhzCl90306Mg51zq1zXcz75+VFj2I6rH9asckClD3mkOVx5gJU
Ptt5CVQpNgNLdvbDPSsXretysOhqHmp9+CLv8FDuy1CDYfuaLtv1WvfhevskV0j6
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
<b>Step 1</b>	<pre>openssl genrsa -out CA_keyfilename keysize</pre> <p><b>Example:</b> # openssl genrsa -out ca.key 1024</p>	<p>This command generates an RSA private key that will be used by the CA.</p> <p><b>Note</b> To allow the CA to access the key without user input, do not use the <code>-des3</code> option for this command.</p> <p>The specified file name contains an RSA key of the specified key size.</p>
<b>Step 2</b>	<pre>openssl req -new -x509 -days numdays -key CA_keyfilename -out CA_certfilename</pre> <p><b>Example:</b> # openssl req -new -x509 -days 365 -key ca.key -out ca.crt</p>	<p>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.</p> <p>The certificate server is an active CA.</p>
<b>Step 3</b>	<pre>echo "nsCertType = server" &gt; openssl.conf</pre> <p><b>Example:</b> # echo "nsCertType = server" &gt; openssl.conf</p>	<p>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.</p> <p>The OpenSSL configuration file <code>openssl.conf</code> contains the statement <code>"nsCertType = server"</code>.</p>
<b>Step 4</b>	<pre>openssl x509 -req -days numdays -in CSR_filename -CA CA_certfilename -set_serial 04 -CAkey CA_keyfilename -out server_certfilename -extfile openssl.conf</pre> <p><b>Example:</b> # openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 04 -CAkey ca.key -out myserver05.crt -extfile openssl.conf</p>	<p>This command directs the CA to use your CSR file to generate a server certificate.</p> <p>Your server certificate is contained in the output file.</p>

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
<b>Step 1</b>	Server# <b>scope certificate</b>	Enters the certificate command mode.
<b>Step 2</b>	Server /certificate # <b>upload</b>	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/zCCAwwCAQAwgZkxCzAJBgNVBAYTA1VMTQswCQYDVQQLIEwJQTEVMBMGA1UE
BxMMU2FuIEpvc2UsIENBMRUwEwYDVQQKEwxFeGFtcGx1IEluYy4xEzARBgNVBAst
C1Rlc3QgR3JvdXAxEWVudG91dC51dC51dC51dC51dC51dC51dC51dC51dC51dC51
9w0BCQEWZHVzZXJAZXhhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
AoGBAMZw4nTepNIDhVzb0j7Z2Je4xAG56zmSHRMQeOGHemdh66u2/XAoLx7YCCyU
ZgAMivyCsKgb/6CjQtsofvzxmC/eAehuK3/SINv7wd6Vv2pBt6ZpXgD4VBNKOND1
GMbkPayVlQjbG4MD2dx2+H8EH3LmtdZrgKvPxPTE+bf5wZVNAgMBAAGgJTAjBqkq
hkiG9w0BCQcxFhMUQSBjaGFsbGVuZ2UgcGFzc3dvcmQwDQYJKoZIhvcNAQEFBQAD
gYEAG61CaJoJaVMhzC190306Mg51zq1zXcz75+VFj2I6rH9ascClD3mkOVx5gJU
Ptt5CVQpNgNldvbDPSsXretysOhqHmp9+CLv8FDuy1CDYfuaLtvLWvfhevskV0j6
mK3Ku+YiORnv6DhxrOoqau8r/hyI/L4317IPN1HhOi3oha4=
-----END CERTIFICATE-----
<CTRL+D>
```



## Configuring Platform Event Filters

This chapter includes the following sections:

- [Platform Event Filters, page 149](#)
- [Enabling Platform Event Alerts, page 149](#)
- [Disabling Platform Event Alerts, page 150](#)
- [Configuring Platform Event Filters, page 150](#)
- [Configuring Platform Event Trap Settings, page 152](#)
- [Interpreting Platform Event Traps, page 153](#)

### 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
<b>Step 1</b>	Server# <b>scope fault</b>	Enters the fault command mode.
<b>Step 2</b>	Server /fault # <b>set platform-event-enabled yes</b>	Enables platform event alerts.

	Command or Action	Purpose
<b>Step 3</b>	Server /fault # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 4</b>	Server /fault # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope fault</b>	Enters the fault command mode.
<b>Step 2</b>	Server /fault # <b>set platform-event-enabled no</b>	Disables platform event alerts.
<b>Step 3</b>	Server /fault # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 4</b>	Server /fault # <b>show [detail]</b>	(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
<b>Step 1</b>	Server# <b>scope fault</b>	Enters the fault command mode.
<b>Step 2</b>	Server /fault # <b>scope pef id</b>	Enters the platform event filter command mode for the specified event. See the Platform Event Filter table for event ID numbers.
<b>Step 3</b>	Server /fault/pef # <b>set action</b> { <b>none</b>   <b>reboot</b>   <b>power-cycle</b>   <b>power-off</b> }	Selects the desired system action when this event occurs. The action can be one of the following: <ul style="list-style-type: none"> <li>• <b>none</b> —No system action is taken.</li> <li>• <b>reboot</b> —The server is rebooted.</li> <li>• <b>power-cycle</b> —The server is power cycled.</li> <li>• <b>power-off</b> —The server is powered off.</li> </ul>
<b>Step 4</b>	Server /fault/pef # <b>set send-alert</b> { <b>yes</b>   <b>no</b> }	Enables or disables the sending of a platform event alert for this event.

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

This example configures the platform event alert for an event:

```

Server# scope fault
Server /fault # scope pef 11
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
-----
11          Memory Assert Filter      reboot      yes

Server /fault/pef #

```

### What to Do Next

If you configure any PEFs to send an alert, enable platform event alerts.

## Configuring Platform Event Trap Settings

### Before You Begin

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope fault</b>	Enters the fault command mode.
<b>Step 2</b>	Server /fault # <b>scope pef-destinations</b>	Enters the platform event filter destinations command mode.
<b>Step 3</b>	Server /fault /pef-destinations # <b>set enabled yes</b>	Enables the platform event trap destination.
<b>Step 4</b>	Server /fault /pef-destinations # <b>set addr IP Address</b>	Specifies the destination IP address to which platform event trap information is sent.
<b>Step 5</b>	Server /fault /pef-destinations # <b>commit</b>	Commits the transaction to the system configuration.



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

```
Server# scope fault
Server /fault # scope pef-destination 1
Server /fault /pef-destinations *# set enabled yes
Server /fault /pef-destinations *# set addr 1.2.3.4
Server /fault /pef-destinations *# commit
Server /fault /pef-destinations # show

Trap Destination 1:
  IP Address: 1.2.3.4
  Enabled: yes

Server /fault /pef-destinations #
```

## Interpreting Platform Event Traps

A CIMC platform event alert 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
524533	0800F5h	Power Supply Critical
524551	080107h	Power Supply Warning

Event Number [Note 1]		Platform Event Description
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
884488	0D7F08h	Drive Slot Online
884489	0D7F09h	Drive Slot Degraded

Event Number [Note 1]	Platform Event Description
	Note 1: Basic information about the event number format can be found in the <i>IPMI Platform Event Trap Format Specification v1.0</i> at this URL: <a href="ftp://download.intel.com/design/servers/ipmi/pet100.pdf">ftp://download.intel.com/design/servers/ipmi/pet100.pdf</a> .
	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).





## CIMC Firmware Management

This chapter includes the following sections:

- [Overview of Firmware, page 157](#)
- [Obtaining Firmware from Cisco, page 158](#)
- [Installing CIMC Firmware from a Remote Server, page 159](#)
- [Activating Installed CIMC Firmware, page 160](#)
- [Installing BIOS Firmware from a Remote Server, page 162](#)

### 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](http://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](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](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 remote server, copy the BIOS installation CAP file and the CIMC installation BIN file to the remote server you want to use.  
The remote server can be one of the following:

- TFTP
- FTP
- SFTP
- SCP
- HTTP

The server must have read permission for the destination folder on the remote server.

---

### 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 Remote Server

### Before You Begin

- Log in to the 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 158.

**Note**

If you start an update while an update is already in process, both updates will fail.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope firmware</b>	Enters the CIMC firmware command mode.
<b>Step 3</b>	Server /cimc/firmware # <b>update</b> <i>protocol IP Address path</i>	Specifies the protocol, IP address of the remote server and the file path to the firmware file on the server. The protocol can be one of the following: <ul style="list-style-type: none"> <li>• TFTP</li> <li>• FTP</li> <li>• SFTP</li> <li>• SCP</li> <li>• HTTP</li> </ul>
<b>Step 4</b>	Server /cimc/firmware # <b>show detail</b>	(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 ftp 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**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope firmware</b>	Enters the firmware command mode.
<b>Step 3</b>	Server /cimc/firmware # <b>show detail</b>	Displays the available firmware images and status.
<b>Step 4</b>	Server /cimc/firmware # <b>activate [1   2]</b>	Activates the selected image. If no image number is specified, the server activates the currently inactive image.
<b>Step 5</b>	At the prompt, enter y to activate the selected firmware image.	The BMC reboots, terminating all CLI and GUI sessions until the reboot completes.
<b>Step 6</b>	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 Remote 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](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 as a user with admin privileges.
- Activate the CIMC firmware that goes with the BIOS version you want to install, as described in .
- 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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope firmware</b>	Enters the firmware command mode.
<b>Step 3</b>	Server /cimc/firmware # <b>show detail</b>	Displays the available firmware images and status.
<b>Step 4</b>	Make sure the firmware version shown in the <b>Current FW Version</b> field matches the BIOS firmware version you are installing.	<b>Important</b> 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 <a href="#">Activating Installed CIMC Firmware, on page 160</a> .
<b>Step 5</b>	Server /cimc/firmware # <b>top</b>	Returns to the server root level.
<b>Step 6</b>	Server# <b>scope bios</b>	Enters the BIOS command mode.

	Command or Action	Purpose
<b>Step 7</b>	Server /bios # <b>update protocol</b>	Specifies the protocol to be used. It can be TFTP, FTP, SFTP, SCP or HTTP.
<b>Step 8</b>	Server /bios # <b>update IP Address</b>	Specifies the IP address or the host name of the remote server.
<b>Step 9</b>	Server /bios # <b>update path</b>	Specifies the file path to the BIOS firmware file on the remote server.

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 ftp 192.0.20.34 //upgrade_bios_files/C260-BIOS-1-4-3j-0.CAP
<CR> Press Enter key
Firmware update has started.
Please check the status using "show detail"
Server /bios #

```





# CHAPTER 14

## Viewing Logs

This chapter includes the following sections:

- [Viewing the Faults and Logs Summary, page 165](#)
- [CIMC Log, page 166](#)
- [System Event Log, page 170](#)

## Viewing the Faults and Logs Summary

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server # <code>scope fault</code>	Enters fault command mode.
<b>Step 2</b>	Server # <code>show fault-entries</code>	Displays a log of all the faults.

