



Cisco UCS C-Series Integrated Management Controller GUI Configuration Guide, Release 4.0

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Preface

This preface includes the following sections:

- [Audience, on page xv](#)
- [Conventions, on page xv](#)
- [Related Cisco UCS Documentation, on page xvii](#)

Audience

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

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

Conventions

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

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



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



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



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



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



Warning IMPORTANT SAFETY INSTRUCTIONS

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

SAVE THESE INSTRUCTIONS

Related Cisco UCS Documentation

Documentation Roadmaps

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

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

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

Other Documentation Resources

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, on page 1](#)
- [Overview of the Server Software, on page 1](#)
- [Server Ports, on page 2](#)
- [Cisco Integrated Management Controller, on page 3](#)
- [Overview of the Cisco IMC User Interface, on page 4](#)

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

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

- Cisco UCS C125 Rack-Mount Server
- Cisco UCS C220 M5 Rack-Mount Server
- Cisco UCS C240 M5 Rack-Mount Server
- Cisco UCS C480 M5 Rack-Mount Server
- Cisco UCS C220 M4 Rack-Mount Server
- Cisco UCS C240 M4 Rack-Mount Server
- Cisco UCS C460 M4 Rack-Mount Server



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

Overview of the Server Software

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

Cisco IMC Firmware

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

Server OS

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



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

Server Ports

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

Table 1: Server Ports

| Port Name | Port Number |
|---------------------------|-------------|
| LDAP Port 1 | 389 |
| LDAP Port 2 | 389 |
| LDAP Port 3 | 389 |
| LDAP Port 4 | 3268 |
| LDAP Port 5 | 3268 |
| LDAP Port 6 | 3268 |
| SSH Port | 22 |
| HTTP Port | 80 |
| HTTPS Port | 443 |
| SMTP Port | 25 |
| KVM Port | 2068 |
| Andromeda Management Port | 8889 |
| Andromeda Cloud Port | 8888 |
| SOL SSH Port | 2400 |

| Port Name | Port Number |
|-----------------|-------------|
| SNMP Port | 161 |
| SNMP Traps | 162 |
| External Syslog | 514 |

Cisco Integrated Management Controller

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



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

Management Interfaces

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

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

Tasks You Can Perform in Cisco IMC

You can use Cisco IMC to perform the following chassis 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, IPMI Over LAN, and SNMP
- Manage certificates
- Configure platform event filters

- Update Cisco IMC firmware
- Monitor faults, alarms, and server status
- Set time zone and view local time
- Install and activate Cisco IMC firmware
- Install and activate BIOS firmware
- Install and activate CMC firmware

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

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

No Operating System or Application Provisioning or Management

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

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

Overview of the Cisco IMC User Interface

The Cisco IMC user interface is a web-based management interface for Cisco C-Series servers. The web user interface is developed using HTML5 with the eXtensible Widget Framework (XWT) framework. You can launch the user interface and manage the server from any remote host that meets the following minimum requirements:

- Microsoft Internet Explorer 6.0 or higher, Mozilla Firefox 3.0 or higher
- Microsoft Windows 7, Microsoft Windows XP, Microsoft Windows Vista, Apple Mac OS X v10.6, Red Hat Enterprise Linux 5.0 or higher operating systems
- Transport Layer Security (TLS) version 1.3



Note In case you lose or forget the password that you use to log in to Cisco IMC, see the password recovery instructions in the Cisco UCS C-Series server installation and service guide for your server. This guide is available from the *Cisco UCS C-Series Servers Documentation Roadmap* at <http://www.cisco.com/go/unifiedcomputing/c-series-doc>.

Cisco IMC Home Page

When you first log into Cisco IMC GUI, the user interface looks similar to the following illustration:



Note There may be user interface changes, which do not have functionality impact, from release to release.

The screenshot shows the Cisco IMC GUI interface for a Cisco Integrated Management Controller (Cisco IMC). The page title is "Cisco Integrated Management Controller" and the user is logged in as "admin@10.127.142.45 - C220-FC". The breadcrumb navigation is "Home / Chassis / Summary".

Server Properties:

- Product Name: UCS C220 M4S
- Serial Number: FCH1919V0HL
- PID: UCSC-C220-M4S
- UUID: 87E9178F-1913-49D4-8DB1-C049A74F0F3D
- BIOS Version: C220M4.3.0.0.10.1026161022
- Description:
- Asset Tag:

Cisco Integrated Management Controller (Cisco IMC) Information:

- Hostname: C220-FCH1919V0HL
- IP Address: 10.104.236.249
- MAC Address: 54:A2:74:CC:08:13
- Firmware Version: 3.0(0.357)
- Current Time (UTC): Tue Nov 2 23:14:06 2021
- Local Time: Tue Nov 2 23:14:06 2021 UTC +0000
- Timezone: UTC [Select Timezone](#)

Chassis Status:

- Power State: ● On
- Overall Server Status: ✔ Good
- Temperature: ✔ Good
- Overall DIMM Status: ✔ Good
- Power Supplies: ✔ Good
- Fans: ✔ Good
- Locator LED: ● Off
- Overall Storage Status: ✔ Good

Server Utilization:

- Overall Utilization (%): N/A
- CPU Utilization (%): N/A
- Memory Utilization (%): N/A
- IO Utilization (%): N/A

At the bottom right of the page, there is a "Save Changes" button.

Navigation and Work Panes

The Cisco Integrated Management Controller GUI comprises the **Navigation** pane on the left hand side of the screen and the **Work** pane on the right hand side of the screen. Clicking links on the **Chassis**, **Compute**, **Networking**, **Storage** or **Admin** menu in the **Navigation** pane displays the associated tabs in the pane on the right.

The **Navigation** pane header displays action buttons that allow you to view the navigation map of the entire GUI, view the index, or select a favorite work pane to go to, directly. The **Pin** icon prevents the **Navigation** pane from sliding in once the **Work** pane displays.

The **Favorite** icon is a star shaped button which allows you to make any specific work pane in the application as your favorite. To do this, navigate to the work pane of your choice and click the **Favorite** icon. To access this work pane directly from anywhere else in the application, click the **Favorite** icon again.

The GUI header displays information about the overall status of the chassis and user login information.

On the right of the GUI header is a gear icon. Click on the gear icon and the drop-down lists the **Change Password** and **Logout** options. You can use the change password option to change your password.



Note When you change your password you will be logged out of Cisco IMC.



Note **Change Password** option is not available when you login as an admin, you can only change the password of the configured users with read-only user privileges.

When you change your password you will be logged out of Cisco IMC.

The Logout option allows you to log out of Cisco IMC.

The GUI header also displays the total number of faults (indicated in green or red), with a **Bell** icon next to it. However, clicking this icon displays the summary of only the critical and major faults of various components. To view all the faults, click the **View All** button to display the **Fault Summary** pane.



Note User interface options may vary depending on the server.

The **Navigation** pane has the following menus:

- **Chassis** Menu
- **Compute** Menu
- **Networking** Menu
- **Storage** Menu
- **Admin** Menu

Chassis Menu

Each node in the **Chassis** menu leads to one or more tabs (except for **Summary** pane) that display in the **Work** pane. These tabs provides access to the following information:

| Chassis Menu Node Name | Work Pane Provide Information About... |
|-------------------------|---|
| Summary | Server properties, Chassis status, Cisco Integrated Management Controller (Cisco IMC) information, and Server Utilization. Note Server Utilization is available on some Cisco UCS C-Series servers. |
| Inventory | CPU, memory, PCI adapters, power supplies, cisco VIC adapters, network adapters, storage, SAS expander, and TPM. |
| Sensors | Power Supply, Fan, Temperature, Voltage, Current, LEDs, and Storage. |
| Power Management | Power Cap Configuration and Power Monitoring. Note This option is not available for Cisco UCS C125 servers. |
| Faults and Logs | Fault summary, Fault history, System Event Log, Cisco IMC Log, and logging controls. |

Compute Menu

The **Compute** menu contains information about the server, and the following information is displayed in the **Work** pane.

| Compute Menu Node Name | Work Pane Tabs Provide Information About... |
|------------------------------|---|
| BIOS | The installed BIOS firmware version and BIOS profile configuration, server boot order configuration, I/O, Server management, Security, Processor, Memory, Power or Performance. |
| Remote Management | Virtual KVM, Virtual Media, and Serial over LAN. |
| Troubleshooting | Bootstrap Process Recording Actions include Play Recording and Download Recording, and Crash Recording Actions include Play Recording, Capture Recording, and Download Recording. |
| Power Policies | Power restore policy settings. |
| PID Catalog | CPU, memory, PCI adapters, and the HDD details. |
| Secure Key Management | Details of KMIP Servers, KMIP Root CA and Client Certificate details, KMIP login details, KMIP Client Private key status |

Networking Menu

Each node in the **Networking** menu leads to one or more tabs that display in the **Work** pane. These tabs provides access to the following information:

| Networking Menu Node Name | Work Pane Tabs Provide Information About... |
|---------------------------|--|
| General | Adapter card properties, firmware, external ethernet interfaces, and actions to export or import configurations, and reset status. |

| Networking Menu Node Name | Work Pane Tabs Provide Information About... |
|------------------------------|---|
| External Ethernet Interfaces | External ethernet interfaces information such as port, admin speed, MAC address, link state. |
| vNICs | Host ethernet interfaces information such as name, CDN, MAC address, MTU and individual vNIC properties. |
| vHBAs | Host fibre channel interfaces information such as name, WWPN, WWNN, boot, uplink, port profile, channel number, and individual vHBA properties. |

Storage Menu

Each node in the **Storage** menu corresponds to the LSI MegaRAID controllers or Host Bus Adapters (HBA) that are installed in the Cisco UCS C-Series Rack-Mount Servers. Each node leads to one or more tabs that display in the **Work** pane and provide information about the installed controllers.

| Storage Menu Node Name | Work Pane Tabs Provide Information About... |
|------------------------|---|
| Controller Info | General information about the selected LSI MegaRAID controller or HBA. |
| Physical Drive Info | General drive information, RAID information, and physical drive information. |
| Virtual Drive Info | General information about virtual drives, RAID information, and physical drives information |
| Battery Backup Unit | Backup battery information for the selected MegaRAID controller. |
| Storage Log | Storage messages. |

Admin Menu

Each node in the **Admin** menu leads to one or more tabs that display in the **Work** pane. These tabs provides access to the following information:

| Admin Menu Node Name | Work Pane Tabs Provide Information About... |
|------------------------|--|
| User Management | Local User Management, LDAP, and Session Management. |
| Networking | Network, Network Security, and NTP Setting. |
| Communication Services | Communication Services tab includes HTTP, SSH, XML API, Redfish Properties, IPMI over LAN Properties, SNMP tab includes SNMP Properties, User Settings, and Trap Destinations, and Mail Alert tab includes SNTTP Properties and SMTP Recipients. |
| Security Management | Certificate Management and Security Configuration. |
| Event Management | List of Platform Event Filters |
| Firmware Management | Cisco IMC and BIOS firmware information and management. |

| Admin Menu Node Name | Work Pane Tabs Provide Information About... |
|----------------------|---|
| Utilities | Technical support data collection export to remote and local download, system configuration import and export options, Generate to NMI host, restore factory defaults settings, add or update Cisco IMC Banner, generate inventory data, export hard inventory data to remote, upload PID catalog, enable or disable secure adapter update. |
| Device Connector | Intersight management and network settings. |

Toolbar

The toolbar displays above the **Work** pane.

| Button Name | Description |
|-------------|--|
| Refresh | Refreshes the current page. |
| Host Power | Displays the drop-down menu for you to choose power options. |
| Launch KVM | Launches the Launch KVM pop-up window. Displays the drop-down menu to launch the Java based or HTML based KVM console. |
| Ping | Launches the Ping Details pop-up window. |
| Reboot | Enables you to reboot Cisco IMC. |
| Locator LED | Allows you to turn on or turn off the locator LED. |

Cisco Integrated Management Controller Online Help Overview

The GUI for the Cisco Integrated Management Controller (Cisco IMC) software is divided into two main sections, a **Navigation** pane on the left and a **Work** pane on the right.

This help system describes the fields on each Cisco IMC GUI page and in each dialog box.

To access the page help, do one of the following:

- In a particular tab in the Cisco IMC GUI, click the **Help** icon in the toolbar above the **Work** pane.
- In a dialog box, click the **Help** button in that dialog box.



Note 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>.

Logging into Cisco IMC

Procedure

Step 1 In your web browser, type or select the web link for Cisco IMC.

Step 2 If a security dialog box displays, do the following:

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

Step 3 In the log in window, enter your username and password.

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

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

- You cannot perform any operation until you change default admin credentials on the Cisco IMC Web UI.
- You cannot close or cancel the password change pop-up window and opening it in a tab or refreshing the browser page will continue to display the pop-up window. This pop-up window appears when you login after a factory reset.
- You cannot choose the word 'password' as your new password. If this creates problems for any scripts you may be running, you could change it to password by logging back into the user management options, but this is ENTIRELY at your own risk. It is not recommended by Cisco.

Step 4 Click **Log In**.

Logging out of Cisco IMC

Procedure

Step 1 In the upper right of Cisco IMC, click the gear icon and click **Log Out** from the drop-down list.

Logging out returns you to the Cisco IMC log in page.

Step 2 (Optional) Log back in or close your web browser.



CHAPTER 2

Installing the Server OS

This chapter includes the following sections:

- [OS Installation Methods, on page 11](#)
- [Virtual KVM Console, on page 11](#)
- [PXE Installation Servers, on page 13](#)
- [Booting an Operating System from a USB Port, on page 14](#)

OS Installation Methods

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

- KVM console
- PXE installation server

For more information on Cisco UCS Server Configuration Utility, see [Cisco UCS Server Configuration Utility Quick Start Guide](#).

Virtual KVM Console

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

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

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

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

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

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

Installing an OS Using the KVM Console



Note This procedure describes only the basic installation steps. Detailed guides for installing Linux, VMware, and Windows can be found at this URL: http://www.cisco.com/en/US/products/ps10493/products_installation_and_configuration_guides_list.html.

Before you begin

- Locate the OS installation disk or disk image file.
- You must log in as a user with admin privileges to install an OS.

Procedure

- Step 1** Load the OS installation disk into your CD/DVD drive, or copy the disk image files to your computer.
- Step 2** If Cisco IMC is not open, log in.
- Step 3** In the **Navigation** pane, click the **Compute** menu.
- Step 4** In the **Compute** menu, select a server.
- Step 5** In the work pane, click the **Remote Management** tab.
- Step 6** In the **Remote Management** pane, click the **Virtual KVM** tab.
- Step 7** In the **Actions** area, click **Launch KVM Console**.
- The **KVM Console** opens in a separate window.
- Step 8** From the KVM console, click the **VM** tab.
- Step 9** In the **VM** tab, map the virtual media using either of the following methods:
- Check the **Mapped** check box for the CD/DVD drive containing the OS installation disk.
 - Click **Add Image**, navigate to and select the OS installation disk image, click **Open** to mount the disk image, and then check the **Mapped** check box for the mounted disk image.

Note You must keep the **VM** tab open during the OS installation process. Closing the tab unmaps all virtual media.

Step 10 Reboot the server and select the virtual CD/DVD drive as the boot device.

When the server reboots, it begins the installation process from the virtual CD/DVD drive. Refer to the installation guide for the OS being installed to guide you through the rest of the installation process.

What to do next

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

<https://ucsheltool.cloudapps.cisco.com/public/>

PXE Installation Servers

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

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



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

Installing an OS Using a PXE Installation Server

Before you begin

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

Procedure

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

Step 2 Reboot the server.

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

What to do next

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

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

Booting an Operating System from a USB Port

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

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

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

http://www.cisco.com/en/US/products/ps10493/prod_installation_guides_list.html.

- After you boot the OS from the USB port, you must set the second-level boot order so that the server boots from that USB source every time.



CHAPTER 3

Managing Chassis

This chapter includes the following sections:

- [Chassis Summary, on page 15](#)
- [Chassis Inventory, on page 18](#)

Chassis Summary

Viewing Chassis Summary

By default when you log on to the Cisco UCS C-Series rack-mount server, the **Summary** pane of the Chassis is displayed in the Web UI. You can also view the Chassis summary when in another tab or working area, by completing the following steps:

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Summary**.
- Step 3** In the **Server Properties** area of the **Chassis Summary** pane, review the following information:

| Name | Description |
|----------------------------|---|
| Product Name field | The model name of the server. |
| Serial Number field | The serial number for the server. |
| PID field | The product ID. |
| UUID field | The UUID assigned to the server. |
| BIOS version field | The version of the BIOS running on the server. |
| Slot ID | Slot ID of the node in the enclosure. Note This field is available only on some C-Series servers. |
| Description field | A user-defined description for the server. |

| Name | Description |
|-----------------|---|
| Asset Tag field | A user-defined tag for the server. By default, the asset tag for a new server displays Unknown . |

Step 4 In the **Cisco IMC Information** area of the **Chassis Summary** pane, review the following information:

| Name | Description |
|------------------------|---|
| Hostname field | A user-defined hostname for the Cisco IMC. By default, the hostname appears in CXXX-YYYYYY format, where XXX is the model number and YYYYYY is the serial number of the server. |
| IP Address field | The IP address for the Cisco IMC. |
| MAC Address field | The MAC address assigned to the active network interface to the Cisco IMC. |
| Firmware Version field | The current Cisco IMC firmware version. |
| Current Time field | The current date and time according to the Cisco IMC clock. Note Cisco IMC gets the current date and time from the server BIOS when the NTP is disabled. When NTP is enabled, Cisco IMC gets the current time and date from the NTP server. 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. |
| Local Time field | The local time of the region according to the chosen time zone. |
| Timezone field | Allows you to select a time zone by clicking on the Select Timezone option. In the Select Timezone pop-up screen, mouse over the map and click on the location to select your time zone or choose your time zone from the Timezone drop-down menu. |

Step 5 In the **Chassis Status** area of the **Chassis Summary** pane, review the following information:

| Name | Description |
|-----------------------------|---|
| Power State field | The current power state. |
| Overall Server Status field | The overall status of the server. This can be one of the following: <ul style="list-style-type: none"> • Memory Test In Progress—The server is performing a self-test of the installed memory. This condition normally occurs during the boot process. • Good • Moderate Fault • Severe Fault |

| Name | Description |
|-------------------------------------|--|
| Temperature field | <p>The temperature status. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Fault • Severe Fault <p>You can click the link in this field to view more temperature information.</p> |
| Overall DIMM Status field | <p>The overall status of the memory modules. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Fault • Severe Fault <p>You can click the link in this field to view detailed status information.</p> |
| Power Supplies field | <p>The overall status of the power supplies. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Fault • Severe Fault <p>You can click the link in this field to view detailed status information.</p> |
| Fans field | <p>The overall status of the power supplies. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Fault • Severe Fault <p>You can click the link in this field to view detailed status information.</p> |
| Locator LED field | Whether the locator LEDs are on or off. |
| Front Locator LED field | <p>Whether the front panel locator LED on the chassis is on or off.</p> <p>Note This option is available only on some UCS C-Series servers.</p> |
| Overall Storage Status field | <p>The overall status of all controllers. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Moderate Fault • Severe Fault |

- Step 6** In the **Server Utilization** area of the **Chassis Summary** pane, review the following information in a graphical representation:

| Name | Description |
|--------------------------------------|---|
| Overall Utilization (%) field | The overall realtime utilization of CPU, memory, and IO (input and output) of the system in percentage. |
| CPU Utilization (%) field | The CPU or computation utilization of the system on all the available CPUs in percentage. |
| Memory Utilization (%) field | The memory utilization of the system on all the available memory (DIMM) channels in percentage. |
| IO Utilization (%) field | The IO resource utilization of the system in percentage. |

Chassis Inventory

Viewing Power Supply Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **Power Supplies** tab and review the following information for each power supply:

| Name | Description |
|--------------------------|---|
| Device ID column | The identifier for the power supply unit. |
| Status column | The status of the power supply unit. |
| Input column | The input into the power supply, in watts. |
| Output column | The maximum output from the power supply, in watts. |
| FW Version column | The firmware version for the power supply. |
| Product ID column | The product identifier for the power supply assigned by the vendor. |

Viewing Cisco VIC Adapter Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **Cisco VIC Adapters** tab and review the following high level information:

| Name | Description |
|---------------------------------|---|
| Slot Number column | The PCI slot in which the adapter is installed. |
| Serial Number column | The serial number for the adapter. |
| Product ID column | The product ID for the adapter. |
| Cisco IMC Enabled column | Whether the adapter is able to manage Cisco IMC. This functionality depends on the type of adapter installed and how it is configured. For details, see the hardware installation guide for the type of server you are using. |
| Description column | Description of the adapter. |

Viewing SAS Expander Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **SAS Expander** tab and review the following information:

| Name | Description |
|--|---|
| ID column | The product ID of the expander. |
| Name column | The name of the expander. |
| Firmware Version column | The firmware version the expander uses. |
| Secondary Firmware Version column | The secondary firmware version of the expander. |

| Name | Description |
|-----------------------------|--|
| Server Up Link Speed column | Up link speed received with the LSI RAID Controller. Note This is available only on some C-Series servers. |

Enabling 6G or 12G Mixed Mode on a SAS Expander

You can enable or disable a 6 gigabyte or 12 gigabyte mixed mode speed support for a card using this option, which is a toggle button.



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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** working area, click the **SAS Expander** tab.
- Step 4** In the **SAS Expander** working area, click **Enable 6G-12G Mixed Mode**.
- Step 5** (Optional) Click **Disable 6g-12G Mixed Mode** to disable the feature.

Viewing Storage Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **Storage** tab and review the following information:

| Name | Description |
|----------------------------|---|
| Controller field | PCIe slot in which the controller drive is located. |
| PCI Slot field | The name of the PCIe slot in which the controller drive is located. |
| Product Name field | Name of the controller. |
| Serial Number field | The serial number of the storage controller. |

| Name | Description |
|-------------------------------------|---|
| Firmware Package Build field | The active firmware package version number. |
| Product ID field | Product ID of the controller. |
| Battery Status field | Status of the battery. |
| Cache Memory Size field | The size of the cache memory, in megabytes. |
| Health field | The health of the controller firmware status. |

Viewing Network Adapter Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **Network Adapters** tab and review the following information:

| Name | Description |
|-------------------------------------|--|
| Slot column | The slot in which the adapter is installed. |
| Product Name column | The product name for the adapter. |
| Number of Interfaces column | The number of interfaces for the adapter. |
| External Ethernet Interfaces | ID —The ID for the external ethernet interface. MAC Address —The MAC address for the external ethernet interface. |

Viewing GPU Inventory

The GPU Inventory option is available only on some C-Series servers.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **GPU Inventory** tab and review the following information:

| Name | Description |
|----------------|-------------------------------------|
| Slot | Slot in which the GPU is installed. |
| Product Name | Name of the GPU. |
| Number of GPUs | Number of GPUs present in the slot. |

Viewing PCI Switch Info

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** work pane, click the **PCI Switch Info** tab and review the following information:

| Name | Description |
|------------------------|---|
| Controller column | PCI Slot in which the controller is present. |
| Controller Type column | Type of PCI switch present in the slot. |
| Product Name column | Name of the PCI switch. |
| Manufacturer column | Manufacture of the PCI switch. |
| Vendor ID column | The switch ID assigned by the vendor. |
| Sub Vendor ID column | The secondary switch ID assigned by the vendor. |
| Device ID column | The device ID assigned by the vendor. |
| Sub Device ID column | The secondary device ID assigned by the vendor. |



CHAPTER 4

Managing the Server

This chapter includes the following sections:

- [Server Boot Order, on page 23](#)
- [Configuring Power Policies, on page 36](#)
- [Configuring DIMM Blacklisting, on page 52](#)
- [Enabling DIMM Black Listing, on page 53](#)
- [Configuring BIOS Settings, on page 53](#)
- [BIOS Profiles, on page 55](#)
- [Setting Dynamic Front Panel Temperature Threshold, on page 58](#)
- [Persistent Memory Modules, on page 59](#)

Server Boot Order

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

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



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

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

**Important**

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

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

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

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

OR

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

**Note**

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

**Note**

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

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

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

**Important**

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

Configuring the Precision Boot Order

Before you begin

You must log in as a user with admin privileges to configure server the boot order.

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **BIOS** tab, click the **Configure Boot Order** tab.
- Step 3** In the **BIOS Properties** area, click **Configure Boot Order** at the bottom of the page. **Configure Boot Order** dialog box is displayed.
- Step 4** In the **Configure Boot Order** dialog box, update the following properties:

Basic Tab

| Name | Description |
|---------------------------|--|
| Device Types table | The server boot options. You can select one or more of the following: <ul style="list-style-type: none"> • HDD—Hard disk drive • FDD—Floppy disk drive • CDROM—Bootable CD-ROM or DVD • PXE—PXE boot • EFI—Extensible Firmware Interface |
| >> | Moves the selected device type to the Boot Order table. |
| << | Removes the selected device type from the Boot Order table. |
| Boot Order table | Displays the device types from which this server can boot, in the order in which the boot will be attempted. |
| Down | Moves the selected device type to a higher priority in the Boot Order table. |
| Up | Moves the selected device type to a higher priority in the Boot Order table. |
| Save Changes | Click this button to save the changes made. |
| Close button | Closes the dialog box without saving any changes and the existing configuration is applied when the server is rebooted. |

Advanced Tab

The following list of links are displayed under **Add Boot Device** pane.

- **Add Local HDD**

- **Add PXE Boot**
- **Add SAN Boot**
- **Add iSCSI Boot**
- **Add USB**
- **Add Virtual Media**
- **Add PCHStorage**
- **Add UEFISHELL**
- **Add NVME**

In the **Advanced Boot Order Configuration** pane, the devices are displayed after they are added. You can perform the following actions by selecting the appropriate buttons:

- **Enable or Disable**
- **Modify**
- **Delete**
- **Clone**
- **Re-Apply**
- **Move Up**
- **Move Down**

Step 5 Click **Save Changes**.

Additional device types might be appended to the actual boot order, depending on what devices you have connected to your server.

What to do next

Reboot the server to boot with your new boot order.

Managing a Boot Device

Before you begin

You must log in as a user with admin privileges to add device type to the server boot order.

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **BIOS** tab, click the **Configure Boot Order** tab.
- Step 3** In the **BIOS Properties** area, click **Configure Boot Order**.

A dialog box with boot order instructions appears.

Step 4 In the **Configure Boot Order** dialog box, from the **Add Boot Device** table, choose the device that you want to add to the boot order.