This example displays a summary of faults:

```
Server # scope fault
Server /fault # show fault-entries
Time                Severity      Description
-----
Sun Jun 27 04:00:52 2013  info         Storage Local disk 12 missing
Sat Jun 26 05:00:22 2013  warning      Power Supply redundancy is lost

Server /fault #
```

# CIMC Log

## Viewing the CIMC Log

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope log</b>	Enters the CIMC log command mode.
<b>Step 3</b>	Server /cimc/log # <b>show entries [detail]</b>	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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope log</b>	Enters the CIMC log command mode.
<b>Step 3</b>	Server /cimc/log # <b>clear</b>	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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope log</b>	Enters the CIMC log command mode.
<b>Step 3</b>	Server /cimc/log # <b>set local-syslog-severity level</b>	<p>The severity <i>level</i> can be one of the following, in decreasing order of severity:</p> <ul style="list-style-type: none"> <li>• emergency</li> <li>• alert</li> <li>• critical</li> <li>• error</li> <li>• warning</li> <li>• notice</li> <li>• informational</li> <li>• debug</li> </ul>

	Command or Action	Purpose
		<b>Note</b> CIMC does not log any messages with a severity below the selected severity. For example, if you select <b>error</b> , 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.
<b>Step 4</b>	Server /cimc/log # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	Server /cimc/log # <b>show local-syslog-severity</b>	(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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope log</b>	Enters the CIMC log command mode.
<b>Step 3</b>	Server /cimc/log # <b>set remote-syslog-severity level</b>	(Optional) The severity <i>level</i> can be one of the following, in decreasing order of severity: <ul style="list-style-type: none"> <li>• emergency</li> <li>• alert</li> </ul>



	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• critical</li> <li>• error</li> <li>• warning</li> <li>• notice</li> <li>• informational</li> <li>• debug</li> </ul> <p><b>Note</b> CIMC does not remotely log any messages with a severity below the selected severity. For example, if you select <b>error</b>, 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.</p>
<b>Step 4</b>	Server /cimc/log # <b>scope server {1   2}</b>	Selects one of the two remote syslog server profiles and enters the command mode for configuring the profile.
<b>Step 5</b>	Server /cimc/log/server # <b>set server-ip ip-address</b>	Specifies the remote syslog server IP address.
<b>Step 6</b>	Server /cimc/log/server # <b>set enabled {yes   no}</b>	Enables the sending of CIMC log entries to this syslog server.
<b>Step 7</b>	Server /cimc/log/server # <b>commit</b>	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
<b>Step 1</b>	Server# <b>scope sel</b>	Enters the system event log (SEL) command mode.
<b>Step 2</b>	Server /sel # <b>show entries [detail]</b>	For system events, displays timestamp, the severity of the event, and a description of the event. The <b>detail</b> 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
<b>Step 1</b>	Server# <b>scope sel</b>	Enters the system event log command mode.
<b>Step 2</b>	Server /sel # <b>clear</b>	You are prompted to confirm the action. If you enter <b>y</b> 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, page 173](#)
- [Rebooting the CIMC, page 175](#)
- [Clearing the BIOS CMOS, page 175](#)
- [Recovering from a Corrupted BIOS, page 176](#)
- [Resetting the CIMC to Factory Defaults, page 177](#)
- [Exporting and Importing the CIMC Configuration, page 178](#)
- [Generating Non maskable Interrupts to the Host, page 180](#)

## 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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope tech-support</b>	Enters the tech-support command mode.
<b>Step 3</b>	Server /cimc/tech-support # <b>set remote-ip ip-address</b>	Specifies the IP address of the remote server on which the technical support data file should be stored.

	Command or Action	Purpose
<b>Step 4</b>	Server /cimc/tech-support # <b>set remote-path</b> <i>path/filename</i>	Specifies the file name in which the support data should be stored on the remote server. When you enter this name, include the relative path for the file from the top of the server tree to the desired location.  <b>Tip</b> To have the system auto-generate the file name, enter the file name as default.tar.gz.
<b>Step 5</b>	Server /cimc/tech-support # <b>set remote-protocol</b> <i>protocol</i>	Specifies the protocol to connect to the remote server. It can be of the following types: <ul style="list-style-type: none"> <li>• tftp</li> <li>• ftp</li> <li>• sftp</li> <li>• scp</li> <li>• http</li> </ul>
<b>Step 6</b>	Server /cimc/tech-support # <b>set remote-username</b> <i>name</i>	Specifies the user name on the remote server on which the technical support data file should be stored. This field does not apply if the protocol is TFTP or HTTP.
<b>Step 7</b>	Server /cimc/tech-support # <b>set remote-password</b> <i>password</i>	Specifies the password on the remote server on which the technical support data file should be stored. This field does not apply if the protocol is TFTP or HTTP.
<b>Step 8</b>	Server /cimc/tech-support # <b>commit</b>	Commits the transaction to the system configuration.
<b>Step 9</b>	Server /cimc/tech-support # <b>start</b>	Begins the transfer of the data file to the remote server.
<b>Step 10</b>	Server /cimc/tech-support # <b>show detail</b>	(Optional) Displays the progress of the transfer of the data file to the remote server.
<b>Step 11</b>	Server /cimc/tech-support # <b>cancel</b>	(Optional) Cancels the transfer of the data file to the remote 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 remote-ip 192.0.20.41
Server /cimc/tech-support* # set remote-protocol tftp
Server /cimc/tech-support* # set remote-path /user/user1/default.tar.gz
Server /cimc/tech-support* # commit
Server /cimc/tech-support # start
Tech Support upload started.

Server /cimc/tech-support # show detail

Tech Support:
  Server Address: 192.0.20.41
  Path: default.tar.gz
```

```

Protocol: tftp
Username:
Password: *****
Progress (%): 5
Status: Collecting

```

```
Server /cimc/tech-support #
```

### What to Do Next

Provide the generated report file to Cisco TAC.

## 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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>reboot</b>	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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the bios command mode.

	Command or Action	Purpose
<b>Step 2</b>	Server /bios # <b>clear-cmos</b>	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
<b>Step 1</b>	Server# <b>scope bios</b>	Enters the bios command mode.
<b>Step 2</b>	Server# <b>recover</b>	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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>factory-default</b>	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 remote server IP address.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.
<b>Step 2</b>	Server /cimc # <b>scope import-export</b>	Enters the import-export command mode.

	Command or Action	Purpose
<b>Step 3</b>	Server /cimc/import-export # <b>export-config</b> <i>protocol ip-address path-and-filename</i>	Starts the backup operation. The configuration file will be stored at the specified path and file name on a remote server at the specified IP address. The remote server could be one of the following types: <ul style="list-style-type: none"> <li>• TFTP</li> <li>• FTP</li> <li>• SFTP</li> <li>• SCP</li> <li>• HTTP</li> </ul>

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 tftp 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
<b>Step 1</b>	Server# <b>scope cimc</b>	Enters the CIMC command mode.

	Command or Action	Purpose
<b>Step 2</b>	Server /cimc # <b>scope import-export</b>	Enters the import-export command mode.
<b>Step 3</b>	Server /cimc/import-export # <b>import-config protocol ip-address path-and-filename</b>	Starts the import operation. The configuration file at the specified path and file name on the remote server at the specified IP address will be imported. The remote server can be one of the following: <ul style="list-style-type: none"> <li>• TFTP</li> <li>• FTP</li> <li>• SFTP</li> <li>• SCP</li> <li>• HTTP</li> </ul>

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

## Generating Non maskable Interrupts to the Host

In some situations, the server might hang and not respond to traditional debug mechanisms. By generating a non maskable interrupt (NMI) to the host, you can create and send a crash dump file of the server and use it to debug the server.

Depending on the type of operating system associated with the server, this task might restart the OS.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	Server # <b>scope chassis</b>	Enters chassis command mode.
<b>Step 2</b>	Server /chassis # <b>generate-nmi</b>	Generates the crash dump file for the server.  To use this command, the server must be powered on, and you must be logged in as an administrator.

This example shows how to generate NMI signals to the host:

```
Server # scope chassis
Server /chassis # generate-nmi
```

```
This operation will send NMI to the host and may cause reboot of the OS.  
OS reboot depends on it's NMI configuration.  
Do you want to continue? [y|N] y  
Server /chassis #
```





# BIOS Parameters by Server Model

This appendix contains the following sections:

- [C22 and C24 Servers, page 183](#)
- [C220 and C240 Servers, page 203](#)
- [C260 Servers, page 222](#)
- [C420 Servers, page 235](#)
- [C460 Servers, page 253](#)

## C22 and C24 Servers

### Main BIOS Parameters for C22 and C24 Servers

Name	Description
<b>TPM Support</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not use the TPM.</li> <li>• <b>Enabled</b>—The server uses the TPM.</li> </ul> <p><b>Note</b> We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

## Advanced BIOS Parameters for C22 and C24 Servers

### Processor Configuration Parameters

Name	Description
<b>Intel Hyper-Threading Technology</b>	<p>Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>Enabled</b>—The processor allows for the parallel execution of multiple threads.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Number of Enabled Cores</b>	<p>Allows you to disable one or more of the physical cores on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>All</b>—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores.</li> <li>• <b>1 through <i>n</i></b>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core.</li> </ul> <p>To disable Hyper Threading and have only one logical processor core running on the server, select <b>1</b>.</p> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Execute Disable</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not classify memory areas.</li> <li>• <b>Enabled</b>—The processor classifies memory areas.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>



Name	Description
<b>Intel VT</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit virtualization.</li> <li>• <b>Enabled</b>—The processor allows multiple operating systems in independent partitions.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>
<b>Intel VT-d</b>	<p>Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not use virtualization technology.</li> <li>• <b>Enabled</b>—The processor uses virtualization technology.</li> </ul>
<b>Intel VT-d Coherency Support</b>	<p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support coherency.</li> <li>• <b>Enabled</b>—The processor uses VT-d Coherency as required.</li> </ul>
<b>Intel VT-d ATS Support</b>	<p>Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support ATS.</li> <li>• <b>Enabled</b>—The processor uses VT-d ATS as required.</li> </ul>

Name	Description
<b>CPU Performance</b>	<p>Sets the CPU performance profile for the server. The performance profile consists of the following options:</p> <ul style="list-style-type: none"> <li>• Data Reuse Optimization</li> <li>• DCU Streamer Prefetcher</li> <li>• DCU IP Prefetcher</li> <li>• Hardware Prefetcher</li> <li>• Adjacent Cache-Line Prefetch</li> </ul> <p>This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enterprise</b>—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled.</li> <li>• —All options are enabled.</li> <li>• <b>HPC</b>—Data Reuse Optimization is disabled and all other options are enabled. This setting is also known as high performance computing.</li> <li>• <b>Custom</b>—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.</li> </ul>
<b>Hardware Prefetcher</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The hardware prefetcher is not used.</li> <li>• <b>Enabled</b>—The processor uses the hardware prefetcher when cache issues are detected.</li> </ul>
<b>Adjacent Cache Line Prefetcher</b>	<p>Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor only fetches the required line.</li> <li>• <b>Enabled</b>— The processor fetches both the required line and its paired line.</li> </ul>

Name	Description
<b>DCU Streamer Prefetch</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines.</li> <li>• <b>Enabled</b>—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.</li> </ul>
<b>DCU IP Prefetcher</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not preload any cache data.</li> <li>• <b>Enabled</b>—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> </ul>
<b>Direct Cache Access Support</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>Enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> </ul>

Name	Description
<b>Power Technology</b>	<p>Enables you to configure the CPU power management settings for the following options:</p> <ul style="list-style-type: none"> <li>• Enhanced Intel Speedstep Technology</li> <li>• Intel Turbo Boost Technology</li> <li>• Processor Power State C6</li> </ul> <p>Power Technology can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Custom</b>—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.</li> <li>• <b>Disabled</b>—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored.</li> <li>• —The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters.</li> </ul>
<b>Enhanced Intel Speedstep Technology</b>	<p>Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>Enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>

Name	Description
<b>Intel Turbo Boost Technology</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>Enabled</b>—The processor utilizes Turbo Boost Technology if required.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Processor Power State C6</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C6 report.</li> <li>• <b>Enabled</b>—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Processor Power State C1 Enhanced</b>	<p>Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The CPU continues to run at its maximum frequency in C1 state.</li> <li>• <b>Enabled</b>—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.</li> </ul>
<b>Frequency Floor Override</b>	<p>Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>— The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance.</li> <li>• <b>Enabled</b>— The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption.</li> </ul>

Name	Description
<b>P-STATE Coordination</b>	<p>Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification.</p> <ul style="list-style-type: none"> <li>• <b>HW_ALL</b>—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package).</li> <li>• <b>SW_ALL</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors.</li> <li>• <b>SW_ANY</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Energy Performance</b>	<p>Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p> <p>In addition, some operating systems, such as Windows 2008, ignore this parameter in favor of their own power plan.</p>

### Memory Configuration Parameters

Name	Description
<b>Select Memory RAS</b>	<p>How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —System performance is optimized.</li> <li>• <b>Mirroring</b>—System reliability is optimized by using half the system memory as backup.</li> <li>• <b>Lockstep</b>—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. 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.</li> </ul>
<b>DRAM Clock Throttling</b>	<p>Allows you to determine whether memory bandwidth or system performance is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Balanced</b>— DRAM clock throttling is reduced, providing a balance between performance and power.</li> <li>• <b>Performance</b>—DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power.</li> <li>• —DRAM clock throttling is increased to improve energy efficiency.</li> </ul>
<b>NUMA</b>	<p>Whether the BIOS supports NUMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not support NUMA.</li> <li>• <b>Enabled</b>—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.</li> </ul>

Name	Description
<b>Low Voltage DDR Mode</b>	<p>Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low.</li> <li>• —The system prioritizes high frequency operations over low voltage operations.</li> </ul>
<b>DRAM Refresh rate</b>	<p>Allows you to set the rate at which the DRAM cells are refreshed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>1x</b>—DRAM cells are refreshed every 64ms.</li> <li>• <b>2x</b>—DRAM cells are refreshed every 32ms.</li> <li>• <b>3x</b>—DRAM cells are refreshed every 21ms.</li> <li>• <b>4x</b>—DRAM cells are refreshed every 16ms.</li> </ul>
<b>Channel Interleaving</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines what interleaving is done.</li> <li>• —Some channel interleaving is used.</li> <li>•</li> <li>•</li> <li>• —The maximum amount of channel interleaving is used.</li> </ul>
<b>Rank Interleaving</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines what interleaving is done.</li> <li>• —Some rank interleaving is used.</li> <li>•</li> <li>•</li> <li>• —The maximum amount of rank interleaving is used.</li> </ul>



Name	Description
<b>Patrol Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system checks for memory ECC errors only when the CPU reads or writes a memory address.</li> <li>• <b>Enabled</b>—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.</li> </ul>
<b>Demand Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>— Single bit memory errors are not corrected.</li> <li>• <b>Enabled</b>— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read.</li> </ul>
<b>Altitude</b>	<p>The approximate number of meters above sea level at which the physical server is installed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines the physical elevation.</li> <li>• —The server is approximately 300 meters above sea level.</li> <li>• —The server is approximately 900 meters above sea level.</li> <li>• —The server is approximately 1500 meters above sea level.</li> <li>• —The server is approximately 3000 meters above sea level.</li> </ul>

**QPI Configuration Parameters**

Name	Description
<b>QPI Link Frequency</b>	<p>The Intel QuickPath Interconnect (QPI) link frequency, in gigatransfers per second (GT/s). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines the QPI link frequency.</li> <li>•</li> <li>•</li> <li>•</li> </ul>

**Onboard Storage Parameters**

Name	Description
<b>Onboard SCU Storage Support</b>	<p>Whether the onboard software RAID controller is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The software RAID controller is not available.</li> <li>• <b>Enabled</b>—The software RAID controller is available.</li> </ul>

**USB Configuration Parameters**

Name	Description
<b>Legacy USB Support</b>	<p>Whether the system supports legacy USB devices. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—USB devices are only available to EFI applications.</li> <li>• <b>Enabled</b>—Legacy USB support is always available.</li> <li>• <b>Auto</b>—Disables legacy USB support if no USB devices are connected.</li> </ul>
<b>Port 60/64 Emulation</b>	<p>Whether the system supports 60h/64h emulation for complete USB keyboard legacy support. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—60h/64 emulation is not supported.</li> <li>• <b>Enabled</b>—60h/64 emulation is supported.</li> </ul> <p>You should select this option if you are using a non-USB aware operating system on the server.</p>

Name	Description
<b>All USB Devices</b>	Whether all physical and virtual USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—All USB devices are disabled.</li> <li>• <b>Enabled</b>—All USB devices are enabled.</li> </ul>
<b>USB Port: Rear</b>	Whether the rear panel USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: Front</b>	Whether the front panel USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: Internal</b>	Whether the internal USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: KVM</b>	Whether the KVM ports are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the KVM port. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the KVM ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: VMedia</b>	Whether the virtual media devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the vMedia devices.</li> <li>• <b>Enabled</b>—Enables the vMedia devices.</li> </ul>

## PCI Configuration Parameters

Name	Description
<b>MMIO Above 4GB</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>Enabled</b>—The server maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> </ul>
<b>ASPM Support</b>	<p>Allows you to set the level of ASPM (Active Power State Management) support in the BIOS. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—ASPM support is disabled in the BIOS.</li> <li>• <b>Force L0s</b>—Force all links to L0 standby (L0s) state.</li> <li>• <b>Auto</b>—The CPU determines the power state.</li> </ul>
<b>VGA Priority</b>	<p>Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Onboard</b>—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port.</li> <li>• <b>Offboard</b>—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port.</li> <li>• —Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled.</li> </ul> <p><b>Note</b> The vKVM does not function when the onboard VGA is disabled.</p>

## Serial Configuration Parameters

Name	Description
<b>Console Redirection</b>	<p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—No console redirection occurs during POST.</li> <li>• <b>Enabled</b>—Enables console redirection on serial port A during POST.</li> </ul>
<b>Terminal Type</b>	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>PC-ANSI</b>—The PC-ANSI terminal font is used.</li> <li>• <b>VT100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>VT100+</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>VT-UTF8</b>—A video terminal with the UTF-8 character set is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Bits per second</b>	<p>What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>9600</b>—A 9,600 BAUD rate is used.</li> <li>• <b>19200</b>—A 19,200 BAUD rate is used.</li> <li>• <b>38400</b>—A 38,400 BAUD rate is used.</li> <li>• <b>57600</b>—A 57,600 BAUD rate is used.</li> <li>• <b>115200</b>—A 115,200 BAUD rate is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>

Name	Description