To add the local HDD device, click **Add Local HDD**, and update the following parameters:

| Name | Description |
|-----------------------------|---|
| Name field | The name of the device. Note Once created, you cannot rename the device. |
| State drop-down list | The visibility of the device by BIOS. This can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Slot field | The slot in which the device is installed. Enter the slot number from the available range. |
| Add Device button | Adds the device to the Boot Order table. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the PXE device, click **Add PXE**, and update the following parameters:

| Name | Description |
|-----------------------------|--|
| Name field | The name of the device. This name cannot be changed after the device has been created. |
| State drop-down list | The visibility of the device by BIOS. The state can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| MAC Address | MAC address of the network ethernet interface. Note This option is available only on some C-Series servers. |

| Name | Description |
|------------|--|
| Slot field | The slot in which the device is installed. Enter the slot number from the available range. |
| Port field | The port of the slot in which the device is present. Enter a number between 0 and 255. |

To add the SAN boot device, click **Add SAN Boot**, and update the following parameters:

| Name | Description |
|----------------------|--|
| Name field | The name of the device. This name cannot be changed after the device has been created. |
| State drop-down list | The visibility of the device by BIOS. The state can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Slot field | The slot in which the device is installed. Enter the slot number from the available range. |
| LUN field | Logical unit in a slot where the device is present. Enter a number between 0 and 255. |
| Save Changes button | Adds the device to the Boot Order table, and saves the changes. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the iSCSI boot device, click **Add iSCSI Boot**, and update the following parameters:

| Name | Description |
|----------------------|--|
| Name field | The name of the device. This name cannot be changed after the device has been created. |
| State drop-down list | The visibility of the device by BIOS. The state can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |

| Name | Description |
|----------------------------|---|
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Slot field | The slot in which the device is installed. Enter the slot number from the available range. |
| Port field | The port of the slot in which the device is present. Enter a number between 0 and 255. Note In case of a VIC card, use a vNIC instance instead of the port number. |
| Save Changes button | Adds the device to the Boot Order table, and saves the changes. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the SD card, click **Add SD Card**, and update the following parameters:

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

| Name | Description |
|-----------------------------|---|
| Name field | The name of the device. This name cannot be changed after the device has been created. |
| State drop-down list | The visibility of the device by BIOS. This can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Save Changes button | Adds the device to the Boot Order table. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the USB device, click **Add USB**, and update the following parameters:

| Name | Description |
|-------------------|---|
| Name field | The name of the device. This name cannot be changed after the device has been created. |

| Name | Description |
|--------------------------------|---|
| Sub Type drop-down list | The subdevice type under a certain device type. This can be one of the following: <ul style="list-style-type: none"> • CD • FDD • HDD |
| State drop-down list | The visibility of the device by BIOS. This can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Save Changes button | Adds the device to the Boot Order table. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the virtual media, click **Virtual Media**, and update the following parameters:

| Name | Description |
|--------------------------------|---|
| Name field | The name of the device. This name cannot be changed after the device has been created. |
| Sub Type drop-down list | The subdevice type under a certain device type. This could be any one of the following: <ul style="list-style-type: none"> • KVM Mapped DVD • Cisco IMC Mapped DVD • KVM Mapped HDD • Cisco IMC Mapped HDD • KVM Mapped FDD |
| State drop-down list | The visibility of the device by BIOS. The state can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |

| Name | Description |
|----------------------------|---|
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Save Changes button | Adds the device to the Boot Order table. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the PCH storage device, click **PCH Storage**, and update the following parameters:

| Name | Description |
|-----------------------------|--|
| Name field | The name of the device. This name cannot be changed after the device has been created. |
| State drop-down list | The visibility of the device by BIOS. This can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| LUN field | Logical unit in a slot where the device is present. <ul style="list-style-type: none"> • Enter a number between 0 and 255 • SATA in AHCI mode—Enter a value between 1 and 10 • SATA in SWRAID mode—Enter 0 for SATA , and enter 1 for SATA <p>Note SATA mode is available only on some UCS C-Series servers.</p> |
| Save Changes button | Adds the device to the Boot Order table. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

To add the UEFI shell device, click **Add UEFI Shell**, and update the following parameters:

| Name | Description |
|-------------------|---|
| Name field | The name of the device. This name cannot be changed after the device has been created. |

| Name | Description |
|----------------------|--|
| State drop-down list | The visibility of the device by BIOS. The state can be one of the following: <ul style="list-style-type: none"> • Enabled—The device is visible to BIOS in a boot order configuration. • Disabled—The device is not visible to BIOS in a boot order configuration. |
| Order field | The order of the device in the available list of devices. Enter between 1 and n, where n is the number of devices. |
| Add Device button | Adds the device to the Boot Order table. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

Overview to UEFI Secure Boot

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



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



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

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

UEFI secure boot is supported on the following components:

| Components | Types |
|------------------------------|---|
| Supported OS | <ul style="list-style-type: none"> • Windows Server 2019 • Windows Server 2016 • ESX 6.7 • ESX 6.5 • ESXi 7.0 • Linux |
| Broadcom PCI adapters | <ul style="list-style-type: none"> • 5709 dual and quad port adapters • 57712 10GBASE-T adapter • 57810 CNA • 57712 SFP port |
| Intel PCI adapters | <ul style="list-style-type: none"> • i350 quad port adapter • X520 adapter • X540 adapter • LOM |
| QLogic PCI adapters | <ul style="list-style-type: none"> • 8362 dual port adapter • 2672 dual port adapter |
| Fusion-io | |
| LSI | <ul style="list-style-type: none"> • LSI MegaRAID SAS 9240-8i • LSI MegaRAID SAS 9220-8i • LSI MegaRAID SAS 9265CV-8i • LSI MegaRAID SAS 9285CV-8e • LSI MegaRAID SAS 9285CV-8e • LSI MegaRAID SAS 9266-8i • LSI SAS2008-8i mezz • LSI Nytro card |

Enabling UEFI Secure Boot

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **BIOS** tab.
- Step 3** In the **BIOS Properties** area of the **Configure Boot Order** tab, check **UEFI Secure Boot** checkbox.

Note If checked, the boot mode is set to UEFI secure boot. You cannot modify the **Configure Boot Mode** until UEFI secure boot option is disabled.

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

- Step 4** Click **Save Changes**.
-

What to do next

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

Disabling UEFI Secure Boot

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **BIOS** tab.
- Step 3** In the **BIOS Properties** area, uncheck the **UEFI Secure Boot** check box.
- Step 4** Click **Save Changes**.
-

What to do next

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

Viewing the Actual Server Boot Order

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **BIOS** tab, click the **Configure Boot Order** tab.
- Step 3** In the **BIOS Properties** area, click **Configure Boot Order**.

This area displays the boot order devices configured through Cisco IMC as well as the actual boot order used by the server BIOS.

The **Configured Boot Devices** section displays the boot order (**Basic** or **Advanced**) configured through Cisco IMC. If this configuration changes, Cisco IMC sends this boot order to BIOS the next time that server boots. The Basic configuration allows you to specify only the device type. The Advanced configuration allows you to configure the device with specific parameters such as slot, port and LUN.

To change the configured boot order, or to restore the previously configured boot order, administrators can click the **Configure Boot Order** button. To have these changes take effect immediately, reboot the server. You can verify the new boot order by refreshing the **BIOS** tab.

Note This information is only sent to BIOS the next time the server boots. Cisco IMC does not send the boot order information to BIOS again until the configuration changes.

The **Actual Boot Devices** section displays the boot order actually used by BIOS when the server last booted. 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. To override any manual changes, you can change the configured boot order through Cisco IMC and reboot the server.

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

Configuring a Server to Boot With a One-Time Boot Device

You can configure a server to boot from a particular device only for the next server boot, without disrupting the currently configured boot order. Once the server boots from the one time boot device, all its future reboots occur from the previously configured boot order.

Before you begin

You must log in as a user with admin privileges to configure server the boot order.

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **BIOS** tab, click the **Configure Boot Order** tab.

- Step 3** In the **BIOS Properties** area, select an option from the **Configured One Time Boot Device** drop-down.
- Note** The host boots to the one time boot device even when configured with a disabled advanced boot device.
-

Creating a Server Asset Tag

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Summary**.
- Step 3** In the **Server Properties** area, update the **Asset Tag** field.
- Step 4** Click **Save Changes**.
-

Configuring Power Policies

Power Capping



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

Power capping determines how server power consumption is actively managed. When you enable power capping option, the system monitors power consumption and maintains the power below the allocated power limit. If the server cannot maintain the power limit or cannot bring the platform power back to the specified power limit within the correction time, power capping performs actions that you specify in the **Action** field under the **Power Profile** area.

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



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

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

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

Setting Power Redundancy Policy

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **Power Supply** tab.
- Step 4** Review the following sensor properties for power supply:

Properties Area

| Name | Description |
|-------------------------|--|
| Redundancy Status field | The power supply redundancy status. |
| Redundancy Policy field | The power supply redundancy policy. This can be one of the following: <ul style="list-style-type: none"> • Non-Redundant - N, the available PSU output capacity, equals the number of PSUs installed, where PSU failure or grid failure is not supported. • N+1 - N, the available PSU output capacity, equals the number of PSUs installed minus 1 (N-1), where the single PSU failure is supported, but grid failure is not supported. • Grid - N, the available PSU output capacity, equals half the number of PSUs installed (N/2), where N PSU failure or grid failure is supported. This policy implies that the you have connected N number of PSUs to one feed and the other N number of PSUs to another feed. |

Enabling Power Characterization

You can enable power characterization only on some Cisco UCS C-Series servers.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Power Management**.
- Step 3** In the **Power Cap Configuration** tab, click the **Run Power Characterization** link.

A confirmation box appears that says the host is going to be either powered on or rebooted depending on the current power state. Review the message and click **OK** to close the dialog box.

You can verify the progress of the power characterization in the **Status** field. The status can be one of the following:

- **Not Run**—When power characterization has not been run at all since the factory reset.
- **Running**—When a power characterization process is in progress.
- **Completed Successfully**—When a power characterization has run successfully.
- **Using Defaults**—After running the power characterization, if the system fails to obtain the valid values, it uses default value as the recommended maximum and minimum power for power capping.

After power characterization action is performed, the platform power limit range is populated under the **Recommended Power Cap** area as a minimum and maximum power in watts.

Three values for power capping limits are displayed: **Minimum (Allow Throttling)**, **Minimum (Efficient)** and **Maximum**:

- **Minimum (Allow Throttling)** - This is the lower power limit for the chassis, when the CPU throttling is enabled.
Note You can use this minimum power limit value only when the **Allow Throttle** checkbox is enabled.
 - **Minimum (Efficient)** - This is the lower power limit for the chassis, when the CPU throttling is disabled.
 - **Maximum** - This is the upper power limit for the chassis.
-

Enabling Power Capping

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

Before you begin

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

Procedure

Step 1 In the **Navigation** pane, click the **Chassis** menu.

Step 2 In the **Chassis** menu, click **Power Management**.

Step 3 Check the **Power Capping** check box.

Note This is the global option to enable or disable power capping. You must enable this option if you want to configure power profile settings.

Step 4 Click **Save Changes**.

Power Profiles

You can configure multiple profiles and set the attributes. These profiles are configured by using either the web UI or CLI. In the web UI, the profiles are listed under the **Power Capping** area. In the CLI, the profiles are configured when you enter the **power-cap-config** command. You can configure the following power profiles for power capping feature:

- **Standard**—Enables you to set a power limit for the platform domain.
- **Advanced**—Enables you to set various attributes such as the power limiting policy, fail-safe power limiting policy, and the ambient temperature-based power limiting policy.

Configuring Standard Power Profiles Settings

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

Before you begin

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

Procedure

Step 1 In the **Navigation** pane, click the **Chassis** menu.

Step 2 In the **Chassis** menu, click **Power Management**.

Step 3 In the **Power Profiles** area, complete the following fields:

| Name | Description |
|--------------------------|---|
| Name field | The name of the profile selected to set the attributes for power capping. |
| Enable Profile check box | Enables the power profile for editing. |
| Allow Throttle check box | If checked, it forces the processor to use more aggressive power management mechanisms such as, CPU the throttling states (T-states) and memory bandwidth throttling to maintain the power limit, in addition to the regular internal mechanisms. |
| Correction Time field | The time in seconds in which the platform power should be brought back to the specified power limit before taking the action specified in the Action field. The range is from 1 and 600. This range varies depending on the server PSU value. Note The supported minimum correction time for all PSU models is 1 second, except for DPST-1400AB and DPST-1200DB PSU models for which the supported minimum correction time is 3 seconds. |
| Action drop-down list | The action to be performed if the specified power limit is not maintained within the correction time. <ul style="list-style-type: none"> • Alert—Logs the event to the Cisco IMC SEL. • Alert and Shutdown—Logs the event to the Cisco IMC SEL, and gracefully shuts down the host. |
| Power Limit check box | The power limit for the server. Enter power in watts within the range specified. |
| Set Hard Cap check box | If checked, ensure that no platform consumption occurs beyond the set power capping value. The platform power consumption is maintained at a safe offset margin below the configured power cap value. |

Step 4 Click **Save Changes**.

Configuring Advanced Power Profile Settings

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

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Power Management**.
- Step 3** From the **Power Profiles** table in the **Power Cap Configuration** tab, choose the **Advanced** profile. In addition to the standard profile settings, the **Domain Specific Power Limit**, **Safe Throttle Level**, and **Ambient Temperature Based Power Capping** areas are displayed.
- Step 4** In the **Domain Specific Power Limit** area, complete the following fields:

| Name | Description |
|-----------------------|---|
| CPU field | The power limit for the CPU. Enter power in watts within the range specified. |
| Memory field | The power limit for the memory. Enter power in watts within the range specified. Note This field is not available on servers with Intel® Optane™ DC persistent memory modules. |
| Platform field | The power limit for the platform. Enter power in watts within the range specified. |

- Step 5** In the **Suspend Period** area, click **Configure** to configure a suspend period for a specific time period and day.
- Step 6** In the **Safe Throttle Level** area, complete the following fields:

| Name | Description |
|-------------------------------|--|
| Failsafe Timeout field | The safe throttle policy that is applied when power capping is impacted due to internal faults such as missing power readings for platforms or CPUs. Enter value in seconds |
| Platform field | The throttling level for the platform. The range is from 0 to 100 percentage. |

- Step 7** In the **Ambient Temperature Based Power Capping** area, complete the following fields:

| Name | Description |
|------------------------------------|---|
| Platform Temp Trigger field | The inlet (front panel) temperature sensor value in Celsius. Note When the inlet temperature on the platform exceeds the specified limit, the system uses the thermal power value as the power capping limit. |
| Thermal Power Limit field | The power limit to be maintained in watts. |

Step 8 Click **Save Changes**.

Resetting Power Profiles to Default

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

Before you begin

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

Procedure

Step 1 In the **Navigation** pane, click the **Chassis** menu.

Step 2 In the **Chassis** menu, click **Power Management**.

Step 3 In the **Power Profiles** area, click the **Reset Profiles to Default** button.

Note This action resets all the power profile settings to factory default values and disables power capping.

Step 4 Click **Save Changes**.

Power Monitoring

Power monitoring is initiated from the time the host is either powered on or booted. This feature collects the power consumption statistics for a platform, CPU, and memory domains and provides a minimum, maximum, and averaged reading for the duration that is being collected. These readings can be used to calculate the power consumption trends of the domains. Cisco IMC collects and stores these power consumption statistic values to plot graphs for various time periods (such as an hour, a day, and a week).



Note You cannot create additional statistics collection policies or delete the existing monitoring policies. You can only modify the default policies.

Viewing Power Monitoring Summary

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Power Management**.
- Step 3** On the **Work** pane, click the **Power Monitoring** tab.
- Step 4** In the **Power Monitoring Summary** area, review the following information:

The following tables display the power consumed by the system and its components since the last time it was rebooted.

| Name | Description |
|--------------------------|--|
| Monitoring Period | The time of monitoring the power consumed by the system since the last time it was rebooted. The monitoring period is displayed in Day HH:MM:SS format. |

Note **Monitoring Period** is displayed under **Chassis**.

Platform, **CPU**, and **Memory** areas are available under **Server 1** and **Server 2**.

- Step 5** In the **Platform** area, review the following information:

| Name | Description |
|----------------|---|
| Current | The power currently being used by the server, CPU, and memory in watts. |
| Minimum | The minimum number of watts consumed by the server, CPU, and memory since the last time it was rebooted. |
| Maximum | The maximum number of watts consumed by the server, CPU, and memory since the last time it was rebooted. |
| Average | The average amount of power consumed by the server, CPU, and memory in watts over the defined period of time. |

- Step 6** In the **CPU** area, review the following information:

| Name | Description |
|----------------|--|
| Current | The power currently being used by the CPU in watts. |
| Minimum | The minimum number of watts consumed by the CPU since the last time it was rebooted. |
| Maximum | The maximum number of watts consumed by the CPU since the last time it was rebooted. |

| Name | Description |
|---------|---|
| Average | The average amount of power consumed by the server, CPU, and memory in watts over the defined period of time. |

Step 7 In the **Memory** area, review the following information:

| Name | Description |
|---------|--|
| Current | The power currently being used by the memory, in watts. |
| Minimum | The minimum number of watts consumed by the memory since the last time it was rebooted. |
| Maximum | The maximum number of watts consumed by the memory since the last time it was rebooted. |
| Average | The average amount of power consumed by the memory in watts over the defined period of time. |

Step 8 In the **Chart Properties** area, review and update the chart, component, and view the power consumption details.

| Name | Description |
|---|--|
| Chart Settings | Enables you to configure the chart properties and the way data is displayed in the chart. |
| Download Power Statistics and Server Utilization Data | <p>Enables you to download the power statistics and host server utilization information. The files are downloaded to your local download folder.</p> <p>Note If the file size of the already downloaded statistics file is less than 256 KB, then when you download, another set of files is downloaded, one for the power statistics and the other for host server utilization. If the size of the existing files exceeds 256 KB, then the next set of files overwrites the existing ones.</p> |

| Name | Description |
|----------------------|---|
| Chart drop-down list | <p>Allows you to collect the trends of power consumption from every server for the selected duration. This can be one of the following:</p> <ul style="list-style-type: none"> • Last Hour— Plots the chart for every five minutes • Last Day—Plots the chart for every hour from the current time. • Last Week—Plots the chart for each day. |

| Name | Description |
|---|---|
| Component drop-down list | <p>The component for which you want to view the power consumption over the selected duration. This can be one of the following:</p> <ul style="list-style-type: none"> • Chassis • <i>Server 1</i> • <i>Server 2</i> |
| Domain drop-down list | The default value displayed is Platform . |
| Plot button | Displays the power consumed by the selected component for the specified duration. |
| Chart/Table View (Appears on mouse-over) | Select to view power monitoring summary in either Chart or Table view. |
| Chart Type (Appears on mouse-over) | <p>Select the type of chart you wish to view. This could be one of the following:</p> <ul style="list-style-type: none"> • Line Chart— Power monitoring data appears in lines. • Column Chart— Power monitoring data appears as a column. <p>Default Chart: Line Chart.</p> <p>Note When the Chart drop-down list is selected as Last Week, and more than one Component is selected, the Column chart is not displayed, and by default the Line chart is displayed. The following message is displayed in such a scenario: For the selected Configuration, Column graph cannot be plotted. Reverting to Line Graph.</p> |
| Current check box | If checked, the chart displays the current power consumed by the selected component for the selected duration. |
| Average check box | If checked, the plot displays the average amount of power consumed by the selected component for the selected duration. |
| Maximum check box | If checked, the plot displays the maximum number of watts consumed by the selected component for the selected duration. |

| Name | Description |
|-------------------|---|
| Minimum check box | If checked, the plot displays the minimum number of watts consumed by the selected component for the selected duration. |

Viewing the Power Statistics in a Chart

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

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Power Management**.
- Step 3** In the **work** pane, click the **Power Monitoring** tab.
- Step 4** On the **Power Monitoring** tab, review and update the chart, component, to view the power consumption details.

| Name | Description |
|--------------------------|--|
| Chart drop-down list | Allows you to collect the trends of power consumption from every server for the selected duration. This can be one of the following: <ul style="list-style-type: none"> • Last One Hour— Plots the chart for every five minutes • Last One Day—Plots the chart for every hour from the current time. • Last One Week—Plots the chart for each day. |
| Component drop-down list | The component for which you want to view the power consumption over the selected duration. This can be one of the following: <ul style="list-style-type: none"> • Platform • CPU • Memory • All |

| Name | Description |
|--------------------------|---|
| Maximum check box | If checked, the plot displays the maximum number of watts consumed by the selected component for the selected duration. |
| Minimum check box | If checked, the plot displays the minimum number of watts consumed by the selected component for the selected duration. |
| Average check box | If checked, the plot displays the average amount of power consumed by the selected component for the selected duration. |
| Current check box | If checked, the chart displays the current power consumed by the selected component for the selected duration. |
| Plot button | Displays the power consumed by the selected component for the specified duration. |

The power reading chart plots power consumption values of different components for the selected duration. These power consumption values are captured from the time that the host is powered on. When a power profile is enabled, the power limit is plotted in the chart as a red line. This plot can be used to determine the power consumption trend of the system. To view the configured power limit values of a particular domain, move the mouse over these trend lines.

If choose the Standard profile, the trend line represent the power limit. If you choose the Advance profile, it represents the power limit for CPU, memory, and platform depending on your power profile configuration.

Note These trend lines are not displayed if the profile is disabled on the **Power Cap Configuration** tab.

Step 5 Click **Save Changes**.

Downloading Power Statistics and Server Utilization Data

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

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Power Management**.
- Step 3** In the **Work** pane, click the **Power Monitoring** tab.
- Step 4** In the **Power Monitoring** tab, click **Download Power Statistics and Server Utilization Data**

The files are downloaded to your local download folder.

Note If the file size of the already downloaded statistics file is less than 256 KB, then when you download, another set of files is downloaded, one for the power statistics and the other for host server utilization. If the size of the existing files exceeds 256 KB, then the next set of files overwrites the existing ones.

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

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **Power Policies** tab.
- Step 3** In the **Power Restore Policy** area, update the following fields:

| Name | Description |
|--|--|
| Power Restore Policy drop-down list | <p>The action to be taken when chassis power is restored after an unexpected power loss. This can be one of the following:</p> <ul style="list-style-type: none"> • Power Off—The server remains off until it is manually restarted. • Power On—The server is allowed to boot up normally when power is restored. The server can restart immediately or, optionally, after a fixed or random delay. • Restore Last State—The server restarts and the system attempts to restore any processes that were running before power was lost. |

- Step 4** Click **Save Changes**.

Configuring Fan Policies

Fan Control Policies

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

- Maximum CPU performance

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

- **Low power consumption**

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

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

Following are the fan policies that you can choose from:

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

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



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

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



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

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

- **SUCCESS** —The selected fan policy matches the actual fan speed that runs on the server.
- **PENDING** —The configured fan policy is not in effect yet. This can be due to one of the following:

- The server is powered off
- The BIOS POST is not complete
- **FAN POLICY OVERRIDE**—Overrides the specified fan speed with the actual speed determined by the configuration requirements of the server.

Configuring the Fan Policy

You can determine the right fan policy based on the server configuration and server components.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **Power Policies** tab.
- Step 3** In the **Configured Fan Policy** area, select a fan policy from the drop-down list. It can be one of the following:

| Name | Description |
|---|--|
| <p>Fan Policy drop-down list</p> | <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Balanced—This setting can cool almost any server configuration, but may not be suitable for servers with PCIe cards as these cards overheat easily. • Low Power—This setting is ideal for minimal configuration servers that do not contain any PCIe cards. • High Power—This policy is ideal for servers that contain PCIe cards that overheat easily and have high temperatures. • Maximum Power—This setting can be used for server configurations that required extremely high fan speeds. This policy is ideal for servers that contain PCIe cards that overheat easily and have very high temperatures. • Acoustic—This setting can be used for configuring the fan noise level, thereby enabling noise reduction in the servers. <p>Application of this policy might result in performance throttling impacting system performance. If excessive thermal or performance events are recorded in the event logs, select a standard fan control policy like Low Power, which is a non-disruptive change.</p> <p>Note This option is available only on Cisco UCS C220 M5, C240 SD M5, C240 M5 servers. For these servers, Acoustic is the default fan policy.</p> <p>For other servers, default fan policy depends on the server configuration and the number of PCIe cards present in the server.</p> |
| <p>Applied Fan Policy field</p> | <p>The actual speed of the fan that runs on the server.</p> <p>When the configured fan policy is not in effect, it displays N/A. The configured fan policy takes effect when the server is powered on and the POST is complete.</p> |

| Name | Description |
|--|---|
| <p>Configuration Status field</p> | <p>The configuration status of the fan policy. This can be one of the following:</p> <ul style="list-style-type: none"> • SUCCESS —The fan speed set by you matches the actual fan speed that runs on the server. • PENDING —The configured fan policy is not in effect yet. This can be due to one of the following: <ul style="list-style-type: none"> • The server is powered off • The BIOS POST is not complete • FAN POLICY OVERRIDE—Overrides the specified fan speed with the actual speed determined by the configuration requirements of the server. |

Step 4 Click **Save Changes**.

Configuring DIMM Blacklisting

DIMM Black Listing

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

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

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



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

Enabling DIMM Black Listing

Before you begin

- You must be logged in as an administrator.

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** pane, click the **Memory** tab.
- Step 4** In the **Memory** pane's **DIMM Black Listing** area, click the **Enable DIMM Black List** check box.
-

Configuring BIOS Settings

Entering BIOS Setup

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **BIOS** tab.
- Step 3** In the **Actions** area, click **Enter BIOS Setup**.
- Step 4** Click **OK** at the prompt.
Enables enter BIOS setup. On restart, the server enters the BIOS setup.
-

Clearing the BIOS CMOS

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the work pane, click the **BIOS** tab.
 - Step 3** In the **Actions** area, click **Clear BIOS CMOS**.
 - Step 4** Click **OK** to confirm.
Clears the BIOS CMOS.
-

Restoring BIOS Manufacturing Custom Settings

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **BIOS** tab.
 - Step 4** In the **Actions** area, click **Restore Manufacturing Custom Settings**.
 - Step 5** Click **Yes** if you wish to reboot the server immediately.
 - Step 6** Click **OK** to confirm.
-

Restoring BIOS Defaults

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **BIOS** tab.
- Step 4** In the **Actions** area, click **Restore Defaults**.
- Step 5** Click **Yes** if you wish to reboot the server immediately.

Step 6 Click **OK** to confirm.

BIOS Profiles

On the Cisco UCS server, default token files are available for every S3260 server platform, and you can configure the value of these tokens using the Graphic User Interface (GUI), CLI interface, and the XML API interface. To optimize server performance, these token values must be configured in a specific combination.

Configuring a BIOS profile helps you to utilize pre-configured token files with the right combination of the token values. Some of the pre-configured profiles that are available are virtualization, high-performance, low power, and so on. You can download the various options of these pre-configured token files from the Cisco website and apply it on the servers through the BMC.

You can edit the downloaded profile to change the value of the tokens or add new tokens. This allows you to customize the profile to your requirements without having to wait for turnaround time.

Uploading a BIOS Profile

You can upload a BIOS profile either from a remote server location or through a browser client.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **BIOS** tab.
- Step 3** Click the **Configure BIOS Profile** tab.
- Step 4** To upload the BIOS profile using a remote server location, in the **BIOS Profile** area, click the **Upload** button.
- Step 5** In the **Upload BIOS Profile** dialog box, update the following fields:

| Name | Description |
|--|---|
| Upload BIOS Profile from drop-down list | The remote server type. This can be one of the following: <ul style="list-style-type: none"> • TFTP • FTP • SFTP • SCP • HTTP |

| Name | Description |
|--------------------------|---|
| Server IP/Hostname field | The IP address or hostname of the server on which the BIOS profile information is available. Depending on the setting in the Upload BIOS Profile from drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename of the BIOS profile on the remote server. |
| Username field | Username of the remote server. |
| Password field | Password of the remote server. |
| Upload button | <p>Uploads the selected BIOS profile.</p> <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |
| Cancel button | Closes the wizard without making any changes to the firmware versions stored on the server. |

Step 6 To upload the BIOS profile using a browser client, in the **BIOS Profile** area, click the **Upload** button.

Step 7 In the **Upload BIOS Profile** dialog box, update the following fields:

| Name | Description |
|---------------|---|
| File field | The BIOS profile that you want to upload. |
| Browse button | Opens a dialog box that allows you to navigate to the appropriate file. |

What to do next

Activate a BIOS profile.

Activating a BIOS Profile

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the work pane, click the **BIOS** tab.
 - Step 3** Click the **Configure BIOS Profile** tab.
 - Step 4** Select a BIOS profile from the **BIOS Profile** area and click **Activate**.
 - Step 5** At the prompt, click **Yes** to activate the BIOS profile.
-

Deleting a BIOS Profile

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **BIOS** tab.
 - Step 4** Select a BIOS profile from the **BIOS Profile** area and click **Delete**.
 - Step 5** At the prompt, click **OK** to delete the BIOS profile.
-

Backing up a BIOS Profile

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **BIOS** tab.
 - Step 4** Select a BIOS profile from the **BIOS Profile** area and click **Take Backup**.
 - Step 5** At the prompt, click **OK** to take a backup of the BIOS profile.
-

What to do next

Activate a BIOS profile.

Viewing BIOS Profile Details

Before you begin

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

Procedure

-
- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **BIOS** tab.
 - Step 4** Select a BIOS profile from the **BIOS Profile** area and click **Details**.
 - Step 5** Review the following information in the **BIOS Profile Details** window:

| Name | Description |
|-----------------------------|--|
| Token Name column | Displays the token name of the BIOS profile. |
| Display Name column | Displays the user name of the BIOS profile. |
| Profile Value column | Displays the value that was provided in the uploaded file. |
| Actual Value column | Displays the value of the active BIOS configuration. |

Setting Dynamic Front Panel Temperature Threshold

The Dynamic Front Panel Temperature Threshold option allows you to set the upper critical threshold for the front panel temperature sensor.

Procedure

-
- Step 1** In the **Navigation** pane, click the **Chassis** menu.
 - Step 2** In the **Chassis** menu, click **Sensors**.
 - Step 3** In the **Sensors** pane, click the **Temperature** tab.
 - Step 4** Expand the **Dynamic Front Panel Temperature Threshold** area, and enter an upper critical threshold for the front panel temperature sensor in the **Critical** field. You can enter a value between 8 and 50.
 - Step 5** Click **Save Changes**.
-

Persistent Memory Modules

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

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

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



CHAPTER 5

Viewing Server Properties

This chapter includes the following sections:

- [Viewing Server Utilization, on page 61](#)
- [Viewing CPU Properties, on page 63](#)
- [Viewing Memory Properties, on page 63](#)
- [Viewing PCI Adapter Properties, on page 66](#)
- [Viewing Storage Properties, on page 67](#)
- [Viewing TPM Properties, on page 67](#)
- [Viewing a PID Catalog , on page 69](#)

Viewing Server Utilization

Procedure

Step 1 In the Navigation pane, click the **Chassis** menu.

Step 2 In the **Chassis** menu, click **Summary**.

The **Summary** node provides information on **Chassis Properties**, **Chassis status**, **Cisco IMC Information**, **Power Utilization** and **Server Utilization**.

Real-time monitoring of CPU, memory, and I/O utilization in the system is provided in terms of **Compute Usage Per Second (CUPS)** . It is independent of the OS and does not consume CPU resources.

Cisco servers monitors below sensors:

Platform CUPS Sensor - Provides the Computation, Memory, and I/O resource utilization value in the form of a platform CUPS Index.

Core CUPS Sensor - Provides the computation utilization value.

Memory CUPS Sensor - Provides the memory utilization value.

IO CUPS Sensor - Provides the I/O resource utilization value.

Note CUPS sensors are hardware level sensors and the values will not match the values from OS based tools.

These utilization values are obtained by querying the data from a set of dedicated, sideband telemetry counters provided by the platform ingredients (CPU and chipset). These counters are called **Resource Monitoring Counters (RMCs)**.

RMCs provide the real-time information pertaining to the three main domains of platform resources – CPU, memory, and I/O. The utilization information for each of these domains is obtained by aggregating the individual counters at a resource instance level.

Step 3 In the **Server Utilization** area, review the following information:

| Name | Description |
|--------------------------------|---|
| Overall Utilization (%) | Measured as CUPS Index. This is a composite metric used to provide quick high level assessment of Platform Utilization. The CUPS Index is thus a measure of the compute headroom available on the server. Hence, if the system has a large CUPS Index, then there is limited headroom to place additional workload on that system. As the resource consumption decreases, the system's CUPS Index decreases. A low CUPS Index indicates that there is a large amount of compute headroom and the server is a prime target for receiving new workloads or having the workload migrated off and the server being put into a lower power state in order to reduce power consumption. Such workload monitoring can then be applied throughout the data center to provide a high-level and holistic view of the datacenter's workload. |
| CPU Utilization (%) | CPU RMC provides CPU utilization metrics. These are individual CPU core counters which are aggregated to provide the cumulative utilization of all the cores in the package. |
| Memory Utilization (%) | Memory RMC provides memory utilization metrics. These are individual counters to measure memory traffic occurring at each memory channel or memory controller instance. These are then aggregated to measure the cumulative memory traffic across all the memory channels in the package. |
| IO Utilization (%) | IO RMC provides IO utilization metrics. These are individual counters, one per root port in the PCI Express Root Complex to measure PCI Express traffic emanating from or directed to that root port and the segment below. These counters are then aggregated to measure PCI express traffic for all PCI Express segments emanating from the package. The PCI Express Root Port represents a PCI segment and is hence is the single central component that carries the entire traffic generated by that segment. |

Viewing CPU Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** pane, click the **CPUs** tab.
- Step 4** Review the following information for each CPU:

| Name | Description |
|--------------------------------|--|
| Socket Name field | The socket in which the CPU is installed. |
| Vendor field | The vendor for the CPU. |
| Status field | The status of the CPU. |
| Family field | The family to which this CPU belongs. |
| Version field | The version information of the CPU. |
| Speed field | The CPU speed, in megahertz. |
| Number of Cores field | The number of cores in the CPU. |
| Signature field | The signature information for the CPU. |
| Number of Threads field | The maximum number of threads that the CPU can process concurrently. |

Viewing Memory Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** pane, click the **Memory** tab.
- Step 4** In the **Memory Summary** area, review the following summary information about memory:

| Name | Description |
|---------------------------|---|
| Memory Speed field | The memory speed, in megahertz. |
| Total Memory field | The total amount of memory available on the server if all DIMMs are fully functional. |

| Name | Description |
|--------------------------------------|---|
| Effective Memory field | <p>The actual amount of memory currently available to the server.</p> <p>When a server has Intel[®] Optane[™] DC persistent memory modules the effective memory is calculated as follows:</p> <ul style="list-style-type: none"> • Memory mode or Mixed mode—It is an approximate sum of all the DCPMM memory. <p>Note Memory and Mixed modes are available only on some servers.</p> <ul style="list-style-type: none"> • Appdirect mode—It is an approximate sum of all the DCPMM memory and the DRAMs memory. |
| Redundant Memory field | The amount of memory used for redundant storage. |
| Failed Memory field | The amount of memory that is currently failing, in megabytes. |
| Ignored Memory field | The amount of memory currently not available for use, in megabytes. |
| Number of Ignored DIMMs field | The number of DIMMs that the server cannot access. |
| Number of Failed DIMMs field | The number of DIMMs that have failed and cannot be used. |
| Memory RAS Possible field | Details about the RAS memory configuration that the server supports. |
| Memory Configuration field | <p>The current memory configuration. This can be one of the following:</p> <ul style="list-style-type: none"> • Maximum Performance—The system automatically optimizes the memory performance. • Mirroring—The server maintains two identical copies of the data in memory. This option effectively halves the available memory on the server, as one half is automatically reserved for mirrored copy. • Lockstep—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. |
| DIMM location diagram | Displays the DIMM or memory layout for the current server. |

Step 5 In the **DIMM Black Listing** area, view the overall status of a DIMM and also enable DIMM black listing.

| Name | Description |
|----------------------------------|---|
| Overall DIMM Status field | <p>The overall status of a DIMM. This can be one of the following:</p> <ul style="list-style-type: none"> • Good—The DIMM status is available. • Severe Fault— The DIMM status when uncorrectable ECC errors are present. |

| Name | Description |
|--|---|
| Enable DIMM Black List checkbox | Check this option to enable DIMM black listing. |

Step 6 In the **Memory Details** table, review the following detailed information about each DIMM:

Tip Click a column header to sort the table rows, according to the entries in that column.

| Name | Description |
|----------------------------------|---|
| Name column | The name of the DIMM slot in which the memory module is installed. |
| Capacity column | The size of the DIMM. |
| Channel Speed column | The clock speed of the memory channel, in megahertz. |
| Channel Type column | The type of memory channel. |
| Memory Type Detail column | The type of memory used in the device. |
| Bank Locator column | The location of the DIMM within the memory bank. |
| Manufacturer column | The vendor ID of the manufacturer. This can be one of the following: <ul style="list-style-type: none"> • 0x2C00—Micron Technology, Inc. • 0x5105—Qimonda AG i. In. • 0x802C—Micron Technology, Inc. • 0x80AD—Hynix Semiconductor Inc. • 0x80CE—Samsung Electronics, Inc. • 0x8551—Qimonda AG i. In. • 0xAD00—Hynix Semiconductor Inc. • 0xCE00—Samsung Electronics, Inc. |
| Serial Number column | The serial number of the DIMM. |
| Asset Tag column | The asset tag associated with the DIMM, if any. |
| Part Number column | The part number for the DIMM assigned by the vendor. |
| Visibility column | Whether the DIMM is available to the server. |
| Operability column | Whether the DIMM is currently operating correctly. |
| Data Width column | The amount of data the DIMM supports, in bits. |

Viewing PCI Adapter Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** pane, click the **PCI Adapters** tab.
- Step 4** In the **PCI Adapters** area, review the following information for the installed PCI adapters:

| Name | Description |
|---------------------------------|---|
| Slot ID column | The slot in which the adapter resides. |
| Product Name column | The name of the adapter. |
| Option ROM Status column | Indicates the Option ROM status. This can be one of the following: <ul style="list-style-type: none"> • Loaded—Data is available in the card. • Unloaded—Data is not available in the card. • Load Error—Card is present and Option ROM is enabled. But Option ROM failed to load due to an error in the card. |
| Firmware Version column | The firmware versions of the adapters. Note The firmware versions are displayed only for adapters that provide versions through the standard UEFI interface. For example, Intel LOM and Emulex Adapters. |
| Vendor ID column | The adapter ID assigned by the vendor. |
| Sub Vendor ID column | The secondary adapter ID assigned by the vendor. |
| Device ID column | The device ID assigned by the vendor. |
| Sub Device ID column | The secondary device ID assigned by the vendor. |

Viewing Storage Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **Inventory** tab.
- Step 4** In the **Storage** tab, review the following information:

| Name | Description |
|-------------------------------------|---|
| Controller field | PCIe slot in which the controller drive is located. |
| PCI Slot field | The name of the PCIe slot in which the controller drive is located. |
| Product Name field | Name of the controller. |
| Serial Number field | The serial number of the storage controller. |
| Firmware Package Build field | The active firmware package version number. |
| Product ID field | Product ID of the controller. |
| Battery Status field | Status of the battery. |
| Cache Memory Size field | The size of the cache memory, in megabytes. |
| Health field | The health of the controller. |

Viewing TPM Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Inventory**.
- Step 3** In the **Inventory** pane, click the **TPM** tab
- Step 4** Review the following information:

| Name | Description |
|------------------------|--|
| Version field | The TPM version. This field displays NA if the TPM version details are not available. |
| Presence field | Presence of the TPM module on the host server. <ul style="list-style-type: none"> • Equipped—The TPM is present on the host server. • Empty—The TPM does not exist on the host server. |
| Model field | The model number of the TPM. This field displays NA if the TPM does not exist on the host server. |
| Enabled Status field | Whether or not the TPM is enabled. <ul style="list-style-type: none"> • Enabled—The TPM is enabled. • Disabled—The TPM is disabled. • Unknown—The TPM does not exist on the host server. |
| Vendor field | The name of the TPM vendor. This field displays NA if the TPM does not exist on the host server. |
| Active Status field | Activation status of the TPM. <ul style="list-style-type: none"> • Activated—The TPM is activated. • Deactivated—The TPM is deactivated. • Unknown—The TPM does not exist on the host server. <p>Note In some C-series servers that have installed TPM version 2.0, Active Status is displayed as NA.</p> |
| Serial field | The serial number of the TPM. This field displays NA if the TPM does not exist on the host server. |
| Ownership field | The ownership status of TPM. <ul style="list-style-type: none"> • Owned—The TPM is owned. • Unowned—The TPM is unowned. • Unknown—The TPM does not exist on the host server. <p>Note In some C-series servers that have installed TPM version 2.0, Ownership status is displayed as NA.</p> |
| Revision field | Revision number of the TPM. This field displays NA if the TPM does not exist on the host server. |
| Firmware Version field | Details of the firmware version. |

Viewing a PID Catalog

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** tab.
- Step 2** In the **Compute** working area, click the **PID Catalog** tab.
- Step 3** Review the following summary information about the PID catalog:
- **Activation Status:** The activation status of the PID catalog.
 - **Current Activated Version:** The activated version of the PID catalog.
- Step 4** In the **CPUs** table, review the following information about CPU:

| Name | Description |
|---------------------------|---|
| Socket Name column | The socket in which the CPU is installed. |
| Product ID column | The product ID for the CPU. |
| Model column | The model number of the CPU |

- Step 5** In the **Memory** table, review the following information about memory:

| Name | Description |
|---------------------------|--|
| Name column | The name of the memory slot. |
| Product ID column | The product ID for the memory slot assigned by the vendor. |
| Vendor ID column | The ID assigned by the vendor. |
| Capacity column | The size of the memory. |
| Speed (MHz) column | The memory speed, in megahertz. |

- Step 6** In the **PCI Adapters** table, review the following information about PCI adapter:

| Name | Description |
|-----------------------------|--|
| Slot column | The slot in which the adapter resides. |
| Product ID column | The product ID for the adapter. |
| Vendor ID column | The adapter ID assigned by the vendor. |
| Sub Vendor ID column | The secondary adapter ID assigned by the vendor. |
| Device ID column | The device ID assigned by the vendor. |
| Sub Device ID column | The secondary device ID assigned by the vendor. |

Step 7 In the **HDD** table, review the following information about HDD:

| Name | Description |
|--------------------------|--|
| Disk column | The disk of the hard drive. |
| Product ID column | The product ID for the hard drive. |
| Controller column | The system-defined name of the selected Cisco Flexible Flash controller. This name cannot be changed. |
| Vendor column | The vendor for the hard drive. |
| Model column | The model of the hard drive. |



CHAPTER 6

Viewing Sensors

This chapter includes the following sections:

- [Viewing Chassis Sensors, on page 71](#)

Viewing Chassis Sensors

Viewing Power Supply Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **Power Supply** tab.
- Step 4** Review the following sensor properties for power supply:

Properties Area

| Name | Description |
|-------------------------|-------------------------------------|
| Redundancy Status field | The power supply redundancy status. |

Threshold Sensors Area

| Name | Description |
|--------------------|------------------------|
| Sensor Name column | The name of the sensor |

| Name | Description |
|---|--|
| Sensor Status column | The status of the sensor. This can be one of the following: <ul style="list-style-type: none"> • Unknown • Informational • Normal • Warning • Critical • Non-Recoverable |
| Reading column | The current power usage, in watts. |
| Critical Threshold Min column | The minimum critical threshold. |
| Critical Threshold Max column | The maximum critical threshold. |
| Non-Recoverable Threshold Min column | The minimum non-recoverable threshold. |
| Non-Recoverable Threshold Max column | The maximum non-recoverable threshold. |

Discrete Sensors Area

| Name | Description |
|-----------------------------|--|
| Sensor Name column | The name of the sensor. |
| Sensor Status column | The status of the sensor. This can be one of the following: <ul style="list-style-type: none"> • Unknown • Informational • Normal • Warning • Critical • Non-Recoverable |
| Reading column | The basic state of the sensor. |

Viewing Fan Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **Fan** tab.
- Step 4** Review the following fan sensor properties:

| Name | Description |
|---|--|
| Sensor Name column | The name of the sensor |
| Sensor Status column | The status of the sensor. This can be one of the following: <ul style="list-style-type: none"> • Unknown • Informational • Normal • Warning • Critical • Non-Recoverable |
| Speed (RPMS) column | The fan speed in RPM. |
| Critical Threshold Min column | The minimum critical threshold. |
| Critical Threshold Max column | The maximum critical threshold. |
| Non-Recoverable Threshold Min column | The minimum non-recoverable threshold. |
| Non-Recoverable Threshold Max column | The maximum non-recoverable threshold. |

Viewing Temperature Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **Temperature** tab.
- Step 4** Review the following temperature sensor properties:

| Name | Description |
|--------------------------------------|--|
| Sensor Name column | The name of the sensor |
| Sensor Status column | The status of the sensor. This can be one of the following: <ul style="list-style-type: none"> • Unknown • Informational • Normal • Warning • Critical • Non-Recoverable |
| Temperature column | The current temperature, in Celsius. |
| Critical Threshold Min column | The minimum critical threshold. |
| Critical Threshold Max column | The maximum critical threshold. |
| Non-Recoverable Threshold Min column | The minimum non-recoverable threshold. |
| Non-Recoverable Threshold Max column | The maximum non-recoverable threshold. |

Viewing Voltage Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **Voltage** tab.
- Step 4** Review the following voltage sensor properties:

| Name | Description |
|--------------------|------------------------|
| Sensor Name column | The name of the sensor |

| Name | Description |
|---|--|
| Sensor Status column | The status of the sensor. This can be one of the following: <ul style="list-style-type: none"> • Unknown • Informational • Normal • Warning • Critical • Non-Recoverable |
| Voltage (V) column | The current voltage, in Volts. |
| Critical Threshold Min column | The minimum critical threshold. |
| Critical Threshold Max column | The maximum critical threshold. |
| Non-Recoverable Threshold Min column | The minimum non-recoverable threshold. |
| Non-Recoverable Threshold Max column | The maximum non-recoverable threshold. |

Viewing Current Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **Current** tab.
- Step 4** Review the following current sensor properties:

| Name | Description |
|---------------------------|------------------------|
| Sensor Name column | The name of the sensor |

| Name | Description |
|---|--|
| Sensor Status column | The status of the sensor. This can be one of the following: <ul style="list-style-type: none"> • Unknown • Informational • Normal • Warning • Critical • Non-Recoverable |
| Current (A) column | The value of current, in Ampere (A). |
| Critical Threshold Min column | The minimum critical threshold. |
| Critical Threshold Max column | The maximum critical threshold. |
| Non-Recoverable Threshold Min column | The minimum non-recoverable threshold. |
| Non-Recoverable Threshold Max column | The maximum non-recoverable threshold. |

Viewing LED Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Sensors**.
- Step 3** In the **Sensors** working area, click the **LEDs** tab.
- Step 4** Review the following LED sensor properties:

| Name | Description |
|---------------------------|--|
| Sensor Name column | The name of the sensor |
| LED Status column | Whether the LED is on, blinking, or off. |
| LED Color column | The current color of the LED. For details about what the colors mean, see the hardware installation guide for the type of server you are using. |

Viewing Storage Sensors

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click **Sensors** tab.
- Step 4** Under the **Storage** tab, view the following statistics for the server in **Storage Sensors** area:

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



CHAPTER 7

Managing Remote Presence

This chapter includes the following sections:

- [Configuring Serial Over LAN, on page 79](#)
- [Configuring Virtual Media, on page 81](#)
- [Virtual KVM Console, on page 87](#)
- [Launching KVM Console, on page 88](#)
- [Virtual KVM Console \(Java Based\) , on page 88](#)
- [Virtual KVM Console , on page 93](#)
- [Comparison Between Java Based KVM and HTML5 Based KVM, on page 96](#)
- [Configuring the Virtual KVM, on page 97](#)

Configuring Serial Over LAN

Serial over LAN enables the input and output of the serial port of a managed system to be redirected over IP. Configure and use serial over LAN on your server when you want to reach the host console with Cisco IMC.



Important

You cannot use native serial redirection and serial over LAN simultaneously.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **Remote Management** tab.
- Step 4** In the **Remote Presence** pane, click the **Serial over LAN** tab.
- Step 5** In the **Serial over LAN Properties** area, update the following properties:

| Name | Description |
|---------------------------------|--|
| Enabled check box | If checked, Serial over LAN (SoL) is enabled on this server. |
| Baud Rate drop-down list | <p>The baud rate the system uses for SoL communication. This can be one of the following:</p> <ul style="list-style-type: none"> • 9600 bps • 19.2 kbps • 38.4 kbps • 57.6 kbps • 115.2 kbps |
| Com Port drop-down list | <p>The serial port through which the system routes SoL communication. You can select one of the following:</p> <ul style="list-style-type: none"> • com0—SoL communication is routed through COM port 0, an externally accessible serial port that supports either a physical RJ45 connection to an external device or a virtual SoL connection to a network device. <p>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.</p> <ul style="list-style-type: none"> • com1—SoL communication is routed through COM port 1, an internal port accessible only through SoL. <p>If you select this option, you can use SoL on COM port 1 and the physical RJ45 connection on COM port 0.</p> <p>Note Changing the Com Port setting disconnects any existing SoL sessions.</p> |
| SSH Port field | <p>The port through which you can access Serial over LAN directly. The port enables you to by-pass the Cisco IMC shell to provide direct access to SoL.</p> <p>The valid range is 1024 to 65535. The default value is 2400.</p> <p>Note Changing the SSH Port setting disconnects any existing SSH sessions.</p> |

Step 6 Click **Save Changes**.

Configuring Virtual Media

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click **Compute**.
- Step 2** In the **Compute** menu, select a server.
- Step 3** Click the **Remote Management** tab.
- Step 4** In the **Remote Management** tab, click the **Virtual Media** tab.
- Step 5** In the **vKVM Console Based vMedia Properties Area**, update the following properties:

| Name | Description |
|--|--|
| Enabled check box | If checked, virtual media is enabled. Note If you clear this check box, all virtual media devices are automatically detached from the host. |
| Active Sessions field | The number of virtual media sessions that are currently running. |
| Enable Virtual Media Encryption check box | If checked, all virtual media communications are encrypted. |
| Low Power USB Enabled check box | If checked, low power USB is enabled. If the low power USB is enabled, after mapping the ISO and rebooting the host, the virtual drives appear on the boot selection menu. But, while mapping an ISO to a server that has a UCS VIC P81E card and the NIC is in Cisco Card mode, this option must be disabled for the virtual drives to appear on the boot selection menu. |

- Step 6** Click **Save Changes**.

Creating a Cisco IMC Mapped vMedia Volume

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.

- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **Remote Management** tab.
- Step 4** In the **Remote Management** tab, click the **Virtual Media** tab
- Step 5** In the **Current Mappings** area, click **Add New Mapping**.
- Step 6** In the **Add New Mapping** dialog box, update the following fields:

| Name | Description |
|----------------------------------|---|
| Volume field | The identity of the image mounted for mapping. |
| Mount Type drop-down list | <p>The type of mapping. This can be one of the following:</p> <p>Note Ensure that the communication port of the mount type that you choose is enabled on the switch. For example, when you are using CIFS as your mount type, ensure port 445 (which is its communication port) is enabled on the switch. Similarly, enable ports 80 for HTTP, 443 for HTTPS and 2049 for NFS when you use them.</p> <ul style="list-style-type: none"> • NFS—Network File System. • CIFS—Common Internet File System. • WWW(HTTP/HTTPS)—HTTP-based or HTTPS-based system. <p>Note Before mounting the virtual media, Cisco IMC tries to verify reachability to the end server by pinging the server.</p> |
| Remote Share field | <p>The URL of the image to be mapped. The format depends on the selected Mount Type:</p> <ul style="list-style-type: none"> • NFS—Use <code>serverip:/share</code>. • CIFS—Use <code>//serverip/share</code>. • WWW(HTTP/HTTPS)—Use <code>http[s]://serverip/share</code>. |
| Remote File field | The name and location of the .iso or .img file in the remote share. |

| Name | Description |
|---------------------|-------------|
| Mount Options field | |

| Name | Description |
|------|--|
| | <p>Industry-standard mount options entered in a comma separated list. The options vary depending on the selected Mount Type.</p> <p>If you are using NFS, leave the field blank or enter one or more of the following:</p> <ul style="list-style-type: none"> • ro • rw <p>Note The folder, which is shared, should have write permissions to use read-write option. Read-write option is available only for .img files.</p> <ul style="list-style-type: none"> • nolock • noexec • soft • port=VALUE • timeo=VALUE • retry=VALUE <p>If you are using CIFS, leave the field blank or enter one or more of the following:</p> <ul style="list-style-type: none"> • soft • nounix • noserverino • guest • username=VALUE—ignored if guest is entered. • password=VALUE—ignored if guest is entered. • sec=VALUE <p>The protocol to use for authentication when communicating with the remote server. Depending on the configuration of CIFS share, VALUE could be one of the following:</p> <ul style="list-style-type: none"> • None—No authentication is used • Ntlm—NT LAN Manager (NTLM) security protocol. Use this option only with Windows 2008 R2 and Windows 2012 R2. • Ntlmi—NTLMI security protocol. Use this option only when you enable Digital Signing in the CIFS Windows server. • Ntlmssp—NT LAN Manager Security Support Provider (NTLMSSP) protocol. Use this option only with Windows |

| Name | Description |
|-----------------|--|
| | <p>2008 R2 and Windows 2012 R2.</p> <ul style="list-style-type: none"> • Ntlmsspi—NTLMSSPi protocol. Use this option only when you enable Digital Signing in the CIFS Windows server. • Ntlmv2—NTLMv2 security protocol. Use this option only with Samba Linux. • Ntlmv2i—NTLMv2i security protocol. Use this option only with Samba Linux. <p>If you are using WWW(HTTP/HTTPS), leave the field blank or enter the following:</p> <ul style="list-style-type: none"> • noauto <p>Note Before mounting the virtual media, Cisco IMC tries to verify reachability to the end server by pinging the server.</p> <ul style="list-style-type: none"> • username=VALUE • password=VALUE |
| User Name field | The username for the specified Mount Type , if required. |
| Password field | The password for the selected username, if required. |

Step 7 Click **Save**.

Viewing Cisco IMC-Mapped vMedia Volume Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **Remote Management** tab.
- Step 4** In the **Remote Management** tab, click the **Virtual Media** tab
- Step 5** Select a row from the **Current Mappings** table.
- Step 6** Click **Properties** and review the following information:

| Name | Description |
|----------------------------------|--|
| Add New Mapping button | Opens a dialog box that allows you to add a new image. |
| Properties button | Opens a dialog box that allows you to view or change the properties for the selected image. |
| Unmap button | Unmaps the mounted vMedia. |
| Last Mapping Status | The status of the last mapping attempted. |
| Volume column | The identity of the image. |
| Mount Type drop-down list | The type of mapping. |
| Remote Share field | The URL of the image. |
| Remote File field | The exact file location of the image. |
| Status field | The current status of the map. This can be one of the following: <ul style="list-style-type: none"> • OK—The mapping is successful. • In Progress—The mapping is in progress. • Stale—Cisco IMC displays a text string with the reason why the mapping is stale. • Error—Cisco IMC displays a text string with the reason for the error. |

Removing a Cisco IMC-Mapped vMedia Volume

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **Remote Management** tab.
- Step 4** In the **Remote Management** tab, click the **Virtual Media** tab
- Step 5** Select a row from the **Current Mappings** table.
- Step 6** Click **Unmap**.

Remapping an Existing Cisco IMC vMedia Image

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **Remote Management** tab.
 - Step 4** In the **Remote Management** tab, click the **Virtual Media** tab
 - Step 5** Select a row from the **Current Mappings** table.
 - Step 6** Click **Remap**.
-

Deleting a Cisco IMC vMedia Image

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **Remote Management** tab.
 - Step 4** In the **Remote Management** tab, click the **Virtual Media** tab
 - Step 5** Select a row from the **Current Mappings** table.
 - Step 6** Click **Delete**.
-

Virtual KVM Console

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

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

- The Cisco KVM console provides connection to KVM, SOL, and vMedia whereas the Avocent KVM provides connection only to KVM and vMedia.

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

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

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

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

Launching KVM Console

You can launch the KVM console from either the Home page or from the Remote Management area.

Procedure

-
- Step 1** To launch the console from Home page, in the **Navigation** pane, click the **Chassis** menu.
 - Step 2** In the **Chassis** menu, click **Summary**.
 - Step 3** From the tool bar, click **Launch vKVM** and select **Java based vKVM** or **HTML based vKVM**.
 - Step 4** Alternatively, in the **Navigation** pane, click the **Compute** menu.
 - Step 5** In the **Compute** menu, select a server.
 - Step 6** In the work pane, click the **Remote Management** tab.
 - Step 7** In the **Remote Management** pane, click the **Virtual KVM** tab.
 - Step 8** In the **Virtual vKVM** tab, click **Launch vKVM console**.
 - Step 9** Required: Click the URL link displayed in the pop-up window to load the client application. You need to click the link every time you launch the vKVM console.
-

Virtual KVM Console (Java Based)

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

location and to map physical locations to virtual drives that can be accessed by the server during this vKVM session.


Important

The vKVM console requires Java Runtime Environment (JRE) version 1.5.0 or higher.

vKVM Tab

This tab provides command line access to the server. The menu options available in this tab are described below.

File Menu

| Menu Item | Description |
|---|---|
| Open | Opens the Open dialog box that allows you to select a file and play the video of the screen recording stored in that file. |
| Capture to File button | Opens the Save dialog box that allows you to save the current screen as a JPG image. |
| Paste Text From Clipboard button | Allows you to copy text from a clipboard to the server using the vKVM console. |
| Paste Text From File button | Allows you to copy text from a remote file to the server using the vKVM console. |
| Exit button | Closes the vKVM console. |

View Menu
Macros Menu

Choose the keyboard shortcut you want to execute on the remote system.

Tools Menu

| Menu Item | Description |
|---|---|
| Session Options button, General tab | General tab in the Session Options dialog box allows you to specify whether all keystrokes are passed to the target system when the console is in Windowed mode. The default is no. |

| Menu Item | Description |
|---|--|
| Session Options button, Mouse tab | <p>The Mouse tab in the Session Options dialog box allows you to specify the following:</p> <ul style="list-style-type: none"> • Termination Key—The key to use that will terminate single cursor mode. The default is F12. • Mouse Acceleration—Allows you to change the positioning of a USB mouse. The default is Absolute Positioning. <p>Note If you are experiencing mouse tracking issues between your system and the remote system, try changing the mouse acceleration mode.</p> <p>If none of the modes solve the problem, you can use the Single Cursor tool to ignore the remote mouse in favor of the local mouse.</p> <p>If that does not work, set this option to No Acceleration and then go into the operating system on the remote server and set mouse acceleration to None in the system settings.</p> |
| Session Options button, Security tab | <p>The Security tab in the Session Options dialog box allows you to specify the type of unsecured connections which will be accepted without user concurrence, and allows you to clear previously accepted connections.</p> |
| Session Options button, Scaling tab | <p>The Scaling tab in the Session Options dialog box allows you to specify whether the aspect ratio maintenance will be in effect when the console is in windowed mode or in full screen mode. The default is Windowed Mode.</p> |
| Session Options button, Mini-Mode tab | <p>The Mini-Mode tab in the Session Options dialog box allows you to specify the size of the vKVM/vMedia client when in Mini-Mode.</p> |
| Session Options button, Video Recording tab | <p>The Video Recording tab in the Session Options dialog box allows you to specify:</p> <ul style="list-style-type: none"> • The maximum amount of disk space to be used by a single vKVM recording. • The amount of disk space to be used by the continuous recording buffer. • To select whether continuous recording is in effect or not. <p>Note The maximum persistent recording file size should be greater than or equal to continuous recording capacity. The default value of persistent recording is 1000 megabytes.</p> |
| Session Options button, Certificate tab | <p>The Certificate tab in the Session Options dialog box displays the details of the certificate being used in the current session and allows you to set the name and path of the exported certificate file.</p> |

| Menu Item | Description |
|---------------------------------|---|
| Single Cursor button | <p>Turns on the single cursor feature, which offsets mouse alignment issues encountered on some remote operating systems. When you turn this feature on, the mouse pointer is trapped within the viewer window.</p> <p>To turn the feature off, press the termination key specified in the Session Options dialog box. The default is F12.</p> |
| Stats button | <p>Opens the Stats dialog box, and the Live vKVM displays the following:</p> <ul style="list-style-type: none"> • The statistics of the vKVM session. • Frame rate measured in the number of frames per second. • Bandwidth measured in the number of KBs per second. • Compression measured in the percentage of compression being used. • Packet rate measured in number of packets per second. <p>Kbd/Mouse USB Reset button that resets the USB connection. You can reset the USB with or without the vMedia activation to reset all the USB devices connected to the server.</p> <p>Note The following message is displayed when you click the USB reset button: Resetting the USB connection can affect keyboard and mouse. Click Yes to reset the USB connection.</p> <p>When vMedia is activated, the Stats dialog box displays the following:</p> <ul style="list-style-type: none"> • Transfer rate of vMedia measured in data transported per second. • The type of local device or image file to which the host server device is mapped. • The elapsed time of the device to map. • The number of bytes sent or received by the server. |
| Session User List button | <p>Opens the Session User List dialog box that shows all the user IDs that have an active vKVM session.</p> |
| Chat button | <p>Communicates with other Virtual Console users through a chatting interface available within the Virtual Console viewer. Chat is not supported for all Cisco UCS servers.</p> <p>Note The chat window cannot be minimized and the chat history is not stored once the window is closed. You can chat even if the server is powered off.</p> |

| Menu Item | Description |
|---------------------------------------|---|
| Recorder /Play Controls button | <p>Opens the Digital Video Recorder (DVR) for recording and playback of vKVM video. In the floating Record/Playback toolbar, the following functions are available:</p> <ul style="list-style-type: none"> • Play/Pause • Fast Forward • Rewind or Skip Back • Slider • Return to Start • Go to End • Live Mode • Record/Stop Recording • Open |
| Export Video button | <p>Opens the Export Video dialog box that allows you to specify:</p> <ul style="list-style-type: none"> • The source file, downloaded from the web UI, or created using the vKVM record capability. • The destination file with specified format such as MOV. • The resolution for exporting movie file. The default resolution is 640 x 480 and the recommended resolution should be 1024 x 768. |

Power Menu

| Menu Item | Description |
|--|--|
| Power On System button | <p>Powers on the system.</p> <p>This option is disabled when the system is powered on and it is enabled when the system is not powered.</p> |
| Power Off System button | <p>Powers off the system from the virtual console session.</p> <p>This option is enabled when the system is powered on and disabled when the system is not powered on.</p> |
| Reset System (warm boot) button | <p>Reboots the system without powering it off.</p> <p>This option is enabled when the system is powered on and disabled when the system is not powered on.</p> |
| Power Cycle System (cold boot) button | <p>Turns off system and then back on.</p> <p>This option is enabled when the system is powered on and disabled when the system is not powered on.</p> |

Boot Device Menu

| Name | Description |
|------------------|---|
| No Override | Clicking this option enables the host to boot to the first device configured. |
| Boot Device list | A list of boot devices that the server uses to boot from only for the next server boot, without disrupting the currently configured boot order. Once the server boots from the one time boot device, all its future reboots occur from the previously configured boot order. A maximum of 15 devices are displayed on the vKVM console. |

Virtual KVM Console

The vKVM console is an interface accessible from Cisco IMC that emulates a direct keyboard, video, and mouse (vKVM) connection to the server. It allows you to connect to and control the server from a remote location and to map physical locations to virtual drives that can be accessed by the server during this vKVM session.