<b>Flow Control</b>	<p>Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No flow control is used.</li> <li>• <b>—</b>RTS/CTS is used for flow control.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Putty KeyPad</b>	<p>Allows you to change the action of the PuTTY function keys and the top row of the numeric keypad. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>VT100</b>—The function keys generate ESC OP through ESC O[.</li> <li>• <b>LINUX</b>—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate ESC [[A through ESC [[E.</li> <li>• <b>XTERMR6</b>—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate <b>ESC OP</b> through <b>ESC OS</b>, which are the sequences produced by the top row of the keypad on Digital terminals.</li> <li>• <b>SCO</b>—The function keys F1 to F12 generate ESC [M through ESC [X. The function and shift keys generate ESC [Y through ESC [j. The control and function keys generate ESC [k through ESC [v. The shift, control and function keys generate ESC [w through ESC [{.</li> <li>• <b>ESCN</b>—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as ESC [11~ and ESC [12~.</li> <li>• <b>VT400</b>—The function keys behave like the default mode. The top row of the numeric keypad generates ESC OP through ESC OS.</li> </ul>
<b>Redirection After BIOS POST</b>	<p>Whether BIOS console redirection should be active after BIOS POST is complete and control given to the OS bootloader. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>—</b>BIOS Legacy console redirection is active during the OS boot and run time.</li> <li>• <b>Bootloader</b>—BIOS Legacy console redirection is disabled before giving control to the OS boot loader.</li> </ul>

### LOM and PCIe Slots Configuration Parameters

Name	Description
<b>All Onboard LOM Ports</b>	Whether all LOM ports are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—All LOM ports are disabled.</li> <li>• <b>Enabled</b>—All LOM ports are enabled.</li> </ul>
<b>LOM Port <i>n</i> OptionROM</b>	Whether Option ROM is available on the LOM port designated by <i>n</i> . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Option ROM is not available on LOM port <i>n</i>.</li> <li>• <b>Enabled</b>—Option ROM is available on LOM port <i>n</i>.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>All PCIe Slots OptionROM</b>	Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—PCIe Option ROMs are not available.</li> <li>• <b>Enabled</b>—PCIe Option ROMs are available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Slot:<i>n</i> OptionROM</b>	Whether PCIe expansion slot <i>n</i> is available to the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>

Name	Description
<b>PCIe Slot:<i>n</i> Link Speed</b>	<p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>GEN1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>GEN2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>GEN3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>Disabled</b>—The maximum speed is not restricted.</li> </ul> <p>For example, if you have a 3<sup>rd</sup> 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 <b>GEN2</b>. 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.</p>

## Server Management BIOS Parameters for C22 and C24 Servers

Name	Description
<b>FRB-2 Timer</b>	<p>Whether the FRB2 timer is used by CIMC to recover the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The FRB2 timer is not used.</li> <li>• <b>Enabled</b>—The FRB2 timer is started during POST and used to recover the system if necessary.</li> </ul>
<b>OS Watchdog Timer</b>	<p>Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The watchdog timer is not used to track how long the server takes to boot.</li> <li>• <b>Enabled</b>—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified</li> </ul>



Name	Description
<b>OS Watchdog Timer Timeout</b>	<p>What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 20 minutes after the OS begins to boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>
<b>OS Watchdog Timer Policy</b>	<p>What action the system takes if the watchdog timer expires. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The server takes no action if the watchdog timer expires during OS boot.</li> <li>• —The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>Reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>

Name	Description
<b>Boot Order Rules</b>	<p>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.</p> <p>The supported device types are:</p> <ul style="list-style-type: none"> <li>• <b>HDD</b>—Hard disk drive</li> <li>• <b>FDD</b>—Floppy disk drive</li> <li>• <b>CDROM</b>—Bootable CD-ROM or DVD</li> <li>• <b>PXE</b>—PXE boot</li> <li>• <b>EFI</b>—Extensible Firmware Interface</li> </ul> <p>The Boot Order Rules option can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Strict</b>—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.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• <b>Loose</b>—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.</li> </ul> <p>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.</p>

## C220 and C240 Servers

### Main BIOS Parameters for C220 and C240 Servers

Name	Description
TPM Support	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not use the TPM.</li> <li>• <b>Enabled</b>—The server uses the TPM.</li> </ul> <p><b>Note</b> We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

### Advanced BIOS Parameters for C220 and C240 Servers

#### Processor Configuration Parameters

Name	Description
Intel Hyper-Threading Technology	<p>Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>Enabled</b>—The processor allows for the parallel execution of multiple threads.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

Name	Description
<b>Number of Enabled Cores</b>	<p>Allows you to disable one or more of the physical cores on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>All</b>—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores.</li> <li>• <b>1 through <i>n</i></b>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core.</li> </ul> <p>To disable Hyper Threading and have only one logical processor core running on the server, select <b>1</b>.</p> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Execute Disable</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not classify memory areas.</li> <li>• <b>Enabled</b>—The processor classifies memory areas.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Intel VT</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit virtualization.</li> <li>• <b>Enabled</b>—The processor allows multiple operating systems in independent partitions.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>
<b>Intel VT-d</b>	<p>Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not use virtualization technology.</li> <li>• <b>Enabled</b>—The processor uses virtualization technology.</li> </ul>

Name	Description
<b>Intel VT-d Coherency Support</b>	<p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support coherency.</li> <li>• <b>Enabled</b>—The processor uses VT-d Coherency as required.</li> </ul>
<b>Intel VT-d ATS Support</b>	<p>Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support ATS.</li> <li>• <b>Enabled</b>—The processor uses VT-d ATS as required.</li> </ul>
<b>CPU Performance</b>	<p>Sets the CPU performance profile for the server. The performance profile consists of the following options:</p> <ul style="list-style-type: none"> <li>• Data Reuse Optimization</li> <li>• DCU Streamer Prefetcher</li> <li>• DCU IP Prefetcher</li> <li>• Hardware Prefetcher</li> <li>• Adjacent Cache-Line Prefetch</li> </ul> <p>This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enterprise</b>—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled.</li> <li>• —All options are enabled.</li> <li>• <b>HPC</b>—Data Reuse Optimization is disabled and all other options are enabled. This setting is also known as high performance computing.</li> <li>• <b>Custom</b>—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.</li> </ul>
<b>Hardware Prefetcher</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The hardware prefetcher is not used.</li> <li>• <b>Enabled</b>—The processor uses the hardware prefetcher when cache issues are detected.</li> </ul>

Name	Description
<b>Adjacent Cache Line Prefetcher</b>	<p>Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor only fetches the required line.</li> <li>• <b>Enabled</b>— The processor fetches both the required line and its paired line.</li> </ul>
<b>DCU Streamer Prefetch</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines.</li> <li>• <b>Enabled</b>—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.</li> </ul>
<b>DCU IP Prefetcher</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not preload any cache data.</li> <li>• <b>Enabled</b>—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> </ul>
<b>Direct Cache Access Support</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>Enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> </ul>

Name	Description
<b>Power Technology</b>	<p>Enables you to configure the CPU power management settings for the following options:</p> <ul style="list-style-type: none"> <li>• Enhanced Intel Speedstep Technology</li> <li>• Intel Turbo Boost Technology</li> <li>• Processor Power State C6</li> </ul> <p>Power Technology can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Custom</b>—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.</li> <li>• <b>Disabled</b>—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored.</li> <li>• —The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters.</li> </ul>
<b>Enhanced Intel Speedstep Technology</b>	<p>Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>Enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>

Name	Description
<b>Intel Turbo Boost Technology</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>Enabled</b>—The processor utilizes Turbo Boost Technology if required.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Processor Power State C6</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C6 report.</li> <li>• <b>Enabled</b>—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Processor Power State C1 Enhanced</b>	<p>Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The CPU continues to run at its maximum frequency in C1 state.</li> <li>• <b>Enabled</b>—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.</li> </ul>
<b>Frequency Floor Override</b>	<p>Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>— The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance.</li> <li>• <b>Enabled</b>— The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption.</li> </ul>



Name	Description
<b>P-STATE Coordination</b>	<p>Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification.</p> <ul style="list-style-type: none"> <li>• <b>HW_ALL</b>—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package).</li> <li>• <b>SW_ALL</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors.</li> <li>• <b>SW_ANY</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Energy Performance</b>	<p>Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p> <p>In addition, some operating systems, such as Windows 2008, ignore this parameter in favor of their own power plan.</p>

**Memory Configuration Parameters**

Name	Description
<b>Select Memory RAS</b>	<p>How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —System performance is optimized.</li> <li>• <b>Mirroring</b>—System reliability is optimized by using half the system memory as backup.</li> <li>• <b>Lockstep</b>—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. 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.</li> </ul>
<b>DRAM Clock Throttling</b>	<p>Allows you to determine whether memory bandwidth or system performance is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Balanced</b>—DRAM clock throttling is reduced, providing a balance between performance and power.</li> <li>• <b>Performance</b>—DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power.</li> <li>• —DRAM clock throttling is increased to improve energy efficiency.</li> </ul>
<b>NUMA</b>	<p>Whether the BIOS supports NUMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not support NUMA.</li> <li>• <b>Enabled</b>—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.</li> </ul>

Name	Description
<b>Low Voltage DDR Mode</b>	<p>Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low.</li> <li>• —The system prioritizes high frequency operations over low voltage operations.</li> </ul>
<b>DRAM Refresh rate</b>	<p>Allows you to set the rate at which the DRAM cells are refreshed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>1x</b>—DRAM cells are refreshed every 64ms.</li> <li>• <b>2x</b>—DRAM cells are refreshed every 32ms.</li> <li>• <b>3x</b>—DRAM cells are refreshed every 21ms.</li> <li>• <b>4x</b>—DRAM cells are refreshed every 16ms.</li> </ul>
<b>Channel Interleaving</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines what interleaving is done.</li> <li>• —Some channel interleaving is used.</li> <li>•</li> <li>•</li> <li>• —The maximum amount of channel interleaving is used.</li> </ul>
<b>Rank Interleaving</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines what interleaving is done.</li> <li>• —Some rank interleaving is used.</li> <li>•</li> <li>•</li> <li>• —The maximum amount of rank interleaving is used.</li> </ul>

Name	Description
<b>Patrol Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system checks for memory ECC errors only when the CPU reads or writes a memory address.</li> <li>• <b>Enabled</b>—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.</li> </ul>
<b>Demand Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>— Single bit memory errors are not corrected.</li> <li>• <b>Enabled</b>— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read.</li> </ul>
<b>Altitude</b>	<p>The approximate number of meters above sea level at which the physical server is installed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines the physical elevation.</li> <li>• —The server is approximately 300 meters above sea level.</li> <li>• —The server is approximately 900 meters above sea level.</li> <li>• —The server is approximately 1500 meters above sea level.</li> <li>• —The server is approximately 3000 meters above sea level.</li> </ul>

**QPI Configuration Parameters**

Name	Description
<b>QPI Link Frequency</b>	<p>The Intel QuickPath Interconnect (QPI) link frequency, in gigatransfers per second (GT/s). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines the QPI link frequency.</li> <li>•</li> <li>•</li> <li>•</li> </ul>

**Onboard Storage Parameters**

Name	Description
<b>Onboard SCU Storage Support</b>	<p>Whether the onboard software RAID controller is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The software RAID controller is not available.</li> <li>• <b>Enabled</b>—The software RAID controller is available.</li> </ul>

**USB Configuration Parameters**

Name	Description
<b>Legacy USB Support</b>	<p>Whether the system supports legacy USB devices. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—USB devices are only available to EFI applications.</li> <li>• <b>Enabled</b>—Legacy USB support is always available.</li> <li>• <b>Auto</b>—Disables legacy USB support if no USB devices are connected.</li> </ul>
<b>Port 60/64 Emulation</b>	<p>Whether the system supports 60h/64h emulation for complete USB keyboard legacy support. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—60h/64 emulation is not supported.</li> <li>• <b>Enabled</b>—60h/64 emulation is supported.</li> </ul> <p>You should select this option if you are using a non-USB aware operating system on the server.</p>

Name	Description
<b>All USB Devices</b>	Whether all physical and virtual USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—All USB devices are disabled.</li> <li>• <b>Enabled</b>—All USB devices are enabled.</li> </ul>
<b>USB Port: Rear</b>	Whether the rear panel USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: Front</b>	Whether the front panel USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: Internal</b>	Whether the internal USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: KVM</b>	Whether the KVM ports are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the KVM port. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the KVM ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: VMedia</b>	Whether the virtual media devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the vMedia devices.</li> <li>• <b>Enabled</b>—Enables the vMedia devices.</li> </ul>

Name	Description
<b>USB Port: SD Card</b>	<p>Whether the SD card drives are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the SD card drives. The SD card drives are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the SD card drives.</li> </ul>

### PCI Configuration Parameters

Name	Description
<b>Memory Mapped I/O Above 4GB</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>Enabled</b>—The server maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> </ul>
<b>ASPM Support</b>	<p>Allows you to set the level of ASPM (Active Power State Management) support in the BIOS. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—ASPM support is disabled in the BIOS.</li> <li>• <b>Force L0s</b>—Force all links to L0 standby (L0s) state.</li> <li>• <b>Auto</b>—The CPU determines the power state.</li> </ul>

Name	Description
VGA Priority	<p>Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Onboard</b>—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port.</li> <li>• <b>Offboard</b>—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port.</li> <li>• —Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled.</li> </ul> <p><b>Note</b> The vKVM does not function when the onboard VGA is disabled.</p>

### Serial Configuration Parameters

Name	Description
Console Redirection	<p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—No console redirection occurs during POST.</li> <li>• —Enables console redirection on COM port 0 during POST.</li> <li>• —Enables console redirection on COM port 1 during POST.</li> </ul>
Terminal Type	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>PC-ANSI</b>—The PC-ANSI terminal font is used.</li> <li>• <b>VT100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>VT100+</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>VT-UTF8</b>—A video terminal with the UTF-8 character set is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>



Name	Description
<b>Bits per second</b>	<p>What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>9600</b>—A 9,600 BAUD rate is used.</li> <li>• <b>19200</b>—A 19,200 BAUD rate is used.</li> <li>• <b>38400</b>—A 38,400 BAUD rate is used.</li> <li>• <b>57600</b>—A 57,600 BAUD rate is used.</li> <li>• <b>115200</b>—A 115,200 BAUD rate is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Flow Control</b>	<p>Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No flow control is used.</li> <li>• <b>—</b>RTS/CTS is used for flow control.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Putty KeyPad</b>	<p>Allows you to change the action of the PuTTY function keys and the top row of the numeric keypad. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>VT100</b>—The function keys generate ESC OP through ESC O[.</li> <li>• <b>LINUX</b>—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate ESC [[A through ESC [[E.</li> <li>• <b>XTERMR6</b>—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate ESC OP through ESC OS, which are the sequences produced by the top row of the keypad on Digital terminals.</li> <li>• <b>SCO</b>—The function keys F1 to F12 generate ESC [M through ESC [X. The function and shift keys generate ESC [Y through ESC [j. The control and function keys generate ESC [k through ESC [v. The shift, control and function keys generate ESC [w through ESC [{}.</li> <li>• <b>ESCN</b>—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as ESC [11~ and ESC [12~.</li> <li>• <b>VT400</b>—The function keys behave like the default mode. The top row of the numeric keypad generates ESC OP through ESC OS.</li> </ul>

Name	Description
<b>Redirection After BIOS POST</b>	<p>Whether BIOS console redirection should be active after BIOS POST is complete and control given to the OS bootloader. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —BIOS Legacy console redirection is active during the OS boot and run time.</li> <li>• <b>Bootloader</b>—BIOS Legacy console redirection is disabled before giving control to the OS boot loader.</li> </ul>

### LOM and PCIe Slots Configuration Parameters

Name	Description
<b>All Onboard LOM Ports</b>	<p>Whether all LOM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—All LOM ports are disabled.</li> <li>• <b>Enabled</b>—All LOM ports are enabled.</li> </ul>
<b>LOM Port <i>n</i> OptionROM</b>	<p>Whether Option ROM is available on the LOM port designated by <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>All PCIe Slots OptionROM</b>	<p>Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>

Name	Description
<b>PCIe Slot:<i>n</i> OptionROM</b>	<p>Whether PCIe expansion slot <i>n</i> is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Mezzanine OptionROM</b>	<p>Whether the PCIe mezzanine slot expansion ROM is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Slot:<i>n</i> Link Speed</b>	<p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>GEN1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>GEN2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>GEN3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>Disabled</b>—The maximum speed is not restricted.</li> </ul> <p>For example, if you have a 3<sup>rd</sup> 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 <b>GEN2</b>. 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.</p>

## Server Management BIOS Parameters for C220 and C240 Servers

Name	Description
<b>FRB-2 Timer</b>	<p>Whether the FRB2 timer is used by CIMC to recover the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The FRB2 timer is not used.</li> <li>• <b>Enabled</b>—The FRB2 timer is started during POST and used to recover the system if necessary.</li> </ul>

Name	Description
<b>OS Watchdog Timer</b>	<p>Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The watchdog timer is not used to track how long the server takes to boot.</li> <li>• <b>Enabled</b>—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified</li> </ul>
<b>OS Watchdog Timer Timeout</b>	<p>What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 20 minutes after the OS begins to boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>
<b>OS Watchdog Timer Policy</b>	<p>What action the system takes if the watchdog timer expires. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The server takes no action if the watchdog timer expires during OS boot.</li> <li>• —The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>Reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>

Name	Description
<b>Boot Order Rules</b>	<p>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.</p> <p>The supported device types are:</p> <ul style="list-style-type: none"> <li>• <b>HDD</b>—Hard disk drive</li> <li>• <b>FDD</b>—Floppy disk drive</li> <li>• <b>CDROM</b>—Bootable CD-ROM or DVD</li> <li>• <b>PXE</b>—PXE boot</li> <li>• <b>EFI</b>—Extensible Firmware Interface</li> </ul> <p>The Boot Order Rules option can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Strict</b>—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.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• <b>Loose</b>—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.</li> </ul> <p>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.</p>

## C260 Servers

### Main BIOS Parameters for C260 Servers

Name	Description
POST Error Pause	<p>What happens when the server encounters a critical error during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enabled</b>—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST.</li> <li>• <b>Disabled</b>—The BIOS continues to attempt to boot the server.</li> </ul>
Boot Option Retry	<p>Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enabled</b>—Continually retries NON-EFI based boot options without waiting for user input.</li> <li>• <b>Disabled</b>—Waits for user input before retrying NON-EFI based boot options.</li> </ul>

### Advanced BIOS Parameters for C260 Servers

#### Processor Configuration Parameters

Name	Description
Intel Turbo Boost Technology	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>Enabled</b>—The processor utilizes Turbo Boost Technology if required.</li> </ul>

Name	Description
<p><b>Enhanced Intel Speedstep Technology</b></p>	<p>Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>Enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<p><b>Intel Hyper-Threading Technology</b></p>	<p>Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>Enabled</b>—The processor allows for the parallel execution of multiple threads.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<p><b>Number of Enabled Cores</b></p>	<p>Allows you to disable one or more of the physical cores on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>All</b>—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores.</li> <li>• <b>1 through n</b>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core.</li> </ul> <p>To disable Hyper Threading and have only one logical processor core running on the server, select <b>1</b>.</p> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

Name	Description
<b>Execute Disable</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not classify memory areas.</li> <li>• <b>Enabled</b>—The processor classifies memory areas.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Intel Virtualization Technology</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit virtualization.</li> <li>• <b>Enabled</b>—The processor allows multiple operating systems in independent partitions.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>
<b>Intel VT for Directed IO</b>	<p>Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not use virtualization technology.</li> <li>• <b>Enabled</b>—The processor uses virtualization technology.</li> </ul>
<b>Intel VT-d Interrupt Remapping</b>	<p>Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support remapping.</li> <li>• <b>Enabled</b>—The processor uses VT-d Interrupt Remapping as required.</li> </ul>
<b>Intel VT-d Coherency Support</b>	<p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support coherency.</li> <li>• <b>Enabled</b>—The processor uses VT-d Coherency as required.</li> </ul>



Name	Description
<b>Intel VT-d Address Translation Services</b>	<p>Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support ATS.</li> <li>• <b>Enabled</b>—The processor uses VT-d ATS as required.</li> </ul>
<b>Intel VT-d PassThrough DMA</b>	<p>Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support pass-through DMA.</li> <li>• <b>Enabled</b>—The processor uses VT-d Pass-through DMA as required.</li> </ul>
<b>Direct Cache Access</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>Enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> </ul>
<b>Processor C3 Report</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C3 report.</li> <li>• —The BIOS sends the C3 report using the ACPI C2 format, allowing the OS to transition the processor to the C3 low power state.</li> <li>• —The BIOS sends the C3 report using the ACPI C3 format, allowing the OS to transition the processor to the C3 low power state.</li> </ul>

Name	Description
<b>Processor C6 Report</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C6 report.</li> <li>• <b>Enabled</b>—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state.</li> </ul>