File Menu

| Menu Item | Description |
|----------------------------------|---|
| Paste Text From File / Send Text | Opens the dialog box that allows you to paste content. |
| Capture to File | Opens the Save dialog box that allows you to save the current screen as a JPG image. |
| Exit | Closes the vKVM console. |

View Menu

| Menu Item | Description |
|-------------|--|
| Keyboard | Displays the virtual keyboard for the vKVM console, which you can use to input data. |
| Refresh | Updates the console display with the server's current video output. |
| Full Screen | Expands the vKVM console so that it fills the entire screen. |

Macros Menu

Choose the keyboard shortcut you want to execute on the remote system.

| Menu Item | Description |
|--------------------|--------------------------------------|
| Static Macros menu | Displays a predefined set of macros. |

| Menu Item | Description |
|-----------|--|
| Manage | Opens the Configure User Defined Macros dialog box, which allows you to create and manage macros. System-defined macros cannot be deleted. |

Tools Menu

| Menu Item | Description |
|-------------------|--|
| Session Options | Opens the Session Options dialog box that lets you specify: <ul style="list-style-type: none"> • Scaling—Specify whether or not you want to maintain the aspect ratio of the screen. Check or uncheck the Maintain Aspect Ratio checkbox (checked by default). • Mouse Acceleration: The mouse acceleration to use on the target system. The default is Absolute positioning (Windows, Newer Linux & MAC OS X). Other options are: <ul style="list-style-type: none"> • Relative Positioning, no acceleration • Relative Positioning (RHEL, Older Linux) • Paste Text: Allows you to select to paste text from clipboard or a file. |
| Session User List | Opens the Session User List dialog box that shows all the user IDs that have an active vKVM session. |
| Chat | Opens the Chat box to communicate with other users. |
| Stats | Opens the Stats dialog box, and the Live vKVM displays the following: <ul style="list-style-type: none"> • Frame Rate: Frame rate measured in the number of frames per second. • Bandwidth: Bandwidth measured in the number of KBs per second. • Compression: Compression measured in the percentage of compression being used. • Packet Rate: Packet rate measured in number of packets per second. <p>When vMedia is activated, the Virtual Media dialog box displays the following:</p> <ul style="list-style-type: none"> • Target Device: The type of local device. • Mapped to: The type of local device or image file to which the host server device is mapped. • Duration: The elapsed time of the device to map. • Read Bytes: The number of bytes sent or received by the server. |

| Menu Item | Description |
|----------------------|--|
| Play Controls | Opens Cisco vKVM Playback window that allows you to choose a .dvc file. |

Power Menu

| Menu Item | Description |
|---------------------------------------|---|
| Power On System | Powers on the system. This option is disabled when the system is powered on and it is enabled when the system is not powered. |
| Power Off System | Powers off the system from the virtual console session. This option is enabled when the system is powered on and disabled when the system is not powered on. |
| Reset System (warm boot) | Reboots the system without powering it off. This option is enabled when the system is powered on and disabled when the system is not powered on. |
| Power Cycle System (cold boot) | Turns off system and then back on. This option is enabled when the system is powered on and disabled when the system is not powered on. |

Boot Device Menu

| Name | Description |
|-------------------------|---|
| No Override | Clicking this option enables the host to boot to the first device configured. |
| Boot Device list | A list of boot devices that the server uses to boot from only for the next server boot, without disrupting the currently configured boot order. Once the server boots from the one time boot device, all its future reboots occur from the previously configured boot order. A maximum of 15 devices are displayed on the vKVM console. |

Virtual Media Menu

| Name | Description |
|--|--|
| Create Image Note This option is available only if you use the Google Chrome web browser. | Allows you to create an ISO image. Drag and drop files or folders in the Create Image dialog box; these files or folders are converted to an ISO image. You can use the Download ISO Image button to save the ISO image to your local machine. |

| Name | Description |
|---------------------------------|---|
| Activate Virtual Devices | Activates a vMedia session that allows you to attach a drive or image file from your local computer or network. |

Help Menu

| Name | Description |
|--------------------------|--|
| Help Topics | Clicking this option brings you back to this window. |
| About vKVM Viewer | Displays the version number of the vKVM viewer. |

Settings

The **Settings** icon is located on the top right hand corner of the HTML vKVM viewer window.

| Name | Description |
|----------------------------|-------------------------------|
| Logged in as: | Displays your user role name. |
| Cisco IMC Host Name | Displays the host name. |

Comparison Between Java Based KVM and HTML5 Based KVM

The following table lists the differences between Java based KVM and HTML5 based KVM.

| Menu Option | Action | Available in Java Based KVM | Available in HTML5 Based KVM |
|---------------|---------------------------|-----------------------------|------------------------------|
| File | Open | Yes | Yes |
| | Capture to file | Yes | Yes |
| | Paste Text from Clipboard | Yes | No |
| | Paste Text from File | Yes | No |
| | Exit | Yes | Yes |
| View | Refresh | Yes | Yes |
| | Fit | Yes | No |
| | Video-Scaling | Yes | No |
| | Full-Screen | Yes | Yes |
| | Mini-Mod | Yes | No |
| Macros | Server Macros | Yes | Yes |

| Menu Option | Action | Available in Java Based KVM | Available in HTML5 Based KVM |
|----------------------|----------------------------|-----------------------------|------------------------------|
| | Static Macros | Yes | Yes |
| | User Defined Macros | Yes | Yes |
| | Manage | Yes | Yes |
| Tool | Session Option | Yes | Yes |
| | Single Cursor | Yes | No |
| | Stats | Yes | No Yes |
| | Session User List | Yes | Yes |
| | Chat | Yes | Yes |
| | Recorder/Playback Controls | Yes | No |
| | Export Video | Yes | No |
| Power | Power On | Yes | Yes |
| | Power OFF | Yes | Yes |
| | Reset System | Yes | Yes |
| | Power Cycle system | Yes | Yes |
| | Mini-Mod | Yes | Yes |
| Virtual Media | Create Image | Yes | No |
| | Activate Virtual Devices | Yes | Yes |
| | Physical Device Mapping | Yes | No |

Configuring the Virtual KVM

Before you begin

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

Procedure

-
- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.

- Step 3** In the work pane, click the **Remote Management** tab.
- Step 4** In the **Remote Management** pane, click the **Virtual KVM** tab.
- Step 5** In the **vKVM Properties** area on the **Virtual KVM** tab, complete the following fields:

| Name | Description |
|--|--|
| Enabled check box | If checked, the virtual KVM is enabled. Note The virtual media viewer is accessed through the KVM. If you disable the KVM console, Cisco IMC also disables access to all virtual media devices attached to the host. |
| Max Sessions drop-down list | The maximum number of concurrent KVM sessions allowed. You can select any number between 1 and 4. |
| Active Sessions field | The number of KVM sessions running on the server. |
| Remote Port field | The port used for KVM communication. |
| Enable Video Encryption check box | If checked, the server encrypts all video information sent through the KVM. |
| Enable Local Server Video check box | If checked, the KVM session is also displayed on any monitor attached to the server. |

- Step 6** Click **Save Changes**.

Enabling the Virtual KVM

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the **Compute** menu, select a server.
- Step 3** In the work pane, click the **Remote Management** tab.
- Step 4** In the **Remote Management** pane, click the **Virtual KVM** tab.
- Step 5** On the **Virtual KVM** tab, check the **Enabled** check box.
- Step 6** Click **Save Changes**.

Disabling the Virtual KVM

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
 - Step 2** In the **Compute** menu, select a server.
 - Step 3** In the work pane, click the **Remote Management** tab.
 - Step 4** In the **Remote Management** pane, click the **Virtual KVM** tab.
 - Step 5** On the **Virtual KVM** tab, uncheck the **Enabled** check box.
 - Step 6** Click **Save Changes**.
-



CHAPTER 8

Managing User Accounts

This chapter includes the following sections:

- [Configuring Local Users, on page 101](#)
- [Changing Password as a Non-Admin User, on page 103](#)
- [Password Expiry, on page 106](#)
- [Configuring Password Expiry Duration, on page 106](#)
- [Enabling Password Expiry, on page 107](#)
- [Resetting User Credentials to Factory Default Values, on page 108](#)
- [LDAP Servers, on page 109](#)
- [Viewing User Sessions, on page 121](#)

Configuring Local Users

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

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click the **Local User Management** tab.
- Step 4** To configure or modify a local user account, click a row in the **Local User Management** pane and click **Modify User**.
- Step 5** In the **Modify User Details** dialog box, update the following properties:

| Name | Description |
|---------------------------|--|
| ID field | The unique identifier for the user. |
| Username field | The username for the user. Enter between 1 and 16 characters. |
| Role Played field | <p>The role assigned to the user. This can be one of the following:</p> <ul style="list-style-type: none"> • read-only—A user with this role can view information but cannot make any changes. • user—A user with this role can perform the following tasks: <ul style="list-style-type: none"> • View all information • Manage the power control options such as power on, power cycle, and power off • Launch the vKVM console and virtual media • Clear all logs • Ping • admin—A user with this role can perform all actions available through the GUI, CLI, and IPMI. <p>Note Any user with admin role will not have the option of Change Password from the right top corner in Settings drop-down menu.</p> <p>To change password as a non-admin user, select read-only or user role and not the admin role.</p> |
| Enabled check box | If checked, the user is enabled on Cisco IMC. |
| Change Password check box | Enable this check box if you want to change the password. |

| Name | Description |
|------------------------|---|
| New Password field | <p>The password for this user name.</p> <p>Click the Suggest button to get a system generated password that you may want to use.</p> <p>When you move the mouse over the help icon beside the field, the following guidelines to set the password are displayed:</p> <ul style="list-style-type: none"> • The password must have a minimum of 8 and a maximum of 20 characters. • The password must not contain the user's name. • The password must contain characters from three of the following four categories: <ul style="list-style-type: none"> • English uppercase characters (A through Z). • English lowercase characters (a through z). • Base 10 digits (0 through 9). • Non-alphabetic characters (!, @, #, \$, %, ^, &, *, -, _, +, =). <p>These guidelines are meant to define a strong password for the user, for security reasons. However, if you want to set a password of your choice ignoring these guidelines, click the Disable Strong Password button on the Local User Management tab. While setting a password when the strong password option is disabled, you can use between 1- 20 characters.</p> |
| Confirm Password field | The password repeated for confirmation. |

Step 6 Enter password information.

Step 7 Click **Save Changes**.

Changing Password as a Non-Admin User



Note To perform this task, you must first login as admin and add a user with read-only or user privileges. Only then, you will be able to login as a non-admin user to change the password.

Procedure

Step 1 Login as an admin user.

Step 2 In the **Navigation** pane, click the **Admin** menu.

- Step 3** In the **Admin** menu, click **User Management**.
- Step 4** In the **User Management** pane, click the **Local User Management** tab.
- Step 5** To configure or add a local user account, click a row in the **Local User Management** pane and click **Add User**.
- Step 6** In the **Add User** dialog box, update the following properties by adding a user with read-only or user privileges:

| Name | Description |
|---------------------------|---|
| ID field | The unique identifier for the user. |
| Username field | The username for the user. Enter between 1 and 16 characters. |
| Role Played field | <p>The role assigned to the user. This can be one of the following:</p> <ul style="list-style-type: none"> • read-only—A user with this role can view information but cannot make any changes. • user—A user with this role can perform the following tasks: <ul style="list-style-type: none"> • View all information • Manage the power control options such as power on, power cycle, and power off • Launch the KVM console and virtual media • Clear all logs • Toggle the locator LED • Set time zone • Ping • admin—A user with this role can perform all actions available through the GUI, CLI, and IPMI. <p>Note To change password select read-only or user role and not the admin role.</p> |
| Enabled check box | If checked, the user is enabled on the Cisco IMC. |
| Change Password check box | If checked, the user is enabled to change the password. |

| Name | Description |
|-------------------------------|---|
| New Password | <p>Enter the new password for this username.</p> <p>Click the Suggest button to get a system generated password that you may want to use.</p> <p>When you move the mouse over the help icon beside the field, the following guidelines to set the password are displayed:</p> <ul style="list-style-type: none"> • The password must have a minimum of 8 and a maximum of 14 characters. • The password must not contain the User's Name. • The password must contain characters from three of the following four categories: <ul style="list-style-type: none"> • English uppercase characters (A through Z). • English lowercase characters (a through z). • Base 10 digits (0 through 9). • Non-alphabetic characters (!, @, #, \$, %, ^, &, *, -, _ , =, "). <p>These guidelines are meant to define a strong password for the user, for security reasons. However, if you want to set a password of your choice ignoring these guidelines, click the Disable Strong Password button on the Local User Management tab. While setting a password when the strong password option is disabled, you can use between 1- 20 characters.</p> |
| Confirm Password field | The password repeated for confirmation. |

Step 7 Click **Save Changes**.

Note On changing the password, you will be logged out of Cisco IMC.

Step 8 After creating a new user with read-only or user privileges, logout as admin.

Step 9 Now, login with the newly created read-only or user role. **Change Password** option is available in the right top corner in **Settings** drop-down menu.

When you click on the **Settings** icon, the drop-down lists the **Change Password** option. This option is visible only if you are logged in as a non-admin user.

If you do not see the **Change Password** option in the drop-down list, login as a non-admin user with read-only or user privileges.

You can now use the **Change Password** option to change your password. As soon as the password is changed, you will be logged out automatically and will be prompted to login with the new password.

Password Expiry

You can set a shelf life for a password, after which it expires. As an administrator, you can set this time in days. This configuration would be common to all users. Upon password expiry, the user is notified on login and would not be allowed to login unless the password is reset.



Note When you downgrade to an older database, existing users are deleted. The database returns to default settings. Previously configured users are cleared and the database is empty, that is, the database has the default username - 'admin' and password - 'password'. Since the server is left with the default user database, the change default credential feature is enabled. This means that when the 'admin' user logs on to the database for the first time after a downgrade, the user must mandatorily change the default credential.

Password Set Time

A 'Password set time' is configured for every existing user, to the time when the migration or upgrade occurred. For new users (users created after an upgrade), the Password Set time is configured to the time when the user was created, and the password is set. For users in general (new and existing), the Password Set Time is updated whenever the password is changed.

Configuring Password Expiry Duration

Before you begin

- You must enable password expiry.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **Local User Management** pane (opens by default), click **Password Expiration Details**.
- Step 4** In the **Password Expiration Details** dialog box, update the following fields:

| Name | Description |
|---|--|
| Enable Password Expiry check box | Checking this box allows you to configure the Password Expiry Duration . Uncheck the check box to disable it. |

| Name | Description |
|---------------------------------------|---|
| Password Expiry Duration field | The time period that you can set for the existing password to expire (from the time you set a new password or modify an existing one). The range is between 1 to 3650 days. Note Password expiry once set by the admin is applicable for all users that are subsequently created. |
| Password History field | The number of occurrences when a password was entered. When this is enabled, you cannot repeat a password. Enter a value between 0 to 5. Entering 0 disables this field. |
| Notification Period field | Notifies the time by when the password expires. Enter a value between 0 to 15 days. Entering 0 disables this field. Note The notification period time must be lesser than the password expiry duration. |
| Grace Period field | Time period till when the existing password can still be used, after it expires. Enter a value between 0 to 5 days. Entering 0 disables this field. Note The grace period time must be lesser than the password expiry duration. |

Note The valid **Password Expiry Duration** must be greater than the **Notification Period** and the **Grace Period**. If otherwise, you will see an **User Password Expiry Policy configuration error**.

Step 5 Click **Save Changes**.

Step 6 Optionally, click **Reset Values** to clear the text fields and reset the values you entered. Click **Restore Defaults** to revert to the default settings.

Enabling Password Expiry

Before you begin

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **Local User Management** pane (opens by default), click **Password Expiration Details**.
- Step 4** In the **Password Expiration Details** dialog box, check the **Enable Password Expiry** check box.

The **Password Expiry Duration** text field becomes editable and you can configure the duration by entering a number in days.

What to do next

Configure password expiry duration.

Resetting User Credentials to Factory Default Values



Caution

You may lose current IP address settings, NIC port settings, NIC redundancy after performing this procedure. Cisco recommends that you make a note of your current server settings before performing this procedure.

Before you begin

Ensure that your management Ethernet cable is plugged into the dedicated management port.

Procedure

- Step 1** Login as an admin user.
- Step 2** In the **Navigation** pane, click the **Chassis** menu.
- Step 3** In the **Chassis** menu, click **Summary**.
- Step 4** From the tool bar, click **Launch KVM**.
- Step 5** Alternatively, in the **Navigation** pane, click the **Compute** menu.
- In the **Compute** menu, select a server.
 - In the work pane, click the **Remote Management** tab.
 - In the **Remote Management** pane, click the **Virtual KVM** tab.
 - In the **Virtual KVM** tab, click **Launch HTML based KVM console**.
- Step 6** From the **Power** menu, select **Reset System**.
- Step 7** When prompted, press **F8** to enter the Cisco IMC Configuration Utility. This utility opens in the KVM console window.
- Step 8** Check the **Factory Default** check box, the server reverts to the factory defaults.
- Step 9** Press **F5** to refresh the settings that you made. You might have to wait about 45 seconds until the new settings appear and the message **Network settings configured** is displayed before you reboot the server in the next step.
- Step 10** Press **F10** to save your settings and reboot the server.
-

LDAP Servers

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

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

By checking the Enable Encryption check box in the **LDAP Settings** area, you can require the server to encrypt data sent to the LDAP server.

Configuring the LDAP Server

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



Important

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



Note

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

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

The following steps must be performed on the LDAP server.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click **LDAP**.
- Step 4** Ensure that the LDAP schema snap-in is installed.
- Step 5** Using the schema snap-in, add a new attribute with the following properties:

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

Step 6 Add the CiscoAVPair attribute to the user class using the snap-in:

- a) Expand the **Classes** node in the left pane and type **U** to select the user class.
- b) Click the **Attributes** tab and click **Add**.
- c) Type **C** to select the CiscoAVPair attribute.
- d) Click **OK**.

Step 7 Add the following user role values to the CiscoAVPair attribute, for the users that you want to have access to Cisco IMC:

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

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

What to do next

Use the Cisco IMC to configure the LDAP server.

Configuring LDAP Settings and Group Authorization in Cisco IMC

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click **LDAP**.

Step 4 In the **LDAP Settings** area, update the following properties:

| Name | Description |
|--|--|
| Enable LDAP check box | If checked, user authentication and role authorization is performed first by the LDAP server, followed by user accounts that are not found in the local user database. |
| Base DN field | Base Distinguished Name. This field describes where to load users and groups from. It must be in the dc=domain,dc=com format for Active Directory servers. |
| Domain field | The IPv4 domain that all users must be in. This field is required unless you specify at least one Global Catalog server address. |
| Enable Encryption check box | If checked, the server encrypts all information it sends to the LDAP server. |
| Enable Binding CA Certificate check box | If checked, allows you to bind the LDAP CA certificate. |
| Timeout (0 - 180) seconds | The number of seconds the Cisco IMC waits until the LDAP search operation times out. If the search operation times out, Cisco IMC tries to connect to the next server listed on this tab, if one is available. Note The value you specify for this field could impact the overall time. |
| User Search Precedence drop-down list | Allows you to specify the order of search between the local user database and LDAP user database. This can be one of the following: <ul style="list-style-type: none"> • Local User Database (Default setting) • LDAP User Database |

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

Step 5 In the **Configure LDAP Servers** area, update the following properties:

| Name | Description |
|--|--|
| Pre-Configure LDAP Servers radio button | If checked, the Active Directory uses the pre-configured LDAP servers. |

| Name | Description |
|---|---|
| LDAP Servers fields | |
| Server | <p>The IP address of the 6 LDAP servers.</p> <p>If you are using Active Directory for LDAP, then servers 1, 2 and 3 are domain controllers, while servers 4, 5 and 6 are Global Catalogs. If you are not Active Directory for LDAP, then you can configure a maximum of 6 LDAP servers.</p> <p>Note You can provide the IP address of the host name as well.</p> |
| Port | <p>The port numbers for the servers.</p> <p>If you are using Active Directory for LDAP, then for servers 1, 2 and 3, which are domain controllers, the default port number is 389. For servers 4, 5 and 6, which are Global Catalogs, the default port number is 3268.</p> <p>LDAPS communication occurs over the TCP 636 port. LDAPS communication to a global catalog server occurs over TCP 3269 port.</p> |
| Use DNS to Configure LDAP Servers radio button | If checked, you can use DNS to configure access to the LDAP servers. |
| DNS Parameters fields | |
| Source drop-down list | <p>Specifies how to obtain the domain name used for the DNS SRV request. It can be one of the following:</p> <ul style="list-style-type: none"> • Extracted—specifies using domain name extracted-domain from the login ID • Configured—specifies using the configured-search domain. • Configured-Extracted—specifies using the domain name extracted from the login ID than the configured-search domain. |
| Domain to Search | <p>A configured domain name that acts as a source for a DNS query.</p> <p>This field is disabled if the source is specified as Extracted.</p> |
| Forest to Search | <p>A configured forest name that acts as a source for a DNS query.</p> <p>This field is disabled if the source is specified as Extracted.</p> |

Step 6 In the **Binding Parameters** area, update the following properties:

| Name | Description |
|------------------------------|--|
| Method drop-down list | <p>It can be one of the following:</p> <ul style="list-style-type: none"> • Anonymous—requires NULL username and password. If this option is selected and the LDAP server is configured for Anonymous logins, then the user can gain access. • Configured Credentials—requires a known set of credentials to be specified for the initial bind process. If the initial bind process succeeds, then the distinguished name (DN) of the user name is queried and re-used for the re-binding process. If the re-binding process fails, then the user is denied access. • Login Credentials—requires the user credentials. If the bind process fails, the user is denied access. <p>By default, the Login Credentials option is selected.</p> |
| Binding DN | The distinguished name (DN) of the user. This field is editable only if you have selected Configured Credentials option as the binding method. |
| Password | The password of the user. This field is editable only if you have selected Configured Credentials option as the binding method. |

Step 7 In the **Search Parameters** area, update the following fields:

| Name | Description |
|-------------------------|---|
| Filter Attribute | <p>This field must match the configured attribute in the schema on the LDAP server.</p> <p>By default, this field displays sAMAccountName.</p> |
| Group Attribute | <p>This field must match the configured attribute in the schema on the LDAP server.</p> <p>By default, this field displays memberOf.</p> |

| Name | Description |
|--|--|
| Attribute | <p>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>The LDAP attribute can use an existing LDAP attribute that is mapped to the Cisco IMC user roles and locales, or can modify the schema such that a new LDAP attribute can be created. For example, CiscoAvPair.</p> |
| Nested Group Search Depth (1-128) | Parameter to search for an LDAP group nested within another defined group in an LDAP group map. The parameter defines the depth of a nested group search. |

Step 8 (Optional) In the **Group Authorization** area, update the following properties:

| Name | Description |
|---|--|
| LDAP Group Authorization check box | <p>If checked, user authentication is also done on the group level for LDAP users that are not found in the local user database.</p> <p>If you check this box, Cisco IMC enables the Configure Group button.</p> |
| Group Name column | The name of the group in the LDAP server database that is authorized to access the server. |
| Group Domain column | The LDAP server domain the group must reside in. |
| Role column | <p>The role assigned to all users in this LDAP server group. This can be one of the following:</p> <ul style="list-style-type: none"> • read-only—A user with this role can view information but cannot make any changes. • user—A user with this role can perform the following tasks: <ul style="list-style-type: none"> • View all information • Manage the power control options such as power on, power cycle, and power off • Launch the KVM console and virtual media • Clear all logs • Ping • admin—A user with this role can perform all actions available through the GUI, CLI, and IPMI. |

| Name | Description |
|-------------------------|--|
| Configure button | Opens the Configure LDAP Group window for an active directory group with the same Group Name , Group Domain , and Role options listed above. Once configured, click Save Changes . |
| Delete button | Deletes an existing LDAP group. |

Step 9 Click **Save Changes**.

Setting User Search Precedence

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** On the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click the **LDAP** tab.
- Step 4** In the **LDAP Settings** area's **User Search Precedence** field, select **Local User Database** or **LDAP User Database**.

This field allows you to specify the order of search between the above options. **Local User Database** is the default option.

LDAP Certificates Overview

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

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

Viewing LDAP CA Certificate Status

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.

- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click the **LDAP** tab.
- Step 4** In the **Certificate Status** area, view the following fields:

| Name | Description |
|-----------------|---|
| Download Status | This field displays the status of the LDAP CA certificate download. |
| Export Status | This field displays the status of the LDAP CA certificate export. |

Exporting an LDAP CA Certificate

Before you begin

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

You should have downloaded a signed LDAP CA Certificate before you can export it.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** tab.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click the **LDAP** tab.
- Step 4** Click the **Export LDAP CA Certificate** link.
- The **Export LDAP CA Certificate** dialog box appears.

| Name | Description |
|----------------------------------|---|
| Export to Remote Location | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the LDAP CA certificate file should be exported. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the certificate from the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| Export to Local Desktop | <p>Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it.</p> |

Step 5 Click **Export Certificate**.

Downloading an LDAP CA Certificate

Before you begin

- You must log in as a user with admin privileges to perform this action.
- You must enable Binding CA Certificate to perform this action.



Note Only CA certificates or chained CA certificates must be used in Cisco IMC. By default, CA certificate is in .cer format. If it is a chained CA certificate, then it needs to be converted to .cer format before downloading it to Cisco IMC.

Procedure

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

Step 2 In the **Admin** menu, click **User Management**.

Step 3 In the **User Management** pane, click the **LDAP** tab.

Step 4 Click the **Download LDAP CA Certificate** link.

The **Download LDAP CA Certificate** dialog box appears.

| Name | Description |
|---|--|
| Download from remote location radio button | <p>Selecting this option allows you to choose the certificate from a remote location and Download it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the LDAP CA certificate file should be stored. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the file to the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| Download through browser client radio button | <p>Selecting this option allows you to navigate to the certificate stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a Browse button that lets you navigate to the file you want to import.</p> |
| Paste Certificate content radio button | <p>Selecting this option allows you to copy the entire content of the signed certificate and paste it in the Paste certificate content text field.</p> <p>Note Ensure the certificate is signed before uploading.</p> |
| Download Certificate button | Allows you to Download the certificate to the server. |

Testing LDAP Binding

Before you begin

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



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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click the **LDAP** tab.
- Step 4** Click the **Test LDAP Binding** link.

The **Test LDAP CA Certificate Binding** dialog box appears.

| Name | Description |
|----------------|-----------------------------------|
| Username field | Enter the user name. |
| Password field | Enter the corresponding password. |

- Step 5** Click **Test**.