<b>Package C State Limit</b>	<p>The amount of power available to the server components when they are idle. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —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.</li> <li>• —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.</li> <li>• —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.</li> <li>• —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.</li> <li>• —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.</li> <li>• —The server may enter any available C state.</li> </ul> <p><b>Note</b> This option is used only if <b>CPU C State</b> is enabled.</p>
<b>CPU C State</b>	<p>Whether the system can enter a power savings mode during idle periods. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system remains in high performance state even when idle.</li> <li>• <b>Enabled</b>—The system can reduce power to system components such as the DIMMs and CPUs. The amount of power reduction is specified .</li> </ul>

Name	Description
<b>C1E</b>	<p>Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The CPU continues to run at its maximum frequency in C1 state.</li> <li>• <b>Enabled</b>—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.</li> </ul> <p><b>Note</b> This option is used only if is enabled.</p>

### Memory Configuration Parameters

Name	Description
<b>Select Memory RAS</b>	<p>How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —System performance is optimized.</li> <li>• <b>Mirroring</b>—System reliability is optimized by using half the system memory as backup.</li> <li>• <b>Sparing</b>—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.</li> </ul>
<b>NUMA Optimized</b>	<p>Whether the BIOS supports NUMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not support NUMA.</li> <li>• <b>Enabled</b>—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.</li> </ul>

Name	Description
<b>Sparing Mode</b>	<p>The sparing mode used by the CIMC. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The spared memory is allocated at the rank level.</li> <li>• <b>DIMM Sparing</b>—The spared memory is allocated at the DIMM level.</li> </ul> <p><b>Note</b> This option is used only if is set to <b>Sparing</b>.</p>
<b>Mirroring Mode</b>	<p>Mirroring is supported across Integrated Memory Controllers (IMCs) where one memory riser is mirrored with another. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Intersocket</b>—Each IMC is mirrored across two sockets.</li> <li>• <b>Intrsocket</b>—One IMC is mirrored with another IMC in the same socket.</li> </ul> <p><b>Note</b> This option is used only if is set to <b>Mirroring</b>.</p>
<b>DRAM Refresh rate</b>	<p>Allows you to set the rate at which the DRAM cells are refreshed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>1x</b>—DRAM cells are refreshed every 64ms.</li> <li>• <b>2x</b>—DRAM cells are refreshed every 32ms.</li> <li>• <b>3x</b>—DRAM cells are refreshed every 21ms.</li> <li>• <b>4x</b>—DRAM cells are refreshed every 16ms.</li> </ul>
<b>Patrol Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system checks for memory ECC errors only when the CPU reads or writes a memory address.</li> <li>• <b>Enabled</b>—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.</li> </ul>

Name	Description
<b>Patrol Scrub Interval</b>	<p>Controls the time interval between each patrol scrub memory access. A lower interval scrubs the memory more often but requires more memory bandwidth.</p> <p>Select a value between 5 and 23. The default value is 8.</p> <p><b>Note</b> This option is used only if <b>Patrol Scrub</b> is enabled.</p>
<b>CKE Low Policy</b>	<p>Controls the DIMM power savings mode policy. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—DIMMs do not enter power saving mode.</li> <li>• <b>Slow</b>—DIMMs can enter power saving mode, but the requirements are higher. Therefore, DIMMs enter power saving mode less frequently.</li> <li>• <b>Fast</b>—DIMMs enter power saving mode as often as possible.</li> <li>• <b>Auto</b>—The BIOS controls when a DIMM enters power saving mode based on the DIMM configuration.</li> </ul>

#### Serial Port Configuration Parameters

Name	Description
<b>Serial A Enable</b>	<p>Whether serial port A is enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The serial port is disabled.</li> <li>• <b>Enabled</b>—The serial port is enabled.</li> </ul>

#### USB Configuration Parameters

Name	Description
<b>Make Device Non-Bootable</b>	<p>Whether the server can boot from a USB device. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server can boot from a USB device.</li> <li>• <b>Enabled</b>—The server cannot boot from a USB device.</li> </ul>

## PCI Configuration Parameters

Name	Description
<b>Memory Mapped I/O Above 4GB</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>Enabled</b>—The server maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> </ul>
<b>Onboard NIC <i>n</i> ROM</b>	<p>Whether the system loads the embedded PXE option ROM for the onboard NIC designated by <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—PXE option ROM is not available for NIC <i>n</i>.</li> <li>• <b>Enabled</b>—PXE option ROM is available for NIC <i>n</i>.</li> </ul>
<b>PCIe OptionROMs</b>	<p>Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—PCIe Option ROMs are not available.</li> <li>• <b>Enabled</b>—PCIe Option ROMs are available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Slot <i>n</i> ROM</b>	<p>Whether PCIe expansion slot <i>n</i> is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>Onboard Gbit LOM</b>	<p>Whether Gbit LOM is enabled or disabled on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Gbit LOM is not available.</li> <li>• <b>Enabled</b>—10Gbit LOM is available.</li> </ul>

Name	Description
<b>Onboard 10Gbit LOM</b>	<p>Whether 10Gbit LOM is enabled or disabled on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—10Gbit LOM is not available.</li> <li>• <b>Enabled</b>—10Gbit LOM is available.</li> </ul>
<b>Sriov</b>	<p>Whether SR-IOV (Single Root I/O Virtualization) is enabled or disabled on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—SR-IOV is disabled.</li> <li>• <b>Enabled</b>—SR-IOV is enabled.</li> </ul>
<b>IOH Resource Allocation</b>	<p>Enables you to distribute 64KB of 16-bit IO resources between IOH0 and IOH1 as per system requirement. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>IOH0 24k IOH1 40k</b>— Allocates 24KB of 16-bit IO resources to IOH0 and 40KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 32k IOH1 32k</b>— Allocates 32KB of 16-bit IO resources to IOH0 and 32KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 40k IOH1 24k</b>— Allocates 40KB of 16-bit IO resources to IOH0 and 24KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 48k IOH1 16k</b>— Allocates 48KB of 16-bit IO resources to IOH0 and 16KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 56k IOH1 8k</b>— Allocates 56KB of 16-bit IO resources to IOH0 and 8KB of 16-bit IO resources to IOH1.</li> </ul>

## Server Management BIOS Parameters for C260 Servers

Name	Description
<b>Assert NMI on SERR</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not generate an NMI or log an error when a SERR occurs.</li> <li>• <b>Enabled</b>—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable .</li> </ul>
<b>Assert NMI on PERR</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not generate an NMI or log an error when a PERR occurs.</li> <li>• <b>Enabled</b>—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable to use this setting.</li> </ul>
<b>Console Redirection</b>	<p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—No console redirection occurs during POST.</li> <li>• <b>—</b>Enables console redirection on serial port A during POST.</li> </ul> <p><b>Note</b> If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.</p>
<b>Flow Control</b>	<p>Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No flow control is used.</li> <li>• <b>RTS-CTS</b>—RTS/CTS is used for flow control.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>



Name	Description
<b>Baud Rate</b>	<p>What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>9.6k</b>—A 9600 BAUD rate is used.</li> <li>• <b>19.2k</b>—A 19200 BAUD rate is used.</li> <li>• <b>38.4k</b>—A 38400 BAUD rate is used.</li> <li>• <b>57.6k</b>—A 57600 BAUD rate is used.</li> <li>• <b>115.2k</b>—A 115200 BAUD rate is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Terminal Type</b>	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>PC-ANSI</b>—The PC-ANSI terminal font is used.</li> <li>• <b>VT100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>VT100-PLUS</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>VT-UTF8</b>—A video terminal with the UTF-8 character set is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>OS Boot Watchdog Timer Timeout</b>	<p>What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 20 minutes after the OS begins to boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>

Name	Description
<b>OS Boot Watchdog Policy</b>	<p>What action the system takes if the watchdog timer expires. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>Reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>
<b>Legacy OS Redirection</b>	<p>Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The serial port enabled for console redirection is hidden from the legacy operating system.</li> <li>• <b>Enabled</b>—The serial port enabled for console redirection is visible to the legacy operating system.</li> </ul>
<b>OS Boot Watchdog Timer</b>	<p>Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The watchdog timer is not used to track how long the server takes to boot.</li> <li>• <b>Enabled</b>—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified</li> </ul>

# C420 Servers

## Main BIOS Parameters for C420 Servers

Name	Description
TPM Support	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not use the TPM.</li> <li>• <b>Enabled</b>—The server uses the TPM.</li> </ul> <p><b>Note</b> We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

## Advanced BIOS Parameters for C420 Servers

### Processor Configuration Parameters

Name	Description
Intel Hyper-Threading Technology	<p>Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>Enabled</b>—The processor allows for the parallel execution of multiple threads.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

Name	Description
<b>Number of Enabled Cores</b>	<p>Allows you to disable one or more of the physical cores on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>All</b>—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores.</li> <li>• <b>1 through n</b>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core.</li> </ul> <p>To disable Hyper Threading and have only one logical processor core running on the server, select <b>1</b>.</p> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Execute Disable</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not classify memory areas.</li> <li>• <b>Enabled</b>—The processor classifies memory areas.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Intel VT</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit virtualization.</li> <li>• <b>Enabled</b>—The processor allows multiple operating systems in independent partitions.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>
<b>Intel VT-d</b>	<p>Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not use virtualization technology.</li> <li>• <b>Enabled</b>—The processor uses virtualization technology.</li> </ul>

Name	Description
<b>Intel VT-d Coherency Support</b>	<p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support coherency.</li> <li>• <b>Enabled</b>—The processor uses VT-d Coherency as required.</li> </ul>
<b>Intel VT-d ATS Support</b>	<p>Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support ATS.</li> <li>• <b>Enabled</b>—The processor uses VT-d ATS as required.</li> </ul>
<b>CPU Performance</b>	<p>Sets the CPU performance profile for the server. The performance profile consists of the following options:</p> <ul style="list-style-type: none"> <li>• Data Reuse Optimization</li> <li>• DCU Streamer Prefetcher</li> <li>• DCU IP Prefetcher</li> <li>• Hardware Prefetcher</li> <li>• Adjacent Cache-Line Prefetch</li> </ul> <p>This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enterprise</b>—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled.</li> <li>• —All options are enabled.</li> <li>• <b>HPC</b>—Data Reuse Optimization is disabled and all other options are enabled. This setting is also known as high performance computing.</li> <li>• <b>Custom</b>—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.</li> </ul>
<b>Hardware Prefetcher</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The hardware prefetcher is not used.</li> <li>• <b>Enabled</b>—The processor uses the hardware prefetcher when cache issues are detected.</li> </ul>

Name	Description
<b>Adjacent Cache Line Prefetcher</b>	<p>Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor only fetches the required line.</li> <li>• <b>Enabled</b>— The processor fetches both the required line and its paired line.</li> </ul>
<b>DCU Streamer Prefetch</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines.</li> <li>• <b>Enabled</b>—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.</li> </ul>
<b>DCU IP Prefetcher</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not preload any cache data.</li> <li>• <b>Enabled</b>—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> </ul>
<b>Direct Cache Access Support</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>Enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> </ul>

Name	Description
<p><b>Power Technology</b></p>	<p>Enables you to configure the CPU power management settings for the following options:</p> <ul style="list-style-type: none"> <li>• Enhanced Intel Speedstep Technology</li> <li>• Intel Turbo Boost Technology</li> <li>• Processor Power State C6</li> </ul> <p>Power Technology can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Custom</b>—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.</li> <li>• <b>Disabled</b>—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored.</li> <li>• —The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters.</li> </ul>
<p><b>Enhanced Intel Speedstep Technology</b></p>	<p>Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>Enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>

Name	Description
<b>Intel Turbo Boost Technology</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>Enabled</b>—The processor utilizes Turbo Boost Technology if required.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Processor Power State C6</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C6 report.</li> <li>• <b>Enabled</b>—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<b>Processor Power State C1 Enhanced</b>	<p>Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The CPU continues to run at its maximum frequency in C1 state.</li> <li>• <b>Enabled</b>—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.</li> </ul>
<b>Frequency Floor Override</b>	<p>Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>— The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance.</li> <li>• <b>Enabled</b>— The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption.</li> </ul>



Name	Description
<p><b>P-STATE Coordination</b></p>	<p>Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification.</p> <ul style="list-style-type: none"> <li>• <b>HW_ALL</b>—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package).</li> <li>• <b>SW_ALL</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors.</li> <li>• <b>SW_ANY</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain.</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<p><b>Energy Performance</b></p>	<p>Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul> <p><b>Note</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p> <p>In addition, some operating systems, such as Windows 2008, ignore this parameter in favor of their own power plan.</p>

**Memory Configuration Parameters**

Name	Description
<b>Select Memory RAS</b>	<p>How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —System performance is optimized.</li> <li>• <b>Mirroring</b>—System reliability is optimized by using half the system memory as backup.</li> <li>• <b>Lockstep</b>—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. 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.</li> </ul>
<b>DRAM Clock Throttling</b>	<p>Allows you to determine whether memory bandwidth or system performance is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Balanced</b>— DRAM clock throttling is reduced, providing a balance between performance and power.</li> <li>• <b>Performance</b>—DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power.</li> <li>• —DRAM clock throttling is increased to improve energy efficiency.</li> </ul>
<b>NUMA</b>	<p>Whether the BIOS supports NUMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not support NUMA.</li> <li>• <b>Enabled</b>—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.</li> </ul>

Name	Description
<b>Low Voltage DDR Mode</b>	<p>Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low.</li> <li>• —The system prioritizes high frequency operations over low voltage operations.</li> </ul>
<b>DRAM Refresh rate</b>	<p>Allows you to set the rate at which the DRAM cells are refreshed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>1x</b>—DRAM cells are refreshed every 64ms.</li> <li>• <b>2x</b>—DRAM cells are refreshed every 32ms.</li> <li>• <b>3x</b>—DRAM cells are refreshed every 21ms.</li> <li>• <b>4x</b>—DRAM cells are refreshed every 16ms.</li> </ul>
<b>Channel Interleaving</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines what interleaving is done.</li> <li>• —Some channel interleaving is used.</li> <li>•</li> <li>•</li> <li>• —The maximum amount of channel interleaving is used.</li> </ul>
<b>Rank Interleaving</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines what interleaving is done.</li> <li>• —Some rank interleaving is used.</li> <li>•</li> <li>•</li> <li>• —The maximum amount of rank interleaving is used.</li> </ul>

Name	Description
<b>Patrol Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system checks for memory ECC errors only when the CPU reads or writes a memory address.</li> <li>• <b>Enabled</b>—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.</li> </ul>
<b>Demand Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>— Single bit memory errors are not corrected.</li> <li>• <b>Enabled</b>— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read.</li> </ul>
<b>Altitude</b>	<p>The approximate number of meters above sea level at which the physical server is installed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines the physical elevation.</li> <li>• —The server is approximately 300 meters above sea level.</li> <li>• —The server is approximately 900 meters above sea level.</li> <li>• —The server is approximately 1500 meters above sea level.</li> <li>• —The server is approximately 3000 meters above sea level.</li> </ul>

**QPI Configuration Parameters**

Name	Description
<b>QPI Link Frequency</b>	<p>The Intel QuickPath Interconnect (QPI) link frequency, in gigatransfers per second (GT/s). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b>—The CPU determines the QPI link frequency.</li> <li>•</li> <li>•</li> <li>•</li> </ul>

**USB Configuration Parameters**

Name	Description
<b>Legacy USB Support</b>	<p>Whether the system supports legacy USB devices. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—USB devices are only available to EFI applications.</li> <li>• <b>Enabled</b>—Legacy USB support is always available.</li> <li>• <b>Auto</b>—Disables legacy USB support if no USB devices are connected.</li> </ul>
<b>All USB Devices</b>	<p>Whether all physical and virtual USB devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—All USB devices are disabled.</li> <li>• <b>Enabled</b>—All USB devices are enabled.</li> </ul>
<b>USB Port: Rear</b>	<p>Whether the rear panel USB devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: Front</b>	<p>Whether the front panel USB devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>

Name	Description
<b>USB Port: Internal</b>	<p>Whether the internal USB devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: KVM</b>	<p>Whether the KVM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the KVM port. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the KVM ports. Devices connected to these ports are detected by the BIOS and operating system.</li> </ul>
<b>USB Port: VMedia</b>	<p>Whether the virtual media devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the vMedia devices.</li> <li>• <b>Enabled</b>—Enables the vMedia devices.</li> </ul>
<b>USB Port: SD Card</b>	<p>Whether the SD card drives are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Disables the SD card drives. The SD card drives are not detected by the BIOS and operating system.</li> <li>• <b>Enabled</b>—Enables the SD card drives.</li> </ul>

### PCI Configuration Parameters

Name	Description
<b>MMIO Above 4GB</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>Enabled</b>—The server maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> </ul>

Name	Description
<b>ASPM Support</b>	<p>Allows you to set the level of ASPM (Active Power State Management) support in the BIOS. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—ASPM support is disabled in the BIOS.</li> <li>• <b>Force L0s</b>—Force all links to L0 standby (L0s) state.</li> <li>• <b>Auto</b>—The CPU determines the power state.</li> </ul>
<b>VGA Priority</b>	<p>Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Onboard</b>—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port.</li> <li>• <b>Offboard</b>—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port.</li> <li>• <b>—</b>Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled.</li> </ul> <p><b>Note</b> The vKVM does not function when the onboard VGA is disabled.</p>

### Serial Configuration Parameters

Name	Description
<b>Console Redirection</b>	<p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—No console redirection occurs during POST.</li> <li>• <b>Enabled</b>—Enables console redirection on serial port A during POST.</li> </ul>

Name	Description
<b>Terminal Type</b>	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>PC-ANSI</b>—The PC-ANSI terminal font is used.</li> <li>• <b>VT100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>VT100+</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>VT-UTF8</b>—A video terminal with the UTF-8 character set is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Bits per second</b>	<p>What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>9600</b>—A 9,600 BAUD rate is used.</li> <li>• <b>19200</b>—A 19,200 BAUD rate is used.</li> <li>• <b>38400</b>—A 38,400 BAUD rate is used.</li> <li>• <b>57600</b>—A 57,600 BAUD rate is used.</li> <li>• <b>115200</b>—A 115,200 BAUD rate is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Flow Control</b>	<p>Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No flow control is used.</li> <li>• <b>—</b>RTS/CTS is used for flow control.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>



Name	Description
<b>Putty KeyPad</b>	<p>Allows you to change the action of the PuTTY function keys and the top row of the numeric keypad. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>VT100</b>—The function keys generate ESC OP through ESC O[.</li> <li>• <b>LINUX</b>—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate ESC [[A through ESC [[E.</li> <li>• <b>XTERMR6</b>—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate <b>ESC OP</b> through ESC OS, which are the sequences produced by the top row of the keypad on Digital terminals.</li> <li>• <b>SCO</b>—The function keys F1 to F12 generate ESC [M through ESC [X. The function and shift keys generate ESC [Y through ESC [j. The control and function keys generate ESC [k through ESC [v. The shift, control and function keys generate ESC [w through ESC [f.</li> <li>• <b>ESCN</b>—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as ESC [11~ and ESC [12~.</li> <li>• <b>VT400</b>—The function keys behave like the default mode. The top row of the numeric keypad generates ESC OP through ESC OS.</li> </ul>
<b>Redirection After BIOS POST</b>	<p>Whether BIOS console redirection should be active after BIOS POST is complete and control given to the OS bootloader. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —BIOS Legacy console redirection is active during the OS boot and run time.</li> <li>• <b>Bootloader</b>—BIOS Legacy console redirection is disabled before giving control to the OS boot loader.</li> </ul>

**LOM and PCIe Slots Configuration Parameters**

Name	Description
<b>All Onboard LOM Ports</b>	<p>Whether all LOM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—All LOM ports are disabled.</li> <li>• <b>Enabled</b>—All LOM ports are enabled.</li> </ul>

Name	Description
<b>LOM Port <i>n</i> OptionROM</b>	<p>Whether Option ROM is available on the LOM port designated by <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Option ROM is not available on LOM port <i>n</i>.</li> <li>• <b>Enabled</b>—Option ROM is available on LOM port <i>n</i>.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>All PCIe Slots OptionROM</b>	<p>Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—PCIe Option ROMs are not available.</li> <li>• <b>Enabled</b>—PCIe Option ROMs are available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Slot:<i>n</i> OptionROM</b>	<p>Whether PCIe expansion slot <i>n</i> is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Slot:<i>n</i> Link Speed</b>	<p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>GEN1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>GEN2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>GEN3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>Disabled</b>—The maximum speed is not restricted.</li> </ul> <p>For example, if you have a 3<sup>rd</sup> 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 <b>GEN2</b>. 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.</p>

## Server Management BIOS Parameters for C420 Servers

Name	Description
<b>FRB-2 Timer</b>	<p>Whether the FRB2 timer is used by CIMC to recover the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The FRB2 timer is not used.</li> <li>• <b>Enabled</b>—The FRB2 timer is started during POST and used to recover the system if necessary.</li> </ul>
<b>OS Watchdog Timer</b>	<p>Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The watchdog timer is not used to track how long the server takes to boot.</li> <li>• <b>Enabled</b>—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified</li> </ul>
<b>OS Watchdog Timer Timeout</b>	<p>What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 20 minutes after the OS begins to boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>
<b>OS Watchdog Timer Policy</b>	<p>What action the system takes if the watchdog timer expires. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The server takes no action if the watchdog timer expires during OS boot.</li> <li>• —The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>Reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>

Name	Description
<b>Boot Order Rules</b>	<p>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.</p> <p>The supported device types are:</p> <ul style="list-style-type: none"> <li>• <b>HDD</b>—Hard disk drive</li> <li>• <b>FDD</b>—Floppy disk drive</li> <li>• <b>CDROM</b>—Bootable CD-ROM or DVD</li> <li>• <b>PXE</b>—PXE boot</li> <li>• <b>EFI</b>—Extensible Firmware Interface</li> </ul> <p>The Boot Order Rules option can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Strict</b>—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.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• <b>Loose</b>—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.</li> </ul> <p>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.</p>

# C460 Servers

## Main BIOS Parameters for C460 Servers

Name	Description