Deleting an LDAP CA Certificate

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click the **LDAP** tab.
- Step 4** Click the **Delete LDAP CA Certificate** link and click **OK** to confirm.

Viewing User Sessions

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **User Management**.
- Step 3** In the **User Management** pane, click **Session Management**.
- Step 4** In the **Sessions** pane, view the following information about current user sessions:

| Name | Description |
|----------------------------|--|
| Session ID column | The unique identifier for the session. |
| BMC Session ID | The identifier for the BMC session. |
| User Name column | The username for the user. |
| IP Address column | The IP address from which the user accessed the server. If this is a serial connection, it displays N/A . |
| Session Type column | The type of session the user chose to access the server. This can be one of the following: <ul style="list-style-type: none"> • webgui— indicates the user is connected to the server using the web UI. • CLI— indicates the user is connected to the server using CLI. • serial— indicates the user is connected to the server using the serial port. |
| Action column | This column displays N/A when the SOL is enabled and Terminate when the SOL is disabled. You can terminate a session by clicking Terminate on the web UI. |



CHAPTER 9

Configuring Chassis Related Settings

This chapter includes the following sections:

- [Managing Server Power, on page 123](#)
- [Pinging a Hostname/IP Address from the Web UI, on page 124](#)
- [Toggling the Locator LEDs, on page 124](#)
- [Selecting a Time Zone, on page 125](#)

Managing Server Power

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Summary**.
- Step 3** In the toolbar above the work pane, click the **Host Power** link.
- Step 4** From the drop-down list, select one of the following options:

| Actions | Description |
|--------------------|---|
| Power On | Powers on the chosen server. |
| Power Off | Powers off the chosen server, even if tasks are running on that server. Important If any firmware or BIOS updates are in progress, do not power off or reset the server until those tasks are complete. |
| Power Cycle | Powers off and powers on chosen server. |
| Hard Reset | Reboots the chosen server. |

| Actions | Description |
|-----------|---|
| Shut Down | Shuts down the chosen server if the operating system supports that feature. |

Pinging a Hostname/IP Address from the Web UI

Before you begin

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

Procedure

Step 1 In the toolbar above the work pane, click the **Ping** icon.

Step 2 In the **Ping Details** dialog box, update the following fields:

| Actions | Description |
|------------------------------------|---|
| * Hostname/IP Address field | Hostname or IP address you want to reach out to. |
| * Number of Retries field | The maximum number of retries allowed to ping the IP address. The default value is 3. The valid range is from 1 to 10. |
| * Timeout field | The maximum response time for a pinging activity. The default value is 10 seconds. The valid range is from 1 to 20 seconds. |
| Ping Status field | Displays results of the pinging activity. |
| Details button | Displays details of the pinging activity. |
| Ping button | Pings the IP address. |
| Cancel button | Closes the dialog box without pinging. |

Step 3 Click **Ping**.

Toggling the Locator LEDs

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
 - Step 2** In the **Chassis** menu, click **Summary**.
 - Step 3** In the toolbar above the work pane, click the **Locator LED** link.
 - Step 4** Select **Turn On Locator LED** or **Turn Off Locator LED**.
-

Selecting a Time Zone

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
 - Step 2** In the **Chassis** menu, click **Summary**.
 - Step 3** In the **Cisco Integrated Management Controller (Cisco IMC) Information** area, click **Select Timezone**.
Select Timezone screen appears.
 - Step 4** In the **Select Timezone** pop-up screen, mouse over the map and click on the location to select your time zone or choose your time zone from the **Timezone** drop-down menu.
 - Step 5** Click **OK**.
-



CHAPTER 10

Configuring Network-Related Settings

This chapter includes the following sections:

- [Server NIC Configuration, on page 127](#)
- [Common Properties Configuration, on page 134](#)
- [Configuring IPv4, on page 135](#)
- [Configuring IPv6, on page 136](#)
- [Connecting to a VLAN, on page 137](#)
- [Connecting to a Port Profile, on page 137](#)
- [Configuring Individual Settings, on page 139](#)
- [Network Security Configuration, on page 140](#)
- [Network Time Protocol Settings, on page 141](#)

Server NIC Configuration

Server NICs

NIC Mode

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

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



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



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

Default NIC Mode Setting:

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

NIC Redundancy

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

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



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

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

The available redundancy modes vary depending on the selected network mode and your platform. For the available modes, see the *Hardware Installation Guide* (HIG) for the type of server you are using. The C-Series HIGs are available at the following URL:

http://www.cisco.com/en/US/products/ps10493/prod_installation_guides_list.html

VIC Slots

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

For C220 M6, VIC slot options are as follows:



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

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

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

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

- **Riser 1**—Slot 1 is selected.
- **Riser 2**—Slot 2 is selected.

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

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

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

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

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

- 4
- 5
- 9
- 10



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

Configuring Server NICs

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

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **NIC Properties** area, update the following properties:

| Name | Description |
|-------------------------|---|
| NIC Mode drop-down list | <p>The ports that can be used to access Cisco IMC. This can be one of the following:</p> <ul style="list-style-type: none"> • Dedicated—The management port that is used to access the Cisco IMC. • Cisco Card—Any port on the adapter card that can be used to access Cisco IMC. The Cisco adapter card has to be installed in a slot with Network the Communications Services Interface protocol support (NCSI). • Shared LOM—Any LOM (LAN on Motherboard) port that can be used to access Cisco IMC. • Shared LOM Extended—Any LOM port or adapter card port that can be used to access Cisco IMC. The Cisco adapter card has to be installed in a slot with NCSI support. <p>Note Shared LOM and Shared LOM Extended ports are available only on some C-series servers.</p> <p>Note For other UCS C-Series M4 and M5 servers, the NIC mode is set to Shared LOM Extended by default.</p> <p>Default NIC Mode Setting:</p> <ul style="list-style-type: none"> • For UCS C-Series C125 M5 servers and S3260 servers, the NIC Mode is set to Cisco Card by default. |

| Name | Description |
|-------------------------|-------------|
| VIC Slot drop-down list | |

| Name | Description |
|------|--|
| | <p>The VIC slot that can be used for management functions in Cisco card mode.</p> <p>For C220 M6, VIC slot options are as follows:</p> <p>Note For C220 M6 , after resetting to factory default settings, the slot precedence is as follows:</p> <ul style="list-style-type: none"> a. mLOM b. Riser 1 - Slot 1 c. Riser 3 - Slot 3 <p>For C125 M5, VIC slot option is Riser 2.</p> <p>For C220 M4, C220 M5 and C240 M5 servers, VIC slot options are as follows:</p> <ul style="list-style-type: none"> • Riser 1—Slot 1 is selected. • Riser 2—Slot 2 is selected. • FLEX LOM—Slot 3 (MLOM) is selected. <p>For C240 SD M5 servers, VIC slot options are as follows:</p> <ul style="list-style-type: none"> • For servers with PCIe Riser 1 and 2B combination: <ul style="list-style-type: none"> • If you select Riser1, you must install the VIC in slot 2. • If you select Riser2, you must install the VIC in slot 5. • For servers with PCIe Riser 1C and 2E combination: <ul style="list-style-type: none"> • If you select Riser1, you must install the VIC in slot 1. • If you select Riser2, you must install the VIC in slot 2. • If you select Flex-LOM, you must install an mLOM-style VIC in the mLOM slot. <p>For C480 M5 ML servers, Cisco card mode slot is Slot 11 and Slot 12.</p> <p>The following options are available only on some UCS C-Series servers:</p> <ul style="list-style-type: none"> • 4 • 5 • 9 • 10 <p>For C240 M4 servers, VIC slot options are as follows:</p> <ul style="list-style-type: none"> • Riser 1—Slot 2 is the primary slot, but you can also use slot 1. |

| Name | Description |
|--------------------------------------|---|
| | <ul style="list-style-type: none"> • Riser 2—Slot 5 is the primary slot, but you can also use slot 4. • FLEX LOM—Slot 7 (MLOM) is selected. <p>Note This option is available only on some UCS C-Series servers.</p> |
| SIOC Slot drop-down list | <p>Configures Cisco IMC network mode. Based on the card present in the System IO Controller (SIOC1), network mode can be changed to either 1 or 2.</p> <p>Note This option is available only on some UCS S-Series servers.</p> |
| NIC Redundancy drop-down list | <p>The available NIC redundancy options depend on the selected NIC mode and the model of the server that you are using. If you do not see a particular option, it is not available for the selected mode or server model.</p> <p>This can be one of the following:</p> <ul style="list-style-type: none"> • active-active—If supported, all ports that are associated with the configured NIC mode operate simultaneously. This feature increases throughput and provides multiple paths to Cisco IMC. • active-standby—If a port that is associated with the configured NIC mode fails, traffic fails over to one of the other ports associated with the NIC mode. <p>Note</p> <ul style="list-style-type: none"> • If you choose this option, make sure that all ports associated with the configured NIC mode are connected to the same VLAN to ensure that traffic is secure regardless of which port is used. • When using active-active, do not configure a port-channel in the upstream switch for the member interfaces. A port-channel can be configured when using active-standby. <ul style="list-style-type: none"> • None—In <i>Dedicated</i> mode, NIC redundancy is set to <i>None</i>. |
| MAC Address field | <p>The MAC address of the Cisco IMC network interface that is selected in the NIC Mode field.</p> |

Step 4 Click **Save Changes**.

Common Properties Configuration

Overview to Common Properties Configuration

Hostname

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

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

Dynamic DNS

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



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

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

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

Configuring Common Properties

Use common properties to describe your server.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **Common Properties** area, update the following properties:

| Name | Description |
|---|--|
| Management Hostname field | The user-defined management hostname of the system that manages the various components of Cisco IMC. |
| Dynamic DNS check box | If checked, updates the resource records to the DNS from Cisco IMC. |
| Dynamic DNS Update Domain field | The domain name that is appended to a hostname for a Dynamic DNS (DDNS) update. If left blank, only a hostname is sent to the DDNS update request. |
| Dynamic DNS Refresh Interval field | The time set to refresh the DNS. Set a value between 0 and 8736 hours. If set to 0, it is disabled. |

- Step 4** Click **Save Changes**.

Configuring IPv4

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **IPv4 Properties** area, update the following properties:

| Name | Description |
|------------------------------------|--|
| Enable IPv4 check box | If checked, IPv4 is enabled. |
| Use DHCP check box | If checked, Cisco IMC uses DHCP. |
| Management IP Address field | The management IP address. An external virtual IP address that helps manage the CMCs and BMCs. |
| Subnet Mask field | The subnet mask for the IP address. |

| Name | Description |
|---|---|
| Gateway field | The gateway for the IP address. |
| Obtain DNS Server Addresses from DHCP check box | If checked, Cisco IMC retrieves the DNS server addresses from DHCP. |
| Preferred DNS Server field | The IP address of the primary DNS server. |
| Alternate DNS Server field | The IP address of the secondary DNS server. |

Step 4 Click **Save Changes**.

Configuring IPv6

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **IPv6 Properties** area, update the following properties:

| Name | Description |
|---|---|
| Enable IPv6 check box | If checked, IPv6 is enabled. |
| Use DHCP check box | If checked, the Cisco IMC uses DHCP. Note Only stateful DHCP is supported. |
| Management IP Address field | Management IPv6 address. Note Only global unicast addresses are supported. |
| Prefix Length field | The prefix length for the IPv6 address. Enter a value within the range 1 to 127. The default value is 64. |
| Gateway field | The gateway for the IPv6 address. Note Only global unicast addresses are supported. |
| Obtain DNS Server Addresses from DHCP check box | If checked, the Cisco IMC retrieves the DNS server addresses from DHCP. Note You can use this option only when the Use DHCP option is enabled. |

| Name | Description |
|----------------------------|---|
| Preferred DNS Server field | The IPv6 address of the primary DNS server. |
| Alternate DNS Server field | The IPv6 address of the secondary DNS server. |
| Link Local Address field | The link local address for the IPv6 address. |
| SLAAC Address field | The Stateless Address Auto Configuration (SLAAC) depends on the Router Advertisement (RA) of the network. |

Step 4 Click **Save Changes**.

Connecting to a VLAN

Before you begin

You must be logged in as admin to connect to a VLAN.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **VLAN Properties** area, update the following properties:

| Name | Description |
|-----------------------|---|
| Enable VLAN check box | If checked, the Cisco IMC is connected to a virtual LAN. Note You can configure a VLAN or a port profile, but you cannot use both. If you want to use a port profile, make sure that this check box is not checked. |
| VLAN ID field | The VLAN ID. |
| Priority field | The priority of this system on the VLAN. |

Step 4 Click **Save Changes**.

Connecting to a Port Profile

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **Port Properties** area, update the following properties:

| Name | Description |
|----------------------------|---|
| Port Profile field | Details of the Port Profile field. |
| Auto Negotiation check box | <p>Using this option, you can either set the network port speed and duplex values for the switch, or allow the system to automatically derive the values from the switch. This option is available for dedicated mode only.</p> <ul style="list-style-type: none"> • If checked, the network port speed and duplex settings are ignored by the system and Cisco IMC retains the speed at which the switch is configured. • If unchecked, you can configure the network port speed and duplex values. |
| Admin Mode Area | <p>Network Port Speed field</p> <p>The network speed of the port. This can be one of the following:</p> <ul style="list-style-type: none"> • 10 Mbps • 100 Mbps • 1 Gbps <p>The default value is 100 Mbps. In the Dedicated mode, if you disable Auto Negotiation, you can configure the network speed and duplex values.</p> <p>Note</p> <ul style="list-style-type: none"> • Before changing the port speed, ensure that the switch you connected to has the same port speed. <p>Duplex drop-down list</p> <p>The duplex mode for the Cisco IMC management port.</p> <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Half • Full <p>By default, the duplex mode is set to Full.</p> |

| Name | Description |
|---------------------|--|
| Operation Mode Area | Displays the operation network port speed and duplex values. If you checked the Auto Negotiation check box, the network port speed and duplex details of the switch are displayed. If unchecked, the network port speed and duplex values that you set at the Admin Mode are displayed. |

Step 4 Click **Save Changes**.

Configuring Individual Settings

This functionality is applicable only for Cisco UCS S-Series servers.

Before you begin

You must be logged in as admin to configure the settings.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the Individual Settings area, review and update the following fields for **CMC 1**, **CMC 2**, **BMC 1** and **BMC 2** in their respective areas:

| Name | Description |
|---------------------------------|---|
| Hostname field | The user-defined hostname. By default, the hostname appears in CXXX-YYYYYY format, where XXX is the model number and YYYYYY is the serial number of the server. |
| MAC Address field | The MAC address of the component. |
| IPv4 Address field | The IPv4 address of the component. |
| IPv6 Address field | The IPv6 address of the component. |
| Link Local Address field | The link local address for the component's IPv6 address. |

Step 4 Click **Save Changes**.

Network Security Configuration

Network Security

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

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

Configuring Network Security

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

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Networking** pane, click **Network Security**.
- Step 3** In the **IP Blocking Properties** area, update the following properties:

| Name | Description |
|---------------------------------------|--|
| Enable IP Blocking check box | Check this box to enable IP blocking. |
| IP Blocking Fail Count field | 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. |
| IP Blocking Fail Window field | 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 280. |
| IP Blocking Penalty Time field | The number of seconds the user remains locked out if they exceed the maximum number of login attempts within the specified time window. Enter an integer between 300 and 900. |

- Step 4** In the **IP Filtering (Whitelisting)** area, update the following properties:

| Name | Description |
|--------------------------------------|---|
| Enable IP Filtering check box | Check this box to enable IP filtering. |
| IP Filter fields | To provide secure access to the server, you can now set a filter to allow only a selected set of IPs to access it. This option provides four slots for storing IP addresses (IP Filter 1, 2, 3, and 4). You can either assign a single IP address or a range of IP addresses while setting the IP filters. Once you set the IP filter, you would be unable to access the server using any other IP address. |

Step 5 Click **Save Changes**.

Network Time Protocol Settings

Network Time Protocol Service Setting

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



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

Configuring Network Time Protocol Settings

Configuring NTP disables the IPMI **Set SEL time** command.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Networking**.
- Step 3** In the **Networking** pane, click **NTP Setting**.
- Step 4** In the **NTP Properties** area, update the following properties:

| Name | Description |
|------------------------------|--|
| NTP Enabled check box | Check this box to enable the NTP service. |
| Server 1 field | The IP/DNS address of one of the four servers that act as an NTP server or the time source server. |
| Server 2 field | The IP/DNS address of one of the four servers that act as an NTP server or the time source server. |
| Server 3 field | The IP/DNS address of one of the four servers that act as an NTP server or the time source server. |
| Server 4 field | The IP/DNS address of one of the four servers that act as an NTP server or the time source server. |
| Status message | <p>Indicates whether or not the server is able to synchronize its time with the remote NTP server. It is an eight bit integer indicating the stratum level of the local clock. This can be one of the following:</p> <ul style="list-style-type: none"> • 0—Unspecified or invalid • 1—Primary server • 2-15—Secondary server (via NTP) • 16—Unsynchronized • 17-255—Reserved |

Step 5 Click **Save Changes**.



CHAPTER 11

Managing Network Adapters

This chapter includes the following sections:

- [Overview of the Cisco UCS C-Series Network Adapters, on page 143](#)
- [Configuring Network Adapter Properties, on page 145](#)
- [Managing vHBAs, on page 152](#)
- [Managing vNICs, on page 166](#)
- [Backing Up and Restoring the Adapter Configuration, on page 190](#)
- [Resetting the Adapter, on page 193](#)

Overview of the Cisco UCS C-Series Network Adapters



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

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

- Cisco UCS VIC 1225 Virtual Interface Card
- Cisco UCS VIC 1227T Virtual Interface Card
- Cisco UCS VIC 1385 Virtual Interface Card
- Cisco UCS VIC 1387 Virtual Interface Card
- Cisco UCS VIC 1455 Virtual Interface Card
- Cisco UCS VIC 1457 Virtual Interface Card
- Cisco UCS VIC 1495 Virtual Interface Card
- Cisco UCS VIC 1497 Virtual Interface Card



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

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

Cisco UCS VIC 1225 Virtual Interface Card

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

Cisco UCS VIC 1385 Virtual Interface Card

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

Cisco UCS VIC 1227T Virtual Interface Card

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

Cisco UCS VIC 1387 Virtual Interface Card

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

Cisco UCS VIC 1455 Virtual Interface Card

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

Cisco UCS VIC 1457 Virtual Interface Card

The Cisco UCS VIC 1457 is a quad-port Small Form-Factor Pluggable (SFP28) mLOM card designed for M5 generation of Cisco UCS C-Series rack servers. The card supports 10/25-Gbps Ethernet or FCoE. It incorporates Cisco's next-generation CNA technology and offers a comprehensive feature set, providing investment protection for future feature software releases. The card can present PCIe standards-compliant interfaces to the host, and these can be dynamically configured as NICs and HBAs.

Cisco UCS VIC 1495 Virtual Interface Card

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

Cisco UCS VIC 1497 Virtual Interface Card

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

Configuring Network Adapter Properties

Before you begin

- You must log in as a user with admin privileges to perform this task.
- The server must be powered on, or the properties will not display.

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** menu, select the adapter card that you want to view.
- Step 3** In the **Adapter Card Properties** area under the **General** tab, review the following information:

| Name | Description |
|-------------------------|---|
| PCI Slot field | The PCI slot in which the adapter is installed. |
| Vendor field | The vendor for the adapter. |
| Product Name field | The product name for the adapter. |
| Product ID field | The product ID for the adapter. |
| Serial Number field | The serial number for the adapter. |
| Version ID field | The version ID for the adapter. |
| PCI Link field | The server to which the PCIe link is established. |
| Hardware Revision field | The hardware revision for the adapter. |

| Name | Description |
|---|--|
| Cisco IMC Management Enabled field | If this field displays yes , then the adapter is functioning in Cisco Card Mode and passing Cisco IMC management traffic through to the server Cisco IMC. |
| Configuration Pending field | If this field displays yes , the adapter configuration has changed in Cisco IMC but these changes have not been communicated to the host operating system. To activate the changes, an administrator must reboot the adapter. |
| iSCSI Boot Capable field | Whether iSCSI boot is supported on the adapter. |
| CDN Capable field | Whether CDN is supported on the adapter. |
| usNIC Capable field | Whether the adapter and the firmware running on the adapter support the usNIC. |
| Port Channel Capable field | Indicates whether Port Channel is supported on the adapter. Note This option is available only on some of the adapters and servers. |
| Description field | A user-defined description for the adapter. You can enter between 1 and 63 characters. |
| Enable FIP Mode check box | If checked, then FCoE Initialization Protocol (FIP) mode is enabled. FIP mode ensures that the adapter is compatible with current FCoE standards. Note We recommend that you use this option only when explicitly directed to do so by a technical support representative. |

| Name | Description |
|---|---|
| <p>Enable LLDP check box</p> | <p>Note For LLDP change to be effective, it is required that you reboot the server.</p> <p>In case of S3260 chassis with two nodes, ensure to reboot the secondary node after making LLDP changes in the primary node.</p> <p>If checked, then Link Layer Discovery Protocol (LLDP) enables all the Data Center Bridging Capability Exchange protocol (DCBX) functionality, which includes FCoE, priority based flow control.</p> <p>By default, LLDP option is enabled.</p> <p>Note We recommend that you do not disable LLDP option, as it disables all the DCBX functionality.</p> |
| <p>Enable VNTAG Mode check box</p> | <p>If VNTAG mode is enabled:</p> <ul style="list-style-type: none"> • vNICs and vHBAs can be assigned to a specific channel. • vNICs and vHBAs can be associated to a port profile. • vNICs can fail over to another vNIC if there are communication problems. |
| <p>Port Channel check box</p> | <p>This option is enabled by default.</p> <p>When Port channel is enabled, two vNICs and two vHBAs are available for use on the adapter card.</p> <p>When disabled, four vNICs and four vHBAs are available for use on the adapter card.</p> <p>Note This option is available only on some of the adapters and servers.</p> |

Step 4 In the **Firmware** area, review the following information:

| Name | Description |
|-------------------------------------|---|
| <p>Running Version field</p> | <p>The firmware version that is currently active.</p> |

| Name | Description |
|---------------------------------|---|
| Backup Version field | <p>The alternate firmware version installed on the adapter, if any. The backup version is not currently running. To activate it, administrators can click Activate Firmware in the Actions area.</p> <p>Note When you install new firmware on the adapter, any existing backup version is deleted and the new firmware becomes the backup version. You must manually activate the new firmware if you want the adapter to run the new version.</p> |
| Startup Version field | The firmware version that will become active the next time the adapter is rebooted. |
| Bootloader Version field | The bootloader version associated with the adapter card. |
| Status field | <p>The status of the last firmware activation that was performed on this adapter.</p> <p>Note The status is reset each time the adapter is rebooted.</p> |

Step 5 Click the **External Ethernet Interfaces** link to review the following information:

Note **External Ethernet Interfaces** opens in a different tab.

| Name | Description |
|-----------------------------|--|
| Port column | The uplink port ID. |
| Admin Speed column | <p>The data transfer rate for the port. This can be one of the following:</p> <ul style="list-style-type: none"> • 1 Gbps • 10 Gbps • 40 Gbps • 4 x 10 Gbps • Auto |
| Link Training column | Indicates if link training is enabled on the port. |

| Name | Description | | |
|---------------------------------|---|----------------------------------|---|
| Admin FEC Mode column | <p>Following Admin Forward Error Correction (FEC) mode options are available for configuration:</p> <ul style="list-style-type: none"> • c191 (available only with 25G and 100G configurations) • c174 (available only with 25G configuration) • Off (available only with 25G and 100G configurations) • Auto <p>Admin FEC Mode is set to Auto by default.</p> <p>Note</p> <ul style="list-style-type: none"> • FEC mode is applicable only for 25G and 100G link speed. On the 14xx adapters, the Operating FEC mode on the adapter and the switch must match in order to achieve link between devices. • In order to achieve a successful BER the Operating FEC value needs to meet or exceed the minimum FEC requirement for the transceiver or cable PID in use. <p>The minimum FEC requirement is dependent on the link speed and specific PID.</p> <p>Note For 25G refer Cisco 25GBASE SFP28 Modules Data Sheet.</p> <p>For 25G:</p> | | |
| | PID | Min. FEC | Optional Higher FEC |
| | SFP-25G-SR-S | c191 (RS-FEC) | NA |
| | SFP-10/25G-CSR-S | Off - 30M/50M on OM3/4 | c174 (FC-FEC, Base-R FEC) (at 25G) c191 (RS-FEC) |
| | | c174 - 70M/100M on OM3/4 | c191 (RS-FEC) |
| | c191 - 300M/400M on OM3/4 | NA | |
| | SFP-H25G-CU1M SFP-H25G-CU2M | Off | c174 (FC-FEC, Base-R FEC) c191 (RS-FEC) |
| | SFP-H25G-CU3M | c174 (FC-FEC, Base-R FEC) | c191 (RS-FEC) |
| | SFP-H25G-CU4M/5M | c191 (RS-FEC) | NA |
| | | | c191 (RS-FEC) |

| Name | Description | | |
|-------------------------------------|---|----------------------------------|--|
| | SFP-25G-AOC1M SFP-25G-AOC2M SFP-25G-AOC3M SFP-25G-AOC5M SFP-25G-AOC7M SFP-25G-AOC10M | cl74 (FC-FEC, Base-R FEC) | |
| | <p>For 100G:</p> <p>All PIDs with the following exceptions require cl91 (RS-FEC):</p> <ul style="list-style-type: none"> • QSFP-40/100-SRBD at 100G requires Operating FEC Off • QSFP-100G-LR4-S requires Operational FEC Off <p>For these two PIDs the Operating FEC is forced to Off regardless of the Admin FEC value.</p> <p>For the 100G cables with the QSFP connector to the Nexus Switch and the SFP28 connector to VIC 14XX 25G adapters:</p> | | |
| | PID | Min. FEC | Optional Higher FEC |
| | QSFP-4SFP25G-CU1M/2M | Off | cl74 (FC-FEC, Base-R FEC) cl91 (RS-FEC) |
| | QSFP-4SFP25G-CU3M | cl74 (FC-FEC, Base-R FEC) | cl91 (RS-FEC) |
| Operating FEC Mode column | <p>For 14xx adapters the Operating FEC Mode is set to the Admin FEC Mode value. The only exceptions are QSFP-40/100-SRBD and QSFP-100G-LR4-S as described in Admin FEC Mode.</p> <p>Note</p> <ul style="list-style-type: none"> • For 25G interfaces on Nexus NXOS Switches with Admin FEC value set to Auto, the default value for Operating FEC is cl74 (FC-FEC). • For 100G interfaces on Nexus Switches with the Admin FEC value set to Auto, the default value for Operating FEC is cl91 (RS-FEC). <p>The exceptions are QSFP-40/100-SRBD and QSFP-100G-LR4-S. The Operating FEC is forced to Off, regardless of the Admin FEC value.</p> <p>Refer to the Admin FEC Mode description for a successful connection with 14xx adapter.</p> | | |
| MAC Address column | The MAC address of the uplink port. | | |

| Name | Description |
|-----------------------------------|--|
| Link State column | <p>The current operational state of the uplink port. This can be one of the following:</p> <ul style="list-style-type: none"> • Fault • Link Up • Link Down • SFP ID Error • SFP Not Installed • SFP Security Check Failed • Unsupported SFP |
| Encap column | <p>The mode in which adapter operates. This can be one of the following:</p> <ul style="list-style-type: none"> • CE—Classical Ethernet mode. • NIV—Network Interface Virtualization mode. |
| Operating Speed column | <p>The operating rate for the port. This can be one of the following:</p> <ul style="list-style-type: none"> • 1 Gbps • 10 Gbps • 40 Gbps • 4 x 10 Gbps • Auto • 100 Gbps |
| Connector Present column | <p>Indicated whether or not the connector is present. This can be one of the following:</p> <ul style="list-style-type: none"> • Yes—Connector is present. • No—Connector not present. <p>Note This option is only available for some adapter cards.</p> |
| Connector Supported column | <p>Indicates whether or not the connector is supported by Cisco. This can be one of the following:</p> <ul style="list-style-type: none"> • Yes—The connector is supported by Cisco. • No—The connector is not supported by Cisco. <p>If the connector is not supported then the link will not be up.</p> <p>Note This option is only available for some adapter cards.</p> |

| Name | Description |
|---------------------------------------|---|
| Connector Type column | The type of the connector. Note This option is only available for some adapter cards. |
| Connector Vendor column | The vendor for the connector. Note This option is only available for some adapter cards. |
| Connector Part Number column | The part number of the connector. Note This option is only available for some adapter cards. |
| Connector Part Revision column | The part revision number of the connector. Note This option is only available for some adapter cards. |

Managing vHBAs

Guidelines for Managing vHBAs

When managing vHBAs, consider the following guidelines and restrictions:

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

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



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

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

Viewing vHBA Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to view.
- Step 3** In the **Adapter Card** area, click the **vHBAs** tab.
- Step 4** In the **vHBAs** pane, click **fc0** or **fc1**.
- Step 5** In the **General** area of vHBA Properties, review the information in the following fields:

| Name | Description |
|---|--|
| Name field | The name of the virtual HBA. This name cannot be changed after the vHBA has been created. |
| Initiator WWNN field | The WWNN associated with the vHBA. To let the system generate the WWNN, select AUTO . To specify a WWNN, click the second radio button and enter the WWNN in the corresponding field. |
| Initiator WWPN field | The WWPN associated with the vHBA. To let the system generate the WWPN, select AUTO . To specify a WWPN, click the second radio button and enter the WWPN in the corresponding field. |
| FC SAN Boot check box | If checked, the vHBA can be used to perform a SAN boot. |
| Persistent LUN Binding check box | If checked, any LUN ID associations are retained in memory until they are manually cleared. |
| Uplink Port drop-down list | The uplink port associated with the vHBA. Note This value cannot be changed for the system-defined vHBAs fc0 and fc1. |
| MAC Address field | The MAC address associated with the vHBA. To let the system generate the MAC address, select AUTO . To specify an address, click the second radio button and enter the MAC address in the corresponding field. |
| Default VLAN field | If there is no default VLAN for this vHBA, click NONE . Otherwise, click the second radio button and enter a VLAN ID between 1 and 4094 in the field. |
| PCI Order field | The order in which this vHBA will be used. To let the system set the order, select ANY . To specify an order, select the second radio button and enter an integer between 0 and 17. |

| Name | Description |
|---------------------------|---|
| vHBA Type drop-down list | <p>Note This option is available only with 14xx series adapters.</p> <p>The vHBA type used in this policy. vHBAs supporting FC and FC-NVMe can now be created on the same adapter. The vHBA type used in this policy can be one of the following:</p> <ul style="list-style-type: none"> • fc-initiator—Legacy SCSI FC vHBA initiator • fc-target—vHBA that supports SCSI FC target functionality <p>Note This option is available as a Tech Preview.</p> <ul style="list-style-type: none"> • fc-nvme-initiator—vHBA that is an FC NVME initiator, which discovers FC NVME targets and connects to them. • fc-nvme-target—vHBA that acts as an FC NVME target and provides connectivity to the NVME storage. |
| Class of Service field | <p>The CoS for the vHBA.</p> <p>Select an integer between 0 and 6, with 0 being lowest priority and 6 being the highest priority.</p> <p>Note This option cannot be used in VNTAG mode.</p> |
| Rate Limit field | <p>The data rate limit for traffic on this vHBA, in Mbps.</p> <p>If you want this vHBA to have an unlimited data rate, select OFF. Otherwise, click the second radio button and enter an integer between 1 and 10,000.</p> <p>Note This option cannot be used in VNTAG mode.</p> |
| EDTOV field | <p>The error detect timeout value (EDTOV), which is the number of milliseconds to wait before the system assumes that an error has occurred.</p> <p>Enter an integer between 1,000 and 100,000. The default is 2,000 milliseconds.</p> |
| RATOV field | <p>The resource allocation timeout value (RATOV), which is the number of milliseconds to wait before the system assumes that a resource cannot be properly allocated.</p> <p>Enter an integer between 5,000 and 100,000. The default is 10,000 milliseconds.</p> |
| Max Data Field Size field | <p>The maximum size of the Fibre Channel frame payload bytes that the vHBA supports.</p> <p>Enter an integer between 256 and 2112.</p> |

| Name | Description |
|------------------------------------|--|
| Channel Number field | The channel number that will be assigned to this vHBA. Enter an integer between 1 and 1,000. Note VNTAG mode is required for this option. |
| PCI Link | It is read-only field. |
| Port Profile drop-down list | The port profile that should be associated with the vHBA, if any. This field displays the port profiles defined on the switch to which this server is connected. Note VNTAG mode is required for this option. |

Step 6

In the **Error Recovery** area, review the information in the following fields:

| Name | Description |
|--|---|
| FCP Error Recovery check box | If checked, the system uses FCP Sequence Level Error Recovery protocol (FC-TAPE). |
| Link Down Timeout field | The number of milliseconds the uplink port should be offline before it informs the system that the uplink port is down and fabric connectivity has been lost. Enter an integer between 0 and 240,000. |
| Port Down I/O Retry Count field | 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. Enter an integer between 0 and 255. |
| IO Timeout Retry field | The time period till which the system waits for timeout before retrying. When a disk does not respond for I/O within the defined timeout period, the driver aborts the pending command, and resends the same I/O after the timer expires. Enter an integer between 1 and 59. |
| Port Down Timeout field | The number of milliseconds a remote Fibre Channel port should be offline before informing the SCSI upper layer that the port is unavailable. Enter an integer between 0 and 240,000. |

Step 7

In the **Fibre Channel Interrupt** area, review the information in the following fields:

| Name | Description |
|--------------------------------------|---|
| Interrupt Mode drop-down list | The preferred driver interrupt mode. This can be one of the following: <ul style="list-style-type: none"> • MSIx—Message Signaled Interrupts (MSI) with the optional extension. This is the recommended option. • MSI—MSI only. • INTx—PCI INTx interrupts. |

Step 8

In the **Fibre Channel Port** area, review the information in the following fields:

| Name | Description |
|---------------------------------|---|
| I/O Throttle Count field | The number of I/O operations that can be pending in the vHBA at one time. Enter an integer between 1 and 1,024. |
| LUNs per Target field | The maximum number of LUNs that the driver will export. This is usually an operating system platform limitation. Enter an integer between 1 and 1,024. |
| LUN Queue Depth field | The number of commands that the HBA can send or receive in a single chunk per LUN. This parameter adjusts the initial queue depth for all LUNs on the adapter. Default value is 20 for physical miniports and 250 for virtual miniports. |

Step 9

In the **Fibre Channel Port FLOGI** area, review the information in the following fields:

| Name | Description |
|----------------------------|---|
| FLOGI Retries field | The number of times that the system tries to log in to the fabric after the first failure. To specify an unlimited number of retries, select the INFINITE radio button. Otherwise select the second radio button and enter an integer into the corresponding field. |
| FLOGI Timeout field | The number of milliseconds that the system waits before it tries to log in again. Enter an integer between 1,000 and 255,000. |

Step 10

In the **Fibre Channel Port PLOGI** area, review the information in the following fields:

| Name | Description |
|----------------------------|---|
| PLOGI Retries field | The number of times that the system tries to log in to a port after the first failure. Enter an integer between 0 and 255. |

| Name | Description |
|----------------------------|--|
| PLOGI Timeout field | The number of milliseconds that the system waits before it tries to log in again. Enter an integer between 1,000 and 255,000. |

Step 11 In the **I/O** area, review the information in the following fields:

| Name | Description |
|---|---|
| CDB Transmit Queue Count field | The number of SCSI I/O queue resources the system should allocate. Enter an integer between 1 and 8. |
| CDB Transmit Queue Ring Size field | The number of descriptors in each SCSI I/O queue. Enter an integer between 64 and 512. |

Step 12 In the **Receive/Transmit Queues** area, review the information in the following fields:

| Name | Description |
|---|---|
| FC Work Queue Ring Size field | The number of descriptors in each transmit queue. Enter an integer between 64 and 128. |
| FC Receive Queue Ring Size field | The number of descriptors in each receive queue. Enter an integer between 64 and 2048. |

Step 13 In the **Boot Table** area, review the information in the following fields:

| Name | Description |
|---------------------------------|--|
| Index column | The unique identifier for the boot target. |
| Target WWPN column | The World Wide Port Name (WWPN) that corresponds to the location of the boot image. |
| LUN column | The LUN ID that corresponds to the location of the boot image. |
| Add Boot Entry button | Opens a dialog box that allows you to specify a new WWPN and LUN ID. |
| Edit Boot Entry button | Opens a dialog box that allows you to change the WWPN and LUN ID for the selected boot target. |
| Delete Boot Entry button | Deletes the selected boot target after you confirm the deletion. |

Step 14 In the **Persistent Bindings** area, review the information in the following fields:

| Name | Description |
|---------------------------|---|
| Index column | The unique identifier for the binding. |
| Target WWPN column | The target World Wide Port Name with which the binding is associated. |

| Name | Description |
|------------------------------------|--|
| Host WWPN column | The host World Wide Port Name with which the binding is associated. |
| Bus ID column | The bus ID with which the binding is associated. |
| Target ID column | The target ID on the host system with which the binding is associated. |
| Rebuild Persistent Bindings button | Clears all unused bindings and resets the ones that are in use. |

Modifying vHBA Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
- Step 4** In the **vHBAs** pane, click **fc0** or **fc1**.
- Step 5** In the **General** area, update the following fields:

| Name | Description |
|----------------------------------|---|
| Name field | The name of the virtual HBA. This name cannot be changed after the vHBA has been created. |
| Initiator WWNN field | The WWNN associated with the vHBA. To let the system generate the WWNN, select AUTO . To specify a WWNN, click the second radio button and enter the WWNN in the corresponding field. |
| Initiator WWPNN field | The WWPNN associated with the vHBA. To let the system generate the WWPNN, select AUTO . To specify a WWPNN, click the second radio button and enter the WWPNN in the corresponding field. |
| FC SAN Boot check box | If checked, the vHBA can be used to perform a SAN boot. |
| Persistent LUN Binding check box | If checked, any LUN ID associations are retained in memory until they are manually cleared. |
| Uplink Port drop-down list | The uplink port associated with the vHBA. Note This value cannot be changed for the system-defined vHBAs fc0 and fc1. |

| Name | Description |
|---------------------------------|---|
| MAC Address field | <p>The MAC address associated with the vHBA.</p> <p>To let the system generate the MAC address, select AUTO. To specify an address, click the second radio button and enter the MAC address in the corresponding field.</p> |
| Default VLAN field | <p>If there is no default VLAN for this vHBA, click NONE. Otherwise, click the second radio button and enter a VLAN ID between 1 and 4094 in the field.</p> |
| PCI Order field | <p>The order in which this vHBA will be used.</p> <p>To let the system set the order, select ANY. To specify an order, select the second radio button and enter an integer between 0 and 17.</p> |
| vHBA Type drop-down list | <p>Note This option is available only with 14xx series adapters.</p> <p>The vHBA type used in this policy. vHBAs supporting FC and FC-NVMe can now be created on the same adapter. The vHBA type used in this policy can be one of the following:</p> <ul style="list-style-type: none"> • fc-initiator—Legacy SCSI FC vHBA initiator • fc-target—vHBA that supports SCSI FC target functionality <p>Note This option is available as a Tech Preview.</p> <ul style="list-style-type: none"> • fc-nvme-initiator—vHBA that is an FC NVME initiator, which discovers FC NVME targets and connects to them. • fc-nvme-target—vHBA that acts as an FC NVME target and provides connectivity to the NVME storage. |
| Class of Service field | <p>The CoS for the vHBA.</p> <p>Select an integer between 0 and 6, with 0 being lowest priority and 6 being the highest priority.</p> <p>Note This option cannot be used in VNTAG mode.</p> |
| Rate Limit field | <p>The data rate limit for traffic on this vHBA, in Mbps.</p> <p>If you want this vHBA to have an unlimited data rate, select OFF. Otherwise, click the second radio button and enter an integer between 1 and 10,000.</p> <p>Note This option cannot be used in VNTAG mode.</p> |
| EDTOV field | <p>The error detect timeout value (EDTOV), which is the number of milliseconds to wait before the system assumes that an error has occurred.</p> <p>Enter an integer between 1,000 and 100,000. The default is 2,000 milliseconds.</p> |

| Name | Description |
|------------------------------------|---|
| RATOV field | The resource allocation timeout value (RATOV), which is the number of milliseconds to wait before the system assumes that a resource cannot be properly allocated. Enter an integer between 5,000 and 100,000. The default is 10,000 milliseconds. |
| Max Data Field Size field | The maximum size of the Fibre Channel frame payload bytes that the vHBA supports. Enter an integer between 256 and 2112. |
| Channel Number field | The channel number that will be assigned to this vHBA. Enter an integer between 1 and 1,000. Note VNTAG mode is required for this option. |
| PCI Link | It is read-only field. |
| Port Profile drop-down list | The port profile that should be associated with the vHBA, if any. This field displays the port profiles defined on the switch to which this server is connected. Note VNTAG mode is required for this option. |

Step 6 In the **Error Recovery** area, update the following fields:

| Name | Description |
|--|---|
| FCP Error Recovery check box | If checked, the system uses FCP Sequence Level Error Recovery protocol (FC-TAPE). |
| Link Down Timeout field | The number of milliseconds the uplink port should be offline before it informs the system that the uplink port is down and fabric connectivity has been lost. Enter an integer between 0 and 240,000. |
| Port Down I/O Retry Count field | 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. Enter an integer between 0 and 255. |
| IO Timeout Retry field | The time period till which the system waits for timeout before retrying. When a disk does not respond for I/O within the defined timeout period, the driver aborts the pending command, and resends the same I/O after the timer expires. Enter an integer between 1 and 59. |
| Port Down Timeout field | The number of milliseconds a remote Fibre Channel port should be offline before informing the SCSI upper layer that the port is unavailable. Enter an integer between 0 and 240,000. |

Step 7 In the **Fibre Channel Interrupt** area, update the following fields:

| Name | Description |
|--------------------------------------|---|
| Interrupt Mode drop-down list | The preferred driver interrupt mode. This can be one of the following: <ul style="list-style-type: none"> • MSIx—Message Signaled Interrupts (MSI) with the optional extension. This is the recommended option. • MSI—MSI only. • INTx—PCI INTx interrupts. |

Step 8 In the **Fibre Channel Port** area, update the following fields:

| Name | Description |
|---------------------------------|---|
| I/O Throttle Count field | The number of I/O operations that can be pending in the vHBA at one time. Enter an integer between 1 and 1,024. |
| LUNs per Target field | The maximum number of LUNs that the driver will export. This is usually an operating system platform limitation. Enter an integer between 1 and 1,024. |
| LUN Queue Depth field | The number of commands that the HBA can send or receive in a single chunk per LUN. This parameter adjusts the initial queue depth for all LUNs on the adapter. Default value is 20 for physical miniports and 250 for virtual miniports. |

Step 9 In the **Fibre Channel Port FLOGI** area, update the following fields:

| Name | Description |
|----------------------------|---|
| FLOGI Retries field | The number of times that the system tries to log in to the fabric after the first failure. To specify an unlimited number of retries, select the INFINITE radio button. Otherwise select the second radio button and enter an integer into the corresponding field. |
| FLOGI Timeout field | The number of milliseconds that the system waits before it tries to log in again. Enter an integer between 1,000 and 255,000. |

Step 10 In the **Fibre Channel Port PLOGI** area, update the following fields:

| Name | Description |
|----------------------------|---|
| PLOGI Retries field | The number of times that the system tries to log in to a port after the first failure. Enter an integer between 0 and 255. |

| Name | Description |
|----------------------------|--|
| PLOGI Timeout field | The number of milliseconds that the system waits before it tries to log in again. Enter an integer between 1,000 and 255,000. |

Step 11 In the **SCSI I/O** area, update the following fields:

| Name | Description |
|---|---|
| CDB Transmit Queue Count field | The number of SCSI I/O queue resources the system should allocate. Enter an integer between 1 and 8. |
| CDB Transmit Queue Ring Size field | The number of descriptors in each SCSI I/O queue. Enter an integer between 64 and 512. |

Step 12 In the **Receive/Transmit Queues** area, update the following fields:

| Name | Description |
|---|---|
| FC Work Queue Ring Size field | The number of descriptors in each transmit queue. Enter an integer between 64 and 128. |
| FC Receive Queue Ring Size field | The number of descriptors in each receive queue. Enter an integer between 64 and 2048. |

Step 13 Click **Save Changes**.

Step 14 In the **Boot Table** area, update the following fields or add a new entry:

| Name | Description |
|---------------------------------|--|
| Index column | The unique identifier for the boot target. |
| Target WWPN column | The World Wide Port Name (WWPN) that corresponds to the location of the boot image. |
| LUN column | The LUN ID that corresponds to the location of the boot image. |
| Add Boot Entry button | Opens a dialog box that allows you to specify a new WWPN and LUN ID. |
| Edit Boot Entry button | Opens a dialog box that allows you to change the WWPN and LUN ID for the selected boot target. |
| Delete Boot Entry button | Deletes the selected boot target after you confirm the deletion. |

Step 15 In the **Persistent Bindings** area, update the following fields or add a new entry:

| Name | Description |
|---------------------|--|
| Index column | The unique identifier for the binding. |

| Name | Description |
|------------------------------------|--|
| Target WWPN column | The target World Wide Port Name with which the binding is associated. |
| Host WWPN column | The host World Wide Port Name with which the binding is associated. |
| Bus ID column | The bus ID with which the binding is associated. |
| Target ID column | The target ID on the host system with which the binding is associated. |
| Rebuild Persistent Bindings button | Clears all unused bindings and resets the ones that are in use. |

Creating a vHBA

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

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

Before you begin

Ensure that **Enable VNTAG Mode** under **Adapter Card Properties** in the **General** tab is checked.

Procedure

-
- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
- Step 4** In the **Host Fibre Channel Interfaces** area, choose one of these actions:
- To create a vHBA using default configuration settings, click **Add vHBA**.
 - To create a vHBA using the same configuration settings as an existing vHBA, select that vHBA and click **Clone vHBA**.
- The **Add vHBA** dialog box appears.
- Step 5** In the **Add vHBA** dialog box, enter a name for the vHBA in the **Name** entry box.
- Step 6** Configure the new vHBA as described in [Modifying vHBA Properties, on page 158](#).
- Step 7** Click **Add vHBA**.
-

What to do next

- Reboot the server to create the vHBA.

Deleting a vHBA

Default vHBAs cannot be deleted. You can delete any other vHBAs created using VNTAG mode.

Procedure

-
- Step 1** In the **Navigation** pane, click the **Networking** menu.
 - Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
 - Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
 - Step 4** In the **Host Fibre Channel Interfaces** area, select a vHBA or vHBAs from the table.
- Note** You cannot delete either of the two default vHBAs, **fc0** or **fc1**.
- Step 5** Click **Delete vHBAs** and click **OK** to confirm.
-

What to do next

Reboot the server to delete the vHBA.

vHBA Boot Table

In the vHBA boot table, you can specify up to four LUNs from which the server can boot.

Creating a Boot Table Entry

Procedure

-
- Step 1** In the **Navigation** pane, click the **Networking** menu.
 - Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
 - Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
 - Step 4** Select a vHBA from the list of available vHBAs under **vHBAs** in the **vHBAs** tab.
The related **vHBA Properties** pane is displayed in the right hand side of the window.
 - Step 5** Scroll down to view **Boot Table** at the end of the page.
 - Step 6** Click the **Add Boot Entry** button to open the **Add Boot Entry** dialog box.
 - Step 7** In the **Add Boot Entry** dialog box, review the following information and perform the actions specified:

| Name | Description |
|--------------------------|---|
| Index field | The default value for this field is 0 . |
| Target WWPN field | The World Wide Port Name (WWPN) that corresponds to the location of the boot image. Enter the WWPN in the format hh : hh : hh : hh : hh : hh : hh . |

| Name | Description |
|-----------------------|--|
| LUN ID field | The LUN ID that corresponds to the location of the boot image. Enter an ID between 0 and 255. |
| Add Boot Entry button | Adds the specified location to the boot table. |
| Reset Values button | Clears the values currently entered in the fields. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

Deleting a Boot Table Entry

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
- Step 4** Select a vHBA from the list of available vHBAs under **vHBAs** in the **vHBAs** tab.
The related **vHBA Properties** pane is displayed in the right hand side of the window.
- Step 5** Scroll down to view **Boot Table** at the end of the page.
- Step 6** In the **Boot Table** area, click the entry to be deleted.
- Step 7** Click **Delete Boot Entry** and click **OK** to confirm.

vHBA Persistent Binding

Persistent binding ensures that the system-assigned mapping of Fibre Channel targets is maintained after a reboot.

Viewing Persistent Bindings

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
- Step 4** In the **vHBAs** pane, click **fc0** or **fc1**.
- Step 5** In the **Persistent Bindings** area, review the following information:

| Name | Description |
|---|--|
| Index column | The unique identifier for the binding. |
| Target WWPN column | The target World Wide Port Name with which the binding is associated. |
| Host WWPN column | The host World Wide Port Name with which the binding is associated. |
| Bus ID column | The bus ID with which the binding is associated. |
| Target ID column | The target ID on the host system with which the binding is associated. |
| Rebuild Persistent Bindings button | Clears all unused bindings and resets the ones that are in use. |

Rebuilding Persistent Bindings

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vHBAs** tab.
- Step 4** In the **vHBAs** pane, click **fc0** or **fc1**.
- Step 5** Scroll down to the **Persistent Bindings** area.
- Step 6** Click the **Rebuild Persistent Bindings** button.
- Step 7** Click **OK** to confirm.

Managing vNICs

Guidelines for Managing vNICs

When managing vNICs, consider the following guidelines and restrictions:

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

Additional vHBAs can be created using VNTAG mode.

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



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

- After making configuration changes, you must reboot the host for settings to take effect.

Viewing vNIC Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to view.
- Step 3** In the **Adapter Card** pane, click the **vNICs** tab.
- Step 4** In the **vNICs** pane, click **eth0** or **eth1**.
- Step 5** In the **General** area under **vNIC Properties** area, review the following fields:

General Area

| Name | Description |
|----------------------------|--|
| Name field | The name for the virtual NIC. This name cannot be changed after the vNIC has been created. |
| CDN field | The Consistent Device Name (CDN) that you can assign to the ethernet vNICs on the VIC cards. Assigning a specific CDN to a device helps in identifying it on the host OS. Note This feature works only when the CDN Support for VIC token is enabled in the BIOS. |
| MTU field | The maximum transmission unit, or packet size, that this vNIC accepts. Enter an integer between 1500 and 9000. |
| Uplink Port drop-down list | The uplink port associated with this vNIC. All traffic for this vNIC goes through this uplink port. |
| MAC Address field | The MAC address associated with the vNIC. To let the adapter select an available MAC address from its internal pool, select Auto . To specify an address, click the second radio button and enter the MAC address in the corresponding field. |
| Class of Service field | The class of service to associate with traffic from this vNIC. Select an integer between 0 and 6, with 0 being lowest priority and 6 being the highest priority. Note This option cannot be used in VNTAG mode. |

| Name | Description |
|----------------------------------|---|
| Trust Host CoS check box | Check this box if you want the vNIC to use the class of service provided by the host operating system. |
| PCI Order field | The order in which this vNIC will be used. To specify an order, enter an integer within the displayed range. |
| Default VLAN radio button | If there is no default VLAN for this vNIC, select NONE . Otherwise, select the second radio button and enter a VLAN ID between 1 and 4094 in the field. Note This option cannot be used in VNTAG mode. |
| VLAN Mode drop-down list | If you want to use VLAN trunking, select TRUNK . Otherwise, select ACCESS . Note This option cannot be used in VNTAG mode. |
| Rate Limit radio button | If you want this vNIC to have an unlimited data rate, select OFF. Otherwise, click the second radio button and enter a rate limit in the associated field. Enter an integer between 1 and 10,000 Mbps. For VIC 13xx controllers, you can enter an integer between 1 and 40,000 Mbps. For VIC 1455 and 1457 controllers: <ul style="list-style-type: none"> • If the adapter is connected to 25 Gbps link on a Switch, then you can enter an integer between 1 to 25,000 Mbps for the Rate Limit field. • If the adapter is connected to 10 Gbps link on a Switch, then you can enter an integer between 1 to 10,000 Mbps for the Rate Limit field. For VIC 1495 and 1497 controllers: <ul style="list-style-type: none"> • If the adapter is connected to 40 Gbps link on a switch, then you can enter an integer between 1 to 40,000 Mbps for the Rate Limit field. • If the adapter is connected to 100 Gbps link on a switch, then you can enter an integer between 1 to 100,000 Mbps for the Rate Limit field. Note This option cannot be used in VNTAG mode. |
| Channel Number field | Select the channel number that will be assigned to this vNIC. Note VNTAG mode is required for this option. |

| Name | Description |
|-------------------------------------|---|
| PCI Link field | <p>The link through which vNICs can be connected. These are the following values:</p> <ul style="list-style-type: none"> • 0 - The first cross-edged link where the vNIC is placed. • 1 - The second cross-edged link where the vNIC is placed. <p>Note</p> <ul style="list-style-type: none"> • This option is available only on some Cisco UCS C-Series servers. |
| Enable NVGRE check box | <p>Check this box to enable Network Virtualization using Generic Routing Encapsulation.</p> <ul style="list-style-type: none"> • This option is available only on some Cisco UCS C-Series servers. • This option is available only on C-Series servers with Cisco VIC 1385 cards. |
| Enable VXLAN check box | <p>Check this box to enable Virtual Extensible LAN.</p> <ul style="list-style-type: none"> • This option is available only on some Cisco UCS C-Series servers. • This option is available only on C-Series servers with Cisco VIC 1385 and VIC 14xx cards. |
| Advanced Filter check box | <p>Check this box to enable advanced filter options in vNICs.</p> |
| Port Profile drop-down list | <p>Select the port profile that should be associated with the vNIC.</p> <p>This field displays the port profiles defined on the switch to which this server is connected.</p> <p>Note VNTAG mode is required for this option.</p> |
| Enable PXE Boot check box | <p>Check this box if the vNIC can be used to perform a PXE boot.</p> |
| Enable VMQ check box | <p>Check this box to enable Virtual Machine Queue (VMQ).</p> |
| Enable Multi Queue check box | <p>Check this box to enable the Multi Queue option on vNICs. When enabled multi queue vNICs will be available to the host. By default this is disabled.</p> <p>Note</p> <ul style="list-style-type: none"> • Multi queue is supported only on C-Series servers with 14xx adapters. • VMQ must be in enabled state to enable this option. • When you enable this option on one of the vNICs, configuring only VMQ (without choosing multi-queue) on other vNICs is not supported. • When this option is enabled usNIC configuration will be disabled. |

| Name | Description |
|----------------------------------|---|
| No. of Sub vNICs field | Number of sub vNICs available to the host when the multi queue option is enabled. |
| Enable aRFS check box | Check this box to enable Accelerated Receive Flow steering (aRFS). This option is available only on some Cisco UCS C-Series servers. |
| Enable Uplink Failover check box | Check this box if traffic on this vNIC should fail over to the secondary interface if there are communication problems. Note VNTAG mode is required for this option. |
| Failback Timeout field | After a vNIC has started using its secondary interface, this setting controls how long the primary interface must be available before the system resumes using the primary interface for the vNIC. Enter a number of seconds between 0 and 600. Note VNTAG mode is required for this option. |

Step 6

In the **Ethernet Interrupt** area, review the information in the following fields:

| Name | Description |
|--------------------------------|--|
| Interrupt Count field | The number of interrupt resources to allocate. In general, this value should be equal to the number of completion queue resources. Enter an integer between 1 and 1024. |
| Interrupt Mode drop-down list | The preferred driver interrupt mode. This can be one of the following: <ul style="list-style-type: none"> • MSI-X—Message Signaled Interrupts (MSI) with the optional extension. This is the recommended option. • MSI—MSI only. • INTx—PCI INTx interrupts. |
| Coalescing Time field | The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent. Enter an integer between 1 and 65535. To turn off interrupt coalescing, enter 0 (zero) in this field. |
| Coalescing Type drop-down list | This can be one of the following: <ul style="list-style-type: none"> • MIN—The system waits for the time specified in the Coalescing Time field before sending another interrupt event. • IDLE—The system does not send an interrupt until there is a period of no activity lasting as least as long as the time specified in the Coalescing Time field. |

Step 7

In the **Ethernet Receive Queue** area, review the information in the following fields:

| Name | Description |
|------------------------|---|
| Count field | The number of receive queue resources to allocate. Enter an integer between 1 and 256. |
| Ring Size field | The number of descriptors in each receive queue. Enter an integer between 64 and 4096. |

Step 8 In the **Ethernet Transmit Queue** area, review the information in the following fields:

| Name | Description |
|------------------------|--|
| Count field | The number of transmit queue resources to allocate. Enter an integer between 1 and 256. |
| Ring Size field | The number of descriptors in each transmit queue. Enter an integer between 64 and 4096. |

Step 9 In the **Completion Queue** area, review the information in the following fields:

| Name | Description |
|--------------------|--|
| Count field | The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 512. |
| Ring Size | The number of descriptors in each completion queue. This value cannot be changed. |

Step 10 In the **Multi Queue** area, review the information in the following fields:

| Name | Description |
|-------------------------------------|---|
| Receive Queue Count field | The number of receive queue resources to allocate. Enter an integer between 1 and 1000. |
| Transmit Queue Count field | The number of transmit queue resources to allocate. Enter an integer between 1 and 1000. |
| Completion Queue Count field | The number of completion queue resources to allocate. Enter an integer between 1 and 2000. |

Step 11 In the **RoCE Properties** area, review the information in the following fields:

| Name | Description |
|----------------------|--|
| RoCE checkbox | Check the check box to change the RoCE Properties. |

| Name | Description |
|--|--|
| Queue Pairs field | <p>The number of queue pairs per adapter. Enter an integer between 1 and 2048.</p> <p>We recommend that this number be an integer power of 2. The recommended value for queue pairs per vNIC is 2048.</p> |
| Memory Regions field | <p>The number of memory regions per adapter. Enter an integer between 1 and 524288. We recommend that this number be an integer power of 2. The recommended value is 131072.</p> <p>The number of memory regions supported should be enough to meet application requirements as the regions are primarily used to send operation channel semantics.</p> |
| Resource Groups field | <p>The number of resource groups per adapter. Enter an integer between 1 and 128. We recommend that this number be an integer power of 2 greater than or equal to the number of CPU cores on the system for optimum performance.</p> <p>The resource group defines the total number of hardware resources such as WQ, RQ, CQ, and interrupts required to support the RDMA functionality, and is based on the total number of processor cores available with the host. The host chooses to dedicate a particular resource group to a core to maximize performance and get a better non-uniform memory access.</p> |
| Class of Service drop-down list | <p>NO Drop QOS COS to be specified. This same value should be configured at the up link switch. Default No Drop QOS COS is 5.</p> <p>Note This option is available only on some adapters.</p> |

Step 12

In the **TCP Offload** area, review the information in the following fields:

| Name | Description |
|--|--|
| Enable Large Receive check box | <p>If checked, the hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput.</p> <p>If cleared, the CPU processes all large packets.</p> |
| Enable TCP Rx Offload Checksum Validation check box | <p>If checked, the CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead.</p> <p>If cleared, the CPU validates all packet checksums.</p> |
| Enable TCP Segmentation Offload check box | <p>If checked, the CPU sends large TCP packets to the hardware to be segmented. This option may reduce CPU overhead and increase throughput rate.</p> <p>If cleared, the CPU segments large packets.</p> <p>Note This option is also known as Large Send Offload (LSO).</p> |

| Name | Description |
|--|--|
| Enable TCP Tx Offload Checksum Generation check box | If checked, the CPU sends all packets to the hardware so that the checksum can be calculated. This option may reduce CPU overhead. If cleared, the CPU calculates all packet checksums. |

Step 13

In the **Receive Side Scaling** area, review the information in the following fields:

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

What to do next

Reboot the server to create the vHBA.