<b>POST Error Pause</b>	<p>What happens when the server encounters a critical error during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enabled</b>—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST.</li> <li>• <b>Disabled</b>—The BIOS continues to attempt to boot the server.</li> </ul>
<b>Boot Option Retry</b>	<p>Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Enabled</b>—Continually retries NON-EFI based boot options without waiting for user input.</li> <li>• <b>Disabled</b>—Waits for user input before retrying NON-EFI based boot options.</li> </ul>

## Advanced BIOS Parameters for C460 Servers

### Processor Configuration Parameters

Name	Description
<b>Intel Turbo Boost Technology</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>Enabled</b>—The processor utilizes Turbo Boost Technology if required.</li> </ul>

Name	Description
<b>Enhanced Intel Speedstep Technology</b>	<p>Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>Enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Intel Hyper-Threading Technology</b>	<p>Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>Enabled</b>—The processor allows for the parallel execution of multiple threads.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Number of Enabled Cores</b>	<p>Allows you to disable one or more of the physical cores on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>All</b>—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores.</li> <li>• <b>1 through <i>n</i></b>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core.</li> </ul> <p>To disable Hyper Threading and have only one logical processor core running on the server, select <b>1</b>.</p> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>

Name	Description
<b>Execute Disable</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not classify memory areas.</li> <li>• <b>Enabled</b>—The processor classifies memory areas.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Intel Virtualization Technology</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not permit virtualization.</li> <li>• <b>Enabled</b>—The processor allows multiple operating systems in independent partitions.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>
<b>Intel VT for Directed IO</b>	<p>Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not use virtualization technology.</li> <li>• <b>Enabled</b>—The processor uses virtualization technology.</li> </ul>
<b>Intel VT-d Interrupt Remapping</b>	<p>Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support remapping.</li> <li>• <b>Enabled</b>—The processor uses VT-d Interrupt Remapping as required.</li> </ul>
<b>Intel VT-d Coherency Support</b>	<p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support coherency.</li> <li>• <b>Enabled</b>—The processor uses VT-d Coherency as required.</li> </ul>

Name	Description
<b>Intel VT-d Address Translation Services</b>	<p>Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support ATS.</li> <li>• <b>Enabled</b>—The processor uses VT-d ATS as required.</li> </ul>
<b>Intel VT-d PassThrough DMA</b>	<p>Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The processor does not support pass-through DMA.</li> <li>• <b>Enabled</b>—The processor uses VT-d Pass-through DMA as required.</li> </ul>
<b>Direct Cache Access</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>Enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> </ul>
<b>Processor C3 Report</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C3 report.</li> <li>• —The BIOS sends the C3 report using the ACPI C2 format, allowing the OS to transition the processor to the C3 low power state.</li> <li>• —The BIOS sends the C3 report using the ACPI C3 format, allowing the OS to transition the processor to the C3 low power state.</li> </ul>



Name	Description
<b>Processor C6 Report</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not send the C6 report.</li> <li>• <b>Enabled</b>—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state.</li> </ul>
<b>Package C State Limit</b>	<p>The amount of power available to the server components when they are idle. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —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.</li> <li>• —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.</li> <li>• —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.</li> <li>• —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.</li> <li>• —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.</li> <li>• —The server may enter any available C state.</li> </ul> <p><b>Note</b> This option is used only if <b>CPU C State</b> is enabled.</p>
<b>CPU C State</b>	<p>Whether the system can enter a power savings mode during idle periods. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system remains in high performance state even when idle.</li> <li>• <b>Enabled</b>—The system can reduce power to system components such as the DIMMs and CPUs. The amount of power reduction is specified .</li> </ul>

Name	Description
<b>C1E</b>	<p>Whether the CPU transitions to its minimum frequency when entering the C1 state. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The CPU continues to run at its maximum frequency in C1 state.</li> <li>• <b>Enabled</b>—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state.</li> </ul> <p><b>Note</b> This option is used only if is enabled.</p>

### Memory Configuration Parameters

Name	Description
<b>Select Memory RAS</b>	<p>How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —System performance is optimized.</li> <li>• <b>Mirroring</b>—System reliability is optimized by using half the system memory as backup.</li> <li>• <b>Sparing</b>—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.</li> </ul>
<b>NUMA Optimized</b>	<p>Whether the BIOS supports NUMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not support NUMA.</li> <li>• <b>Enabled</b>—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.</li> </ul>

Name	Description
<b>Sparing Mode</b>	<p>The sparing mode used by the CIMC. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The spared memory is allocated at the rank level.</li> <li>• <b>DIMM Sparing</b>—The spared memory is allocated at the DIMM level.</li> </ul> <p><b>Note</b> This option is used only if is set to <b>Sparing</b>.</p>
<b>Mirroring Mode</b>	<p>Mirroring is supported across Integrated Memory Controllers (IMCs) where one memory riser is mirrored with another. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Intersocket</b>—Each IMC is mirrored across two sockets.</li> <li>• <b>Intrsocket</b>—One IMC is mirrored with another IMC in the same socket.</li> </ul> <p><b>Note</b> This option is used only if is set to <b>Mirroring</b>.</p>
<b>Patrol Scrub</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The system checks for memory ECC errors only when the CPU reads or writes a memory address.</li> <li>• <b>Enabled</b>—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.</li> </ul>
<b>Patrol Scrub Interval</b>	<p>Controls the time interval between each patrol scrub memory access. A lower interval scrubs the memory more often but requires more memory bandwidth.</p> <p>Select a value between 5 and 23. The default value is 8.</p> <p><b>Note</b> This option is used only if <b>Patrol Scrub</b> is enabled.</p>

Name	Description
<b>CKE Low Policy</b>	<p>Controls the DIMM power savings mode policy. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—DIMMs do not enter power saving mode.</li> <li>• <b>Slow</b>—DIMMs can enter power saving mode, but the requirements are higher. Therefore, DIMMs enter power saving mode less frequently.</li> <li>• <b>Fast</b>—DIMMs enter power saving mode as often as possible.</li> <li>• <b>Auto</b>—The BIOS controls when a DIMM enters power saving mode based on the DIMM configuration.</li> </ul>

#### Serial Port Configuration Parameters

Name	Description
<b>Serial A Enable</b>	<p>Whether serial port A is enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The serial port is disabled.</li> <li>• <b>Enabled</b>—The serial port is enabled.</li> </ul>

#### USB Configuration Parameters

Name	Description
<b>Make Device Non-Bootable</b>	<p>Whether the server can boot from a USB device. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server can boot from a USB device.</li> <li>• <b>Enabled</b>—The server cannot boot from a USB device.</li> </ul>

## PCI Configuration Parameters

Name	Description
<b>Memory Mapped I/O Above 4GB</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>Enabled</b>—The server maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> </ul>
<b>Onboard NIC <i>n</i> ROM</b>	<p>Whether the system loads the embedded PXE option ROM for the onboard NIC designated by <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—PXE option ROM is not available for NIC <i>n</i>.</li> <li>• <b>Enabled</b>—PXE option ROM is available for NIC <i>n</i>.</li> </ul>
<b>PCIe OptionROMs</b>	<p>Whether the server can use the PCIe Option ROM expansion slots. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—PCIe Option ROMs are not available.</li> <li>• <b>Enabled</b>—PCIe Option ROMs are available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>PCIe Slot <i>n</i> ROM</b>	<p>Whether PCIe expansion slot <i>n</i> is available to the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The expansion slot <i>n</i> is not available.</li> <li>• <b>Enabled</b>—The expansion slot <i>n</i> is available.</li> <li>• —The expansion slot <i>n</i> is available for UEFI only.</li> <li>• —The expansion slot <i>n</i> is available for legacy only.</li> </ul>
<b>Onboard Gbit LOM</b>	<p>Whether Gbit LOM is enabled or disabled on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Gbit LOM is not available.</li> <li>• <b>Enabled</b>—10Git LOM is available.</li> </ul>

Name	Description
<b>Onboard 10Gbit LOM</b>	Whether 10Gbit LOM is enabled or disabled on the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—10Gbit LOM is not available.</li> <li>• <b>Enabled</b>—10Gbit LOM is available.</li> </ul>
<b>Sriov</b>	Whether SR-IOV (Single Root I/O Virtualization) is enabled or disabled on the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Disabled</b>—SR-IOV is disabled.</li> <li>• <b>Enabled</b>—SR-IOV is enabled.</li> </ul>
<b>IOH Resource Allocation</b>	Enables you to distribute 64KB of 16-bit IO resources between IOH0 and IOH1 as per system requirement. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>IOH0 24k IOH1 40k</b>— Allocates 24KB of 16-bit IO resources to IOH0 and 40KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 32k IOH1 32k</b>— Allocates 32KB of 16-bit IO resources to IOH0 and 32KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 40k IOH1 24k</b>— Allocates 40KB of 16-bit IO resources to IOH0 and 24KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 48k IOH1 16k</b>— Allocates 48KB of 16-bit IO resources to IOH0 and 16KB of 16-bit IO resources to IOH1.</li> <li>• <b>IOH0 56k IOH1 8k</b>— Allocates 56KB of 16-bit IO resources to IOH0 and 8KB of 16-bit IO resources to IOH1.</li> </ul>

## Server Management BIOS Parameters for C460 Servers

Name	Description
<b>Assert NMI on SERR</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not generate an NMI or log an error when a SERR occurs.</li> <li>• <b>Enabled</b>—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable .</li> </ul>
<b>Assert NMI on PERR</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The BIOS does not generate an NMI or log an error when a PERR occurs.</li> <li>• <b>Enabled</b>—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable to use this setting.</li> </ul>
<b>Console Redirection</b>	<p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—No console redirection occurs during POST.</li> <li>• —Enables console redirection on serial port A during POST.</li> </ul> <p><b>Note</b> If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.</p>
<b>Flow Control</b>	<p>Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>None</b>—No flow control is used.</li> <li>• <b>RTS-CTS</b>—RTS/CTS is used for flow control.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>

Name	Description
<b>Baud Rate</b>	<p>What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>9.6k</b>—A 9600 BAUD rate is used.</li> <li>• <b>19.2k</b>—A 19200 BAUD rate is used.</li> <li>• <b>38.4k</b>—A 38400 BAUD rate is used.</li> <li>• <b>57.6k</b>—A 57600 BAUD rate is used.</li> <li>• <b>115.2k</b>—A 115200 BAUD rate is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>Terminal Type</b>	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>PC-ANSI</b>—The PC-ANSI terminal font is used.</li> <li>• <b>VT100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>VT100-PLUS</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>VT-UTF8</b>—A video terminal with the UTF-8 character set is used.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<b>OS Boot Watchdog Timer Timeout</b>	<p>What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• —The watchdog timer expires 20 minutes after the OS begins to boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>



Name	Description
<b>OS Boot Watchdog Policy</b>	<p>What action the system takes if the watchdog timer expires. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• —The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>Reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> </ul> <p><b>Note</b> This option is only applicable if you enable the OS Boot Watchdog Timer.</p>
<b>Legacy OS Redirection</b>	<p>Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The serial port enabled for console redirection is hidden from the legacy operating system.</li> <li>• <b>Enabled</b>—The serial port enabled for console redirection is visible to the legacy operating system.</li> </ul>
<b>OS Boot Watchdog Timer</b>	<p>Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—The watchdog timer is not used to track how long the server takes to boot.</li> <li>• <b>Enabled</b>—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified</li> </ul>





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