Modifying vNIC Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the vNICs tab.
- Step 4** In the vNICs pane, click **eth0** or **eth1**.
- Step 5** In the **General** area under **vNIC Properties** in the vNICs pane, update the following fields:

| Name | Description |
|----------------------------|---|
| Name field | <p>The name for the virtual NIC.</p> <p>This name cannot be changed after the vNIC has been created.</p> |
| CDN field | <p>The Consistent Device Name (CDN) that you can assign to the ethernet vNICs on the VIC cards. Assigning a specific CDN to a device helps in identifying it on the host OS.</p> <p>Note This feature works only when the CDN Support for VIC token is enabled in the BIOS.</p> |
| MTU field | <p>The maximum transmission unit, or packet size, that this vNIC accepts.</p> <p>Enter an integer between 1500 and 9000.</p> |
| Uplink Port drop-down list | <p>The uplink port associated with this vNIC. All traffic for this vNIC goes through this uplink port.</p> |
| MAC Address field | <p>The MAC address associated with the vNIC.</p> <p>To let the adapter select an available MAC address from its internal pool, select Auto. To specify an address, click the second radio button and enter the MAC address in the corresponding field.</p> |
| Class of Service field | <p>The class of service to associate with traffic from this vNIC.</p> <p>Select an integer between 0 and 6, with 0 being lowest priority and 6 being the highest priority.</p> <p>Note This option cannot be used in VNTAG mode.</p> |
| Trust Host CoS check box | <p>Check this box if you want the vNIC to use the class of service provided by the host operating system.</p> |
| PCI Order field | <p>The order in which this vNIC will be used.</p> <p>To specify an order, enter an integer within the displayed range.</p> |
| Default VLAN radio button | <p>If there is no default VLAN for this vNIC, select NONE. Otherwise, select the second radio button and enter a VLAN ID between 1 and 4094 in the field.</p> <p>Note This option cannot be used in VNTAG mode.</p> |
| VLAN Mode drop-down list | <p>If you want to use VLAN trunking, select TRUNK. Otherwise, select ACCESS.</p> <p>Note This option cannot be used in VNTAG mode.</p> |

| Name | Description |
|--------------------------------|--|
| Rate Limit radio button | <p>If you want this vNIC to have an unlimited data rate, select OFF. Otherwise, click the second radio button and enter a rate limit in the associated field.</p> <p>Enter an integer between 1 and 10,000 Mbps.</p> <p>For VIC 13xx controllers, you can enter an integer between 1 and 40,000 Mbps.</p> <p>For VIC 1455 and 1457 controllers:</p> <ul style="list-style-type: none"> • If the adapter is connected to 25 Gbps link on a Switch, then you can enter an integer between 1 to 25,000 Mbps for the Rate Limit field. • If the adapter is connected to 10 Gbps link on a Switch, then you can enter an integer between 1 to 10,000 Mbps for the Rate Limit field. <p>For VIC 1495 and 1497 controllers:</p> <ul style="list-style-type: none"> • If the adapter is connected to 40 Gbps link on a switch, then you can enter an integer between 1 to 40,000 Mbps for the Rate Limit field. • If the adapter is connected to 100 Gbps link on a switch, then you can enter an integer between 1 to 100,000 Mbps for the Rate Limit field. <p>Note This option cannot be used in VNTAG mode.</p> |
| Channel Number field | <p>Select the channel number that will be assigned to this vNIC.</p> <p>Note VNTAG mode is required for this option.</p> |
| PCI Link field | <p>The link through which vNICs can be connected. These are the following values:</p> <ul style="list-style-type: none"> • 0 - The first cross-edged link where the vNIC is placed. • 1 - The second cross-edged link where the vNIC is placed. <p>Note</p> <ul style="list-style-type: none"> • This option is available only on some Cisco UCS C-Series servers. |
| Enable NVGRE check box | <p>Check this box to enable Network Virtualization using Generic Routing Encapsulation.</p> <ul style="list-style-type: none"> • This option is available only on some Cisco UCS C-Series servers. • This option is available only on C-Series servers with Cisco VIC 1385 cards. |

| Name | Description |
|---|--|
| Enable VXLAN check box | Check this box to enable Virtual Extensible LAN. <ul style="list-style-type: none"> • This option is available only on some Cisco UCS C-Series servers. • This option is available only on C-Series servers with Cisco VIC 1385 and VIC 14xx cards. |
| Advanced Filter check box | Check this box to enable advanced filter options in vNICs. |
| Port Profile drop-down list | Select the port profile that should be associated with the vNIC. This field displays the port profiles defined on the switch to which this server is connected. Note VNTAG mode is required for this option. |
| Enable PXE Boot check box | Check this box if the vNIC can be used to perform a PXE boot. |
| Enable VMQ check box | Check this box to enable Virtual Machine Queue (VMQ). |
| Enable Multi Queue check box | Check this box to enable the Multi Queue option on vNICs. When enabled multi queue vNICs will be available to the host. By default this is disabled. Note <ul style="list-style-type: none"> • Multi queue is supported only on C-Series servers with 14xx adapters. • VMQ must be in enabled state to enable this option. • When you enable this option on one of the vNICs, configuring only VMQ (without choosing multi-queue) on other vNICs is not supported. • When this option is enabled usNIC configuration will be disabled. |
| No. of Sub vNICs field | Number of sub vNICs available to the host when the multi queue option is enabled. |
| Enable aRFS check box | Check this box to enable Accelerated Receive Flow steering (aRFS). This option is available only on some Cisco UCS C-Series servers. |
| Enable Uplink Failover check box | Check this box if traffic on this vNIC should fail over to the secondary interface if there are communication problems. Note VNTAG mode is required for this option. |

| Name | Description |
|-------------------------------|--|
| Failback Timeout field | <p>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.</p> <p>Enter a number of seconds between 0 and 600.</p> <p>Note VNTAG mode is required for this option.</p> |

Step 6

In the **Ethernet Interrupt** area, update the following fields:

| Name | Description |
|---------------------------------------|---|
| Interrupt Count field | <p>The number of interrupt resources to allocate. In general, this value should be equal to the number of completion queue resources.</p> <p>Enter an integer between 1 and 1024.</p> |
| Coalescing Time field | <p>The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent.</p> <p>Enter an integer between 1 and 65535. To turn off interrupt coalescing, enter 0 (zero) in this field.</p> |
| Coalescing Type drop-down list | <p>This can be one of the following:</p> <ul style="list-style-type: none"> • MIN—The system waits for the time specified in the Coalescing Time field before sending another interrupt event. • IDLE—The system does not send an interrupt until there is a period of no activity lasting as least as long as the time specified in the Coalescing Time field. |
| Interrupt Mode drop-down list | <p>The preferred driver interrupt mode. This can be one of the following:</p> <ul style="list-style-type: none"> • MSI-X—Message Signaled Interrupts (MSI) with the optional extension. This is the recommended option. • MSI—MSI only. • INTx—PCI INTx interrupts. |

Step 7

In the **Ethernet Receive Queue** area, update the following fields:

| Name | Description |
|------------------------|--|
| Count field | <p>The number of receive queue resources to allocate.</p> <p>Enter an integer between 1 and 256.</p> |
| Ring Size field | <p>The number of descriptors in each receive queue.</p> <p>Enter an integer between 64 and 4096.</p> |

Step 8

In the **Ethernet Transmit Queue** area, update the following fields:

| Name | Description |
|-----------------|--|
| Count field | The number of transmit queue resources to allocate. Enter an integer between 1 and 256. |
| Ring Size field | The number of descriptors in each transmit queue. Enter an integer between 64 and 4096. |

Step 9 In the **Completion Queue** area, update the following fields:

| Name | Description |
|-------------|--|
| Count field | The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 512. |
| Ring Size | The number of descriptors in each completion queue. This value cannot be changed. |

Step 10 In the **Multi Queue** area, update the following details:

| Name | Description |
|------------------------------|---|
| Receive Queue Count field | The number of receive queue resources to allocate. Enter an integer between 1 and 1000. |
| Transmit Queue Count field | The number of transmit queue resources to allocate. Enter an integer between 1 and 1000. |
| Completion Queue Count field | The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 2000. |

Step 11 In the **RoCE Properties** area, update the following fields:

| Name | Description |
|----------------------|--|
| RoCE check box | Check the check box to change the RoCE Properties. |
| Queue Pairs field | The number of queue pairs per adapter. Enter an integer between 1 and 2048. We recommend that this number be an integer power of 2. |
| Memory Regions field | The number of memory regions per adapter. Enter an integer between 1 and 524288. We recommend that this number be an integer power of 2. |

| Name | Description |
|-------------------------------|---|
| Resource Groups field | The number of resource groups per adapter. Enter an integer between 1 and 128. We recommend that this number be an integer power of 2 greater than or equal to the number of CPU cores on the system for optimum performance. |
| Class of Service field | This field is read-only and is set to 5. Note This option is available only on some of the adapters. |

Step 12

In the **TCP Offload** area, update the following fields:

| Name | Description |
|--|---|
| Enable Large Receive check box | If checked, the hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput. If cleared, the CPU processes all large packets. |
| Enable TCP Segmentation Offload check box | If checked, the CPU sends large TCP packets to the hardware to be segmented. This option may reduce CPU overhead and increase throughput rate. If cleared, the CPU segments large packets. Note This option is also known as Large Send Offload (LSO). |
| Enable TCP Rx Offload Checksum Validation check box | If checked, the CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. If cleared, the CPU validates all packet checksums. |
| Enable TCP Tx Offload Checksum Generation check box | If checked, the CPU sends all packets to the hardware so that the checksum can be calculated. This option may reduce CPU overhead. If cleared, the CPU calculates all packet checksums. |

Step 13

In the **Receive Side Scaling** area, update the following fields:

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

| Name | Description |
|---|--|
| Enable TCP-IPv6 RSS check box | If checked, RSS is enabled for TCP transmissions across IPv6 networks. |
| Enable IPv6 Extension RSS check box | If checked, RSS is enabled for IPv6 extensions. |
| Enable TCP-IPv6 Extension RSS check box | If checked, RSS is enabled for TCP transmissions across IPv6 networks. |

Step 14 Click **Save Changes**.

What to do next

Reboot the server to modify the vNIC.

Creating a vNIC

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

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

Procedure

-
- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vNICs** tab.
- Step 4** In the **Host Ethernet Interfaces** area, choose one of these actions:
- To create a vNIC using default configuration settings, click **Add vNIC**.
 - To create a vNIC using the same configuration settings as an existing vNIC, select that vNIC and click **Clone vNIC**.
- The **Add vNIC** dialog box appears.
- Step 5** In the **Add vNIC** dialog box, enter a name for the vNIC in the **Name** entry box.
- Step 6** In the **Add vNIC** dialog box, enter a channel number for the vNIC in the **Channel Number** entry box.
- Note** If VNTAG is enabled on the adapter, you must assign a channel number for the vNIC when you create it.
- Step 7** Click **Add vNIC**.
-

What to do next

If configuration changes are required, configure the new vNIC as described in [Modifying vNIC Properties](#), on page 173.

Deleting a vNIC

Procedure

-
- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vNICs** tab.
- Step 4** In the **Host Ethernet Interfaces** area, select a vNIC from the table.
- Note** You cannot delete either of the two default vNICs, **eth0** or **eth1**.
- Step 5** Click **Delete vNIC** and click **OK** to confirm.
-

Configuring iSCSI Boot Capability

Configuring iSCSI Boot Capability for vNICs

To configure the iSCSI boot capability on a vNIC:

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



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

Configuring iSCSI Boot Capability on a vNIC

Procedure

-
- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vNICs** tab.
- Step 4** In the **vNICs** pane, click **eth0** or **eth1**.
- Step 5** Select the **iSCSI Boot Properties** area.
- Step 6** In the **General** area, update the following fields:

| Name | Description |
|----------------------------|--|
| Name field | The name of the vNIC. |
| DHCP Network check box | Whether DHCP Network is enabled for the vNIC. If enabled, the initiator network configuration is obtained from the DHCP server. |
| DHCP iSCSI check box | Whether DHCP iSCSI is enabled for the vNIC. If enabled and the DHCP ID is set, the initiator IQN and target information are obtained from the DHCP server. Note If DHCP iSCSI is enabled without a DHCP ID, only the target information is obtained. |
| DHCP ID field | The vendor identifier string used by the adapter to obtain the initiator IQN and target information from the DHCP server. Enter a string up to 64 characters. |
| DHCP Timeout field | The number of seconds to wait before the initiator assumes that the DHCP server is unavailable. Enter an integer between 60 and 300 (default: 60 seconds) |
| Link Timeout field | The number of seconds to wait before the initiator assumes that the link is unavailable. Enter an integer between 0 and 255 (default: 15 seconds) |
| LUN Busy Retry Count field | The number of times to retry the connection in case of a failure during iSCSI LUN discovery. Enter an integer between 0 and 255. The default is 15. |
| IP Version field | The IP version to use during iSCSI boot. |

Step 7 In the **Initiator** area, update the following fields:

| Name | Description |
|------------------|---|
| Name field | A regular expression that defines the name of the iSCSI initiator. You can enter any alphanumeric string as well as the following special characters: <ul style="list-style-type: none"> • . (period) • : (colon) • - (dash) Note The name is in the IQN format. |
| IP Address field | The IP address of the iSCSI initiator. |

| Name | Description |
|-----------------------------------|---|
| Subnet Mask field | The subnet mask for the iSCSI initiator. |
| Gateway field | The default gateway. |
| Primary DNS field | The primary DNS server address. |
| Initiator Priority drop-down list | The initiator priority drop-down list. |
| Secondary DNS field | The secondary DNS server address. |
| TCP Timeout field | The number of seconds to wait before the initiator assumes that TCP is unavailable. Enter an integer between 0 and 255 (default: 15 seconds) |
| CHAP Name field | The Challenge-Handshake Authentication Protocol (CHAP) name of the initiator. |
| CHAP Secret field | The Challenge-Handshake Authentication Protocol (CHAP) shared secret of the initiator. |

Step 8 In the **Primary Target** area, update the following fields:

| Name | Description |
|-------------------|--|
| Name field | The name of the primary target in the IQN format. |
| IP Address field | The IP address of the target. |
| TCP Port field | The TCP port associated with the target. |
| Boot LUN field | The Boot LUN associated with the target. |
| CHAP Name field | The Challenge-Handshake Authentication Protocol (CHAP) name of the initiator. |
| CHAP Secret field | The Challenge-Handshake Authentication Protocol (CHAP) shared secret of the initiator. |

Step 9 In the **Secondary Target** area, update the following fields:

| Name | Description |
|------------------|---|
| Name field | The name of the secondary target in the IQN format. |
| IP Address field | The IP address of the target. |
| TCP Port field | The TCP port associated with the target. |
| Boot LUN field | The Boot LUN associated with the target. |
| CHAP Name field | The Challenge-Handshake Authentication Protocol (CHAP) name of the initiator. |

| Name | Description |
|--------------------------|---|
| CHAP Secret field | The Challenge-Handshake Authentication Protocol (CHAP) shared secret of the initiator. |
| Name | Description |
| Configure iSCSI button | Configures iSCSI boot on the selected vNIC. |
| Unconfigure iSCSI button | Removes the configuration from the selected vNIC. |
| Reset Values button | Restores the values for the vNIC to the settings that were in effect when this dialog box was first opened. |
| Cancel button | Closes the dialog box without making any changes. |

Step 10 Click **Save Changes**.

Removing iSCSI Boot Configuration from a vNIC

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **vNICs** tab.
- Step 4** In the **vNICs** pane, click **eth0** or **eth1**.
- Step 5** Select the **iSCSI Boot Properties** area.
- Step 6** Click the **Unconfigure iSCSI Boot** button at the bottom of the **iSCSI Boot Properties** area.

What to do next

Reboot the server to remove the iSCSI Boot Configuration.

Managing Cisco usNIC

Overview of Cisco usNIC

The Cisco user-space NIC (Cisco usNIC) feature improves the performance of software applications that run on the Cisco UCS servers in your data center by bypassing the kernel when sending and receiving networking packets. The applications interact directly with a Cisco UCS VIC second generation or later generation adapter, such as the , which improves the networking performance of your high-performance computing cluster. To

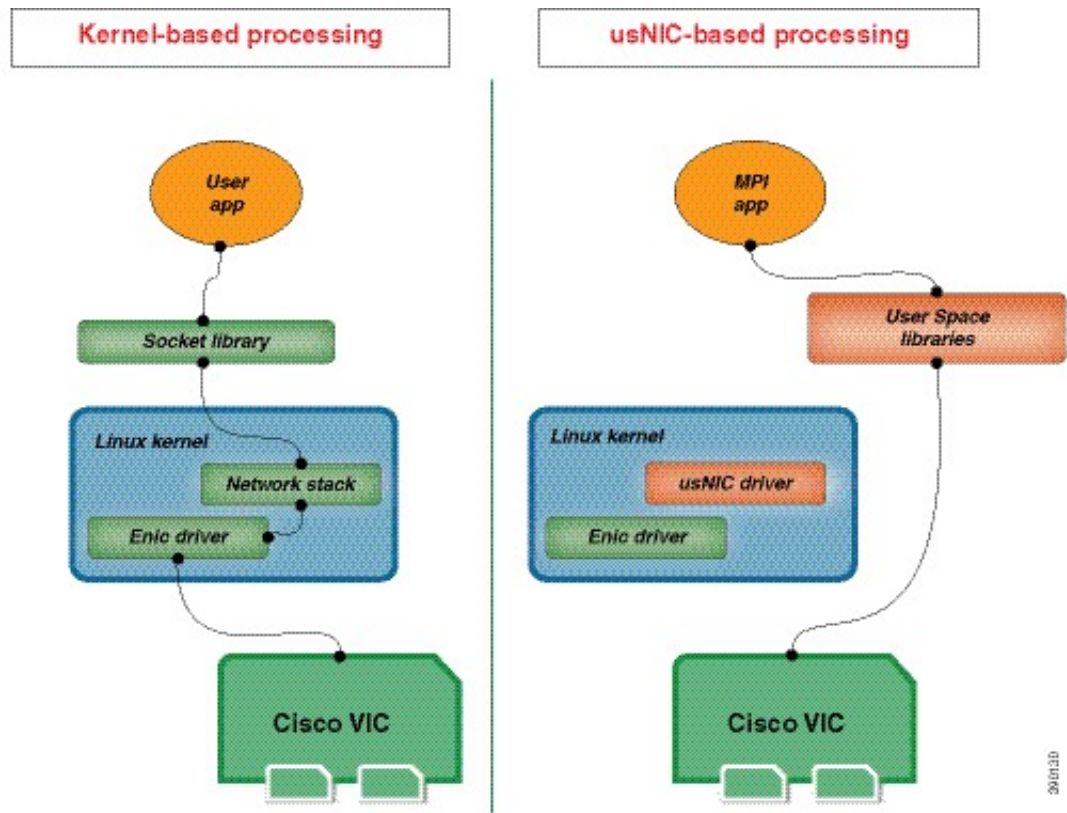
benefit from Cisco usNIC, your applications must use the Message Passing Interface (MPI) instead of sockets or other communication APIs.

Cisco usNIC offers the following benefits for your MPI applications:

- Provides a low-latency and high-throughput communication transport.
- Employs the standard and application-independent Ethernet protocol.
- Takes advantage of lowlatency forwarding, Unified Fabric, and integrated management support in the following Cisco data center platforms:
 - Cisco UCS server
 - Cisco UCS VIC second generation or later generation adapter
 - 10 or 40GbE networks

Standard Ethernet applications use user-space socket libraries, which invoke the networking stack in the Linux kernel. The networking stack then uses the Cisco eNIC driver to communicate with the Cisco VIC hardware. The following figure shows the contrast between a regular software application and an MPI application that uses Cisco usNIC.

Figure 1: Kernel-Based Network Communication versus Cisco usNIC-Based Communication



Viewing and Configuring Cisco usNIC using the Cisco IMC GUI

Before you begin

You must log in to the Cisco IMC GUI with admin privileges to perform this task. Click Play on this [video](#) to watch how to configure Cisco usNIC in Cisco IMC.

Procedure

- Step 1** Log into the Cisco IMC GUI.
- For more information about how to log into Cisco IMC, see [Cisco UCS C-Series Servers Integrated Management Controller GUI Configuration Guide](#).
- Step 2** In the **Navigation** pane, click the **Networking** menu.
- Step 3** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 4** In the **Adapter Card** pane, click the **vNICs** tab.
- Step 5** In the vNICs pane, click **eth0** or **eth1**.
- Step 6** In the **usNIC** area, review and update the following fields.

| Name | Description |
|------------------------------|--|
| Name | The name for the vNIC that is the parent of the usNIC. Note This field is read-only. |
| usNIC field | The number of usNICs assigned to the specific vNIC. Enter an integer between 0 and 225. To assign additional usNICs to a specified vNIC, enter value higher than the existing value. To delete usNICs from a specified vNIC, enter value smaller than the existing value. To delete all the usNICs assigned to a vNIC, enter zero. |
| Transmit Queue Count field | The number of transmit queue resources to allocate. Enter an integer between 1 and 256. |
| Receive Queue Count field | The number of receive queue resources to allocate. Enter an integer between 1 and 256. |
| Completion Queue Count field | The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 512. |

| Name | Description |
|---|---|
| Transmit Queue Ring Size field | The number of descriptors in each transmit queue. Enter an integer between 64 and 4096. |
| Receive Queue Ring Size field | The number of descriptors in each receive queue. Enter an integer between 64 and 4096. |
| Interrupt Count field | The number of interrupt resources to allocate. In general, this value should be equal to the number of completion queue resources. Enter an integer between 1 and 514. |
| Interrupt Coalescing Type drop-down list | This can be one of the following: <ul style="list-style-type: none"> • MIN—The system waits for the time specified in the Coalescing Time field before sending another interrupt event. • IDLE—The system does not send an interrupt until there is a period of no activity lasting as long as the time specified in the Coalescing Time field. |
| Interrupt Coalescing Timer Time field | The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent. Enter an integer between 1 and 65535. To turn off interrupt coalescing, enter 0 (zero) in this field. |
| Class of Service field | The class of service to associate with traffic from this usNIC. Select an integer between 0 and 6, with 0 being lowest priority and 6 being the highest priority. Note This option cannot be used in VNTAG mode. |
| TCP Segment Offload check box | If checked, the CPU sends large TCP packets to the hardware to be segmented. This option may reduce CPU overhead and increase throughput rate. If cleared, the CPU segments large packets. Note This option is also known as Large Send Offload (LSO). |
| Large Receive check box | If checked, the hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput. If cleared, the CPU processes all large packets. |

| Name | Description |
|---------------------------|--|
| TCP Tx Checksum check box | If checked, the CPU sends all packets to the hardware so that the checksum can be calculated. This option may reduce CPU overhead. If cleared, the CPU calculates all packet checksums. |
| TCP Rx Checksum check box | If checked, the CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead. If cleared, the CPU validates all packet checksums. |

Step 7 Click **Save Changes**.

The changes take effect upon the next server reboot.

Viewing usNIC Properties

Procedure

Step 1 In the **Navigation** pane, click the **Networking** menu.

Step 2 In the **Networking** pane, select the Adapter Card that you want to view.

Step 3 In the **Adapter Card** pane, click the **vNICs** tab.

Step 4 In the **vNICs** pane, click **eth0** or **eth1**.

Step 5 In the **Host Ethernet Interfaces** pane's **usNIC Properties** area, review the information in the following fields:

| Name | Description |
|----------------------------|--|
| Name | The name for the vNIC that is the parent of the usNIC. Note This field is read-only. |
| usNIC field | The number of usNICs assigned to the specific vNIC. Enter an integer between 0 and 225. To assign additional usNICs to a specified vNIC, enter value higher than the existing value. To delete usNICs from a specified vNIC, enter value smaller than the existing value. To delete all the usNICs assigned to a vNIC, enter zero. |
| Transmit Queue Count field | The number of transmit queue resources to allocate. Enter an integer between 1 and 256. |

| Name | Description |
|---|---|
| Receive Queue Count field | The number of receive queue resources to allocate. Enter an integer between 1 and 256. |
| Completion Queue Count field | The number of completion queue resources to allocate. In general, the number of completion queue resources you should allocate is equal to the number of transmit queue resources plus the number of receive queue resources. Enter an integer between 1 and 512. |
| Transmit Queue Ring Size field | The number of descriptors in each transmit queue. Enter an integer between 64 and 4096. |
| Receive Queue Ring Size field | The number of descriptors in each receive queue. Enter an integer between 64 and 4096. |
| Interrupt Count field | The number of interrupt resources to allocate. In general, this value should be equal to the number of completion queue resources. Enter an integer between 1 and 514. |
| Interrupt Coalescing Type drop-down list | This can be one of the following: <ul style="list-style-type: none"> • MIN—The system waits for the time specified in the Coalescing Time field before sending another interrupt event. • IDLE—The system does not send an interrupt until there is a period of no activity lasting as long as the time specified in the Coalescing Time field. |
| Interrupt Coalescing Timer Time field | The time to wait between interrupts or the idle period that must be encountered before an interrupt is sent. Enter an integer between 1 and 65535. To turn off interrupt coalescing, enter 0 (zero) in this field. |
| Class of Service field | The class of service to associate with traffic from this usNIC. Select an integer between 0 and 6, with 0 being lowest priority and 6 being the highest priority. Note This option cannot be used in VNTAG mode. |

| Name | Description |
|--------------------------------------|--|
| TCP Segment Offload check box | <p>If checked, the CPU sends large TCP packets to the hardware to be segmented. This option may reduce CPU overhead and increase throughput rate.</p> <p>If cleared, the CPU segments large packets.</p> <p>Note This option is also known as Large Send Offload (LSO).</p> |
| Large Receive check box | <p>If checked, the hardware reassembles all segmented packets before sending them to the CPU. This option may reduce CPU utilization and increase inbound throughput.</p> <p>If cleared, the CPU processes all large packets.</p> |
| TCP Tx Checksum check box | <p>If checked, the CPU sends all packets to the hardware so that the checksum can be calculated. This option may reduce CPU overhead.</p> <p>If cleared, the CPU calculates all packet checksums.</p> |
| TCP Rx Checksum check box | <p>If checked, the CPU sends all packet checksums to the hardware for validation. This option may reduce CPU overhead.</p> <p>If cleared, the CPU validates all packet checksums.</p> |

Backing Up and Restoring the Adapter Configuration

Exporting the Adapter Configuration

The adapter configuration can be exported as an XML file to a remote server which can be one of the following:

- TFTP
- FTP
- SFTP
- SCP
- HTTP

Before you begin

Obtain the remote server IP address.

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** In the **Adapter Card** pane, click the **General** tab.
- Step 4** In the **Actions** area of the **General** tab, click **Export vNIC**.
The **Export vNIC** dialog box opens.
- Step 5** In the **Export Adapter Configuration** dialog box, update the following fields:

| Name | Description |
|--------------------------------------|---|
| Export To drop-down list | <p>The remote server type. This can be one of the following:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |
| IP Address or Host Name field | The IPv4 or IPv6 address, or hostname of the server to which the adapter configuration file will be exported. Depending on the setting in the Export to drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename Cisco IMC should use when exporting the file to the remote server. |
| Username | The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. |
| Password | The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

- Step 6** Click **Export vNIC**.

Importing the Adapter Configuration

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to modify.
- Step 3** Select the **General** tab.
- Step 4** In the **Actions** area of the **General** tab, click **Import vNIC**.

The **Import vNIC** dialog box is displayed.

- Step 5** In the **Import vNIC** dialog box, update the following fields:

| Name | Description |
|--------------------------------------|---|
| Import from drop-down list | <p>The remote server type. This can be one of the following:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |
| IP Address or Host Name field | The IPv4 or IPv6 address, or hostname of the server on which the adapter configuration file resides. Depending on the setting in the Import from drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename of the configuration file on the remote server. |
| Username | The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. |
| Password | The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

- Step 6** Click **Import vNIC**.

What to do next

Reboot the server to apply the imported configuration.

Restoring Adapter Defaults

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
 - Step 2** In the **Networking** pane, select the Adapter Card that you want to restore to default settings.
 - Step 3** Select the **General** tab.
 - Step 4** In the **Actions** area of the **General** tab, click **Reset To Defaults** and click **OK** to confirm.
-

Resetting the Adapter

Procedure

- Step 1** In the **Navigation** pane, click the **Networking** menu.
- Step 2** In the **Networking** pane, select the Adapter Card that you want to reset.
- Step 3** Select the **General** tab.
- Step 4** In the **Actions** area of the **General** tab, click **Reset** and click **OK** to confirm.

Note Resetting the adapter also resets the host.



CHAPTER 12

Managing Storage Adapters

This chapter includes the following sections:

- [Managing Storage Adapters, on page 195](#)
- [Managing the Flexible Flash Controller, on page 223](#)
- [Managing the FlexUtil Controller, on page 232](#)
- [Cisco Boot Optimized M.2 Raid Controller, on page 243](#)

Managing Storage Adapters

Self Encrypting Drives (Full Disk Encryption)

Cisco IMC supports self encrypting drives (SED). A special hardware in the drives encrypts incoming data and decrypts outgoing data in real-time. This feature is also called Full Disk Encryption (FDE).

The data on the drive is encrypted on its way into the drive and decrypted on its way out. However, if you lock the drive, no security key is required to retrieve the data.

When a drive is locked, an encryption key is created and stored internally. All data stored on this drive is encrypted using that key, and stored in encrypted form. Once you store the data in this manner, a security key is required in order to un-encrypt and fetch the data from the drive. Unlocking a drive deletes that encryption key and renders the stored data unusable. This is called a Secure Erase. The FDE comprises a key ID and a security key.

The FDE feature supports the following operations:

- Enable and disable security on a controller
- Create a secure virtual drive
- Secure a non-secure drive group
- Unlock foreign configuration drives
- Enable security on a physical drive (JBOD)
- Clear secure SED drives
- Clear secure foreign configuration

Scenarios to consider While Configuring Controller Security in a Dual or Multiple Controllers Environment



Note Dual or Multiple controllers connectivity is available only on some servers.

Controller security can be enabled, disabled, or modified independently. However, local and remote key management applies to all the controllers on the server. Therefore security action involving switching the key management modes must be performed with caution. In a scenario where both controllers are secure, and you decide to move one of the controllers to a different mode, you need to perform the same operation on the other controller as well.

Consider the following two scenarios:

- Scenario 1—Key management is set to remote; both controllers are secure and use remote key management. If you now wish to switch to local key management, switch the key management for each controller and disable remote key management.
- Scenario 2—Key management is set to local; both controllers are secure and use local key management. If you now wish to switch to remote key management, enable remote key management and switch the key management for each controller.

If you do not modify the controller security method on any one of the controllers, it renders the secure key management in an unsupported configuration state.

Enabling Controller Security

This option is available only on some C-series servers.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Controller Info** area, click **Enable Drive Security**.
- Step 4** In the **Enable Drive Security** dialog box, update the following fields:

| Name | Description |
|---------------------------|--|
| Controller Security field | Indicates that the controller is disabled. |

| Name | Description |
|--------------------------------------|---|
| Key Management field | Indicates whether the key is remotely managed or locally managed. This can be one of the following: <ul style="list-style-type: none"> • Remote Key Management radio button— Controller security key is configured or managed using the remote KMIP server. <p>Note If you choose this option, you do not have to specify the existing security key but you have to provide the key ID and the security key for local management.</p> • Local Key Management radio button— Controller security is configured locally. |
| Security Key Identifier field | The current key ID. |
| Security Key field | Security key used to enable controller security. If you wish to change the current security key, enter the new key here. <p>Note Once you change the security key, a Secure Key Verification pop-up window appears where you need to enter the current security key to verify it.</p> |
| Confirm Security Key field | Re-enter the security key. |
| Suggest button | Suggests the security key or key ID that can be assigned. |

Step 5 Click **Save**.

This enables controller security.

Modifying Controller Security

This option is available only on some C-series servers.

Before you begin

- You must log in with admin privileges to perform this task.
- You must have first enabled controller security to modify it.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Controller Info** area, click **Modify Drive Security**.
- Step 4** In the **Modify Drive Security** dialog box, update the following fields:

| Name | Description |
|--------------------------------------|---|
| Controller Security field | Indicates whether or not controller security is enabled. This can be one of the following: <ul style="list-style-type: none"> • Enabled— Controller security is enabled. • Disabled— Controller security is disabled. |
| Security Key Identifier field | The current key ID. |
| Security Key field | Security key used to enable controller security. If you wish to change the current security key, enter the new key here. <p>Note Once you change the security key, a Secure Key Verification pop-up window appears where you need to enter the current security key to verify it.</p> |
| Confirm Security Key field | Re-enter the security key. |
| Modify Security Key check box | Note This option appears only for remote key management. <p>If you select this option the security key on the KMIP server is modified.</p> |
| Suggest button | Suggests the security key or key ID that can be assigned. |
| Save button | Saves the data. |
| Cancel button | Cancels the action. |

Step 5 Click **Save**.

This modifies the controller security settings.

Disabling Controller Security

This option is available only on some C-series servers.

Before you begin

- You must log in with admin privileges to perform this task.
- You must have first enabled controller security to disable it.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Controller Info** area, click **Disable Drive Security**.
- Step 4** Click **OK** in the confirmation pop-up window.

This disables controller security.

Switching Controller Security Between Local and Remote Key Management

This task allows you to switch controller security from local management to remote management, and from remote to local management.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Controller Info** area, to switch the controller security from remote to local management, click **Switch to Local Key Management**.
- Note** When you switch from remote to local key management, ensure that you disable KMIP secure key management first.
- Step 4** (Optional) Similarly, if you want to switch the controller security from local to remote management, click **Switch to Remote Key Management**.
- Step 5** Click **OK** to confirm.
-

Creating Virtual Drive from Unused Physical Drives

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Actions** area, click **Create Virtual Drive from Unused Physical Drives**.
The **Create Virtual Drive from Unused Physical Drives** dialog box displays.
- Step 4** In the **Create Virtual Drive from Unused Physical Drives** dialog box, select the RAID level for the new virtual drives:
This can be one of the following:
- **Raid 0**—Simple striping.

- **Raid 1**—Simple mirroring.
- **Raid 5**—Striping with parity.
- **Raid 6**—Striping with two parity drives.
- **Raid 10**—Spanned mirroring.
- **Raid 50**—Spanned striping with parity.
- **Raid 60**—Spanned striping with two parity drives.

Step 5 In the **Create Drive Groups** area, choose one or more physical drives to include in the group.

Use the >> button to add the drives to the **Drive Groups** table. Use the << button to remove physical drives from the drive group.

- Note**
- The size of the smallest physical drive in the drive group defines the maximum size used for all the physical drives. To ensure maximum use of space for all physical drives, it is recommended that the size of all the drives in the drive group are similar.
 - Cisco IMC manages only RAID controllers and not HBAs attached to the server.
 - You must have multiple drive groups available to create virtual drives for certain RAID levels. While creating drives for these RAID levels, the create drive option is available only if the required number of drives are selected.

Step 6 In the **Virtual Drive Properties** area, update the following properties:

| Name | Description |
|------------------------------------|---|
| Virtual Drive Name field | The name of the new virtual drive you want to create. |
| Read Policy drop-down list | The read-ahead cache mode. |
| Cache Policy drop-down list | The cache policy used for buffering reads. |
| Strip Size drop-down list | The size of each strip, in KB. |
| Write Policy drop-down list | This can be one of the following <ul style="list-style-type: none"> • Write Through— Data is written through the cache and to the physical drives. Performance is improved, because subsequent reads of that data can be satisfied from the cache. • Write Back— Data is stored in the cache, and is only written to the physical drives when space in the cache is needed. Virtual drives requesting this policy fall back to Write Through caching when the BBU cannot guarantee the safety of the cache in the event of a power failure. • Write Back Bad BBU—With this policy, write caching remains Write Back even if the battery backup unit is defective or discharged. |

| Name | Description |
|----------------------------------|--|
| Disk Cache Policy drop-down list | This can be one of the following <ul style="list-style-type: none"> • Unchanged— The disk cache policy is unchanged. • Enabled— Allows IO caching on the disk. • Disabled— Disallows disk caching. |
| Access Policy drop-down list | This can be one of the following <ul style="list-style-type: none"> • Read Write— Enables host to perform read-write on the VD. • Read Only— Host can only read from the VD. • Blocked— Host can neither read nor write to the VD. |
| Size field | The size of the virtual drive you want to create. Enter a value and select one of the following units: <ul style="list-style-type: none"> • MB • GB • TB |

- Step 7** Click the **Generate XML API Request** button to generate an API request.
- Step 8** Click **Close**.
- Step 9** Click **Create Virtual Drive**.

Creating Virtual Drive from an Existing Drive Group

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Actions** area, click **Create Virtual Drive from an Existing Virtual Drive Group**.
The **Create Virtual Drive from an Existing Virtual Drive Group** dialog box displays.
- Step 4** In the **Create Virtual Drive from an Existing Virtual Drive Group** dialog box, select the virtual drive whose drive group you want to use to create a new virtual drive.
- Step 5** In the **Virtual Drive Properties** area, update the following properties:

| Name | Description |
|---|---|
| Virtual Drive Name field | The name of the new virtual drive you want to create. |
| Read Policy drop-down list | The read-ahead cache mode. |
| Cache Policy drop-down list | The cache policy used for buffering reads. |
| Strip Size drop-down list | The size of each strip, in KB. |
| Write Policy drop-down list | This can be one of the following <ul style="list-style-type: none"> • Write Through— Data is written through the cache and to the physical drives. Performance is improved, because subsequent reads of that data can be satisfied from the cache. • Write Back— Data is stored in the cache, and is only written to the physical drives when space in the cache is needed. Virtual drives requesting this policy fall back to Write Through caching when the BBU cannot guarantee the safety of the cache in the event of a power failure. • Write Back Bad BBU—With this policy, write caching remains Write Back even if the battery backup unit is defective or discharged. |
| Disk Cache Policy drop-down list | This can be one of the following <ul style="list-style-type: none"> • Unchanged— The disk cache policy is unchanged. • Enabled— Allows IO caching on the disk. • Disabled— Disallows disk caching. |
| Access Policy drop-down list | This can be one of the following <ul style="list-style-type: none"> • Read Write— Enables host to perform read-write on the VD. • Read Only— Host can only read from the VD. • Blocked— Host can neither read nor write to the VD. |
| Size field | The size of the virtual drive you want to create. Enter a value and select one of the following units: <ul style="list-style-type: none"> • MB • GB • TB |

Step 6 Click the **Generate XML API Request** button to generate an API request.

Step 7 Click **Close**.

Step 8 Click **Create Virtual Drive**.

Setting a Virtual Drive to Transport Ready State

You can move a virtual drive from one MegaRAID controller to another using the **Set Transport Ready** feature. This allows all the pending IOs of the virtual drive to complete their activities, hide the virtual drive from the operating system, flush cache, pause all the background operations, and save the current progress in disk data format, allowing you to move the drive. When you move a virtual drive, all other drives belonging to the same drive group inherit the same change as the moved drive.

When the last configured physical drive on the group is removed from the current controller, the drive group becomes foreign and all foreign configuration rules apply to the group. However, the Transport Ready feature does not change any foreign configuration behavior.

You can also clear a virtual drive from the Transport Ready state. This makes the virtual drive available to the operating systems.

Following restrictions apply to a transport ready virtual drive:

- Only a maximum of 16 transport ready drive groups are currently supported.
- This feature is not supported on high availability.
- A virtual drive cannot be set as transport ready under these conditions:
 - When a virtual drive of a drive group is being reconstructed
 - When a virtual drive of a drive group contains a pinned cache
 - When a virtual drive of a drive group is marked as cacheable or associated with a cachecade virtual drive
 - If a virtual drive is a cachecade virtual drive
 - If a virtual drive is offline
 - If a virtual drive is a bootable virtual drive

Setting a Virtual Drive as Transport Ready

Before you begin

- You must log in with admin privileges to perform this task.
- The virtual drive must be in optimal state to enable transport ready.

Procedure

-
- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA Controller.
 - Step 3** On the **Work** pane, click the **Virtual Drive Info** tab.
 - Step 4** In the **Virtual Drives** area, choose the drive that you want set as transport ready.
 - Step 5** In the **Actions** area, click **Set Transport Ready**.

The **Set Transport Ready** dialog box displays.

Step 6 Update the following properties in the dialog box:

| Name | Description |
|---------------------------------------|--|
| Initialize Type drop-down list | Allows you to select the initialization type using which you can set the selected virtual drive as transport ready. This can be one of the following: <ul style="list-style-type: none"> • Exclude All— Excludes all the dedicated hot spare drives. • Include All— Includes any exclusively available or shared dedicated hot spare drives. • Include Dedicated Hot Spare Drive— Includes exclusive dedicated hot spare drives. |
| Set Transport Ready button | Sets the selected virtual drive as transport ready. |
| Cancel button | Cancels the action. |

Note When you set a virtual drive to transport ready all the physical drives associated with it are displayed as **Ready to Remove**.

Clearing a Virtual Drive from Transport Ready State

Before you begin

- You must log in with admin privileges to perform this task.
- The virtual drive must be transport ready.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** On the **Work** pane, click the **Virtual Drive Info** tab.
- Step 4** In the **Virtual Drives** area, choose the drive to set as transport ready.
- Step 5** In the **Actions** area, click **Clear Transport Ready**.

This reverts the selected transport ready virtual drive to its original optimal state.

Importing Foreign Configuration

When one or more physical drives that have previously been configured with a different controller are inserted into a server, they are identified as foreign configurations. You can import these foreign configurations to a controller.



Important You cannot import a foreign configuration in the following two scenarios:

1. When the secure virtual drive was created on server 1 (from which you want to import the configuration) using the remote key, and on server 2 (to which you want to import) using the local key.
2. When server 2 is configured with another KMIP server, which is not a part of the server 1 KMIP server cluster.

In order to import the foreign configuration in these scenarios, change the controller security on server 2 from local key management to remote key management, and use the same KMIP server from the same cluster where the server 1 KMIP is configured.

Before you begin

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

Procedure

Step 1 In the **Navigation** pane, click the **Storage** menu.

Step 2 In the **RAID controller** area, the **Controller Info** tab displays by default.

Step 3 In the **Actions** area, click **Import Foreign Config**.

Note If KMIP is not enabled, a **Secure Key Verification** dialog box is displayed, prompting you to enter a security key to initiate the foreign configuration import process.

If KMIP is enabled, the **Secure Key Verification** dialog box is displayed with the following note:
"If drive security has been enabled via remote key management, specifying Security key is optional. Click on verify to start foreign configuration import."

This allows you to click **Verify** without entering the Security Key, and initiate import.

Step 4 Click **OK** to confirm.

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

-
- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
In the **RAID Controller** area, the **Controller Info** tab displays by default.
 - Step 3** In the **Actions** area, click **Clear Foreign Config**.
 - Step 4** Click **OK** to confirm.
-

Clearing a Boot Drive



Important This task clears the boot drive configuration on the controller. This action cannot be reverted.

Before you begin

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

Procedure

-
- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
In the **RAID Controller** area, the **Controller Info** tab displays by default.
 - Step 3** In the **Actions** area, click **Clear Boot Drive**.
 - Step 4** Click **OK** to confirm.
-

Enabling JBOD Mode

Procedure

-
- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
 - Step 4** In the **Physical Drives** area, select an unconfigured good drive.
 - Step 5** In the **Actions** area, click **Enable JBOD**.

Step 6 Click **Ok** to confirm.

Disabling a JBOD



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

Before you begin

JBOD option must be enabled for the selected controller.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
 - Step 4** In the **Physical Drives** area, select a JBOD drive.
 - Step 5** In the **Actions** area, click **Disable JBOD**.
 - Step 6** Click **Ok** to confirm.
-

Retrieving Storage Firmware Logs for a Controller

This task retrieves the storage firmware logs for the controller and places it in the `/var/log` location. This ensures that this log data is available when Technical Support Data is requested.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the working area, the **Controller Info** tab displays by default.
- Step 3** In the **Actions** area, click **Get Storage Firmware Log**.
- Step 4** Click **OK** to confirm.

Important Retrieving storage firmware logs for a controller could take up to 2-4 minutes. Until this process is complete, do not initiate exporting technical support data.

Clearing Controller Configuration

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Controller Info** area, click **Clear All Configuration**.
- Step 4** Click **OK** to confirm.

This clears the existing controller configuration.

Restoring Storage Controller to Factory Defaults

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **Controller Info** area, click **Set Factory Defaults**.
- Step 4** Click **OK** to confirm.

This restores the controller configuration to factory defaults.

Preparing a Drive for Removal



Note You can perform 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

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
 - Step 4** In the **Physical Drives** area, select the drive you want to remove.
 - Step 5** In the **Actions** area, click **Prepare for Removal**.
 - Step 6** Click **OK** to confirm.
-

Undo Preparing a Drive for Removal

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** On the **RAID Controller** area, click the **Physical Drive Info** tab.
 - Step 4** In the **Physical Drives** area, select a drive with a status of **Ready to Remove**.
 - Step 5** In the **Actions** area, click **Undo Prepare for Removal**.
 - Step 6** Click **OK** to confirm.
-

Making a Dedicated Hot Spare

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** On the **RAID Controller** area, click the **Physical Drive Info** tab.
- Step 4** In the **Physical Drives** area, select an unconfigured good drive you want to make a dedicated hot spare.
- Step 5** In the **Actions** area, click **Make Dedicated Hot Spare**.

The **Make Dedicated Hot Spare** dialog box displays.

Step 6 In the **Virtual Drive Details** area, update the following properties:

| Name | Description |
|--|---|
| Virtual Drive Number drop-down list | Select the virtual drive to which you want to dedicate the physical drive as hot spare. |
| Virtual Drive Name field | The name of the selected virtual drive. |
| Make Dedicated Hot Spare button | Creates the dedicated hot spare. |
| Cancel button | Closes the dialog box without saving any changes made while the dialog box was open. |

Step 7 Click **Make Dedicated Hot Spare** to confirm.

Making a Global Hot Spare

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
 - Step 4** In the **Physical Drives** area, select an unconfigured good drive you want to make a global hot spare.
 - Step 5** In the **Actions** area, click **Make Global Hot Spare**.
-

Removing a Drive from Hot Spare Pools

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** tab, click the appropriate LSI MegaRAID controller.
- Step 3** On the **Work** pane, click the **Physical Drive Info** tab.
- Step 4** In the **Physical Drives** area, select the global or dedicated hot spare you want to remove from the hot spare pools.

- Step 5** In the **Actions** area, click **Remove From Hot Spare Pools**.
-

Toggling Physical Drive Status

Before you begin

- You must log in with admin privileges to perform this task.
- The controller must support the JBOD mode and the JBOD mode must be enabled.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
- Step 4** In the **Physical Drives** area, select the drive you want to set as unconfigured good.
- Step 5** In the **Actions** area, click **Set State as Unconfigured Good**.
- Step 6** Click **OK** to confirm that the JBOD mode be disabled.
- The **Set State as JBOD** option is enabled.
- Step 7** To enable the JBOD mode for the physical drive, click **Set State as JBOD**.
- Step 8** Click **OK** to confirm.
- The **Set State as Unconfigured Good** option is enabled.
-

Setting a Physical Drive as a Controller Boot Drive

Before you begin

- You must log in with admin privileges to perform this task.
- The controller must support the JBOD mode and the JBOD mode must be enabled.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
- Step 4** In the **Physical Drives** area, select the drive you want to set as boot drive for the controller.
- Step 5** In the **Actions** area, click **Set as Boot Drive**.

Step 6 Click **OK** to confirm.

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

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
- Step 4** In the **Virtual Drives** area, choose the drive that you want to initialize.
- Step 5** In the **Actions** area, click **Initialize**.

The **Initialize Virtual Drive** dialog box displays.

Step 6 Choose the type of initialization you want to use for the virtual drive.

This can be one of the following:

- **Fast Initialize**—This option allows you to start writing data to the virtual drive immediately.
- **Full Initialize**—A complete initialization is done on the new configuration. You cannot write data to the new virtual drive until the initialization is complete.

Step 7 Click **Initialize VD** to initialize the drive, or **Cancel** to close the dialog box without making any changes.

Step 8 To view the status of the task running on the drive, in the **Operations** area, click **Refresh**.

The following details are displayed:

| Name | Description |
|-----------------------------|--|
| Operation | Name of the operation that is in progress on the drive. |
| Progress in % | Progress of the operation, in percentage complete. |
| Elapsed Time in secs | The number of seconds that have elapsed since the operation began. |

Set as Boot Drive

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
 - Step 4** In the **Virtual Drives** area, choose the drive from which the controller must boot.
 - Step 5** In the **Actions** area, click **Set as Boot Drive**.
 - Step 6** Click **OK** to confirm.
-

Editing a Virtual Drive

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
- Step 4** In the **Virtual Drives** area, click **Edit Virtual Drive**.
- Step 5** Review the instructions, and then click **OK**.
The **Edit Virtual Drive** dialog box displays before prompting you to take a backup of your data.
- Step 6** From the **Select RAID Level to migrate** drop-down list, choose a RAID level.
See the following table for RAID migration criteria:

| Name | Description |
|---|--|
| Select RAID Level to migrate drop-down list | <p>Select the RAID level to which you want to migrate. Migrations are allowed for the following RAID levels:</p> <ul style="list-style-type: none"> • RAID 0 to RAID 1 • RAID 0 to RAID 5 • RAID 0 to RAID 6 • RAID 1 to RAID 0 • RAID 1 to RAID 5 • RAID 1 to RAID 6 • RAID 5 to RAID 0 • RAID 6 to RAID 0 • RAID 6 to RAID 5 <p>When you are migrating from one raid level to another, the data arms of the new RAID level should be equal to or greater than the existing one.</p> <p>In case of RAID 6, the data arms will be number of drives minus two, as RAID 6 has double distributed parity. For example, when you create RAID 6 with eight drives, the number of data arms will be $8 - 2 = 6$. In this case, if you are migrating from RAID 6 to RAID 0, RAID 0 must have a minimum of six drives. If you select lesser number of drives then Edit or Save button will be disabled.</p> <p>If you are adding, you can migrate to RAID 0 as you will not be deleting any drives.</p> <p>Note RAID level migration is not supported in the following cases:</p> <ul style="list-style-type: none"> • When there are multiple virtual drives in a RAID group. • With a combination of SSD/HDD RAID groups. |

Step 7 From the **Write Policy** drop-down list in the **Virtual Drive Properties** area, choose one of the following:

- **Write Through**— Data is written through the cache and to the physical drives. Performance is improved, because subsequent reads of that data can be satisfied from the cache.
- **Write Back**— Data is stored in the cache, and is only written to the physical drives when space in the cache is needed. Virtual drives requesting this policy fall back to **Write Through** caching when the BBU cannot guarantee the safety of the cache in the event of a power failure.
- **Write Back Bad BBU**—With this policy, write caching remains **Write Back** even if the battery backup unit is defective or discharged.

Step 8 Click **Save Changes**.

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

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
 - Step 4** In the **Virtual Drives** area, select the virtual drive you want to delete.
 - Step 5** In the **Actions** area, click **Delete Virtual Drive**.
 - Step 6** Click **OK** to confirm.
-

Hiding a Virtual Drive

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
 - Step 3** On the **RAID Controller** area, click the **Virtual Drive Info** tab.
 - Step 4** In the **Virtual Drives** area, select the virtual drive you want to hide.
 - Step 5** In the **Actions** area, click **Hide Drive**.
 - Step 6** Click **OK** to confirm.
-

Starting Learn Cycles for a Battery Backup Unit

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click the **Battery Backup Unit** tab.
- Step 4** From the **Actions** pane, click **Start Learn Cycle**.
A dialog prompts you to confirm the task.
- Step 5** Click **OK**.
-

Viewing Storage Controller Logs

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click **Storage Log** tab and review the following information:

| Name | Description |
|---------------------------|--|
| Time column | The date and time the event occurred. |
| Severity column | The event severity. This can be one of the following: <ul style="list-style-type: none"> • Emergency • Alert • Critical • Error • Warning • Notice • Informational • Debug |
| Description column | A description of the event. |

Viewing SSD Smart Information for MegaRAID Controllers

You can view smart information for a solid state drive. Complete these steps:

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID Controller.
- Step 3** On the **Work** pane, click the **Physical Drive Info** tab.
- Step 4** In the **Smart Information** area, review the following information:

| Name | Description |
|--|--|
| Power Cycle Count field | Number of power cycles that the drive went through from the time it was manufactured. |
| Power on Hours field | Total number of hours that the drive is in the 'Power On' mode. |
| Percentage Life Left field | The number of write cycles remaining in a solid state drive (SSD). For instance, if an SSD is capable of 100 write cycles during its life time, and it has completed 15 writes, then the percentage of life left in the drive is 85%. Each percentage range is represented in a different color. For instance, green for 75% to 100% and red for 1 to 25%. |
| Wear Status in Days field | The number of days an SSD has gone through with the write cycles. SSD vendors provide a finite number of writes per day on the SSD, based on which, you can calculate the total number of years the SSD would continue to work. |
| Operating Temperature field | The current temperature of the drive at which the selected SSD operates at the time of selection. |
| Percentage Reserved Capacity Consumed field | The total capacity (out of the percentage reserved for it) consumed by the SSD. |
| Time of Last Refresh field | Time period since the drive was last refreshed. |

Viewing NVMe Controller Details

Before you begin

- The server must be powered on.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate NVMe controller.
- Step 3** In the **Controller** area, the **Controller Info** tab displays by default.
- Step 4** In the **Work** pane's **Health/Status** area, review the following information:

| Name | Description |
|-------------------------------|--|
| Composite Health field | The health of the controller. This can be one of the following: <ul style="list-style-type: none"> • Good- All the drives under the controller is in optimal state. • Severe Fault- When one or more drives under the controller is in faulty state. • N/A |
| Drive Count field | The number of drives configured on the controller. |

- Step 5** In the **Manufacturer Information** area, review the following information:

| Name | Description |
|-------------------------------|--|
| Vendor ID field | The vendor ID of the NVMe controller. |
| Product ID field | The controller product ID. |
| Component ID field | The component ID of the NVMe controller. |
| Product Revision field | The board revision number, if any. |

- Step 6** In the **Group PCI Info** area, review the following information:

| Name | Description |
|------------------------|------------------------------------|
| Vendor ID field | The PCI vendor ID, in hexadecimal. |
| Device ID field | The PCI device ID, in hexadecimal. |

- Step 7** In the **Group Firmware Information** area, review the following information:

| Name | Description |
|--------------------------------------|------------------------------|
| Running Firmware Images field | NVMe drive firmware version. |

- Step 8** In the **Group Switch Information** area, review the following information:

| Name | Description |
|----------------------------|--|
| Temperature field | Temperature in degree centigrade of the switch. |
| Switch Status field | The current status of the switch. This can be one of the following: <ul style="list-style-type: none"> • Optimal — The controller is functioning properly. • Failed — The controller is not functioning. • Unresponsive — The controller is down. |
| Link Status field | The current status of the link. This field indicates if any of the upstream or downstream links in the switch are down. Individual drive also has a link status that can then be used to identify which drive causes the switch link status to be Link Degraded. This can be one of the following: <ul style="list-style-type: none"> • Optimal — The controller is functioning properly. • Failed — The controller is not functioning. • Unresponsive — The controller is down. |
| Shutdown Temperature field | This is the temperature beyond which the safe operation of switch is not guaranteed and recommends shutting down the system. |

Viewing NVMe Physical Drive Details

Before you begin

- The server must be powered on.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate NVMe controller.
- Step 3** Click **Physical Drive** tab and review the following information:

| Name | Description |
|------------------------|--|
| Physical Drives column | The list of available physical drives. |

| Name | Description |
|-------------------------|--|
| PCI Slot column | The PCI slot number in which the physical drive resides. |
| Managed ID column | Internal ID referenced in debug. |
| Product Name column | The name of the drive as assigned by the vendor. |
| Firmware Version column | The firmware version running on the drive. |
| Vendor column | The drive vendor name. |
| Serial Number column | Drive serial number. |

Step 4 Physical Drives Details

Note These details of a physical drive are displayed when you expand one of the listed physical drives.

| Name | Description |
|--|---|
| PCI Slot field | The PCI slot number in which the physical drive resides. |
| Managed ID field | Internal ID referenced in debug. |
| Throttle State field | The state of the throttle. |
| Serial Number field | Controller serial number. |
| Chip Temperature field | Temperature of the drive in degree centigrade. This is the max temperature read from internal sensors in the drive. |
| Percentage Drive Life Used field | The percentage of the drive life that is used up. |
| Device ID field | The PCI device ID, in hexadecimal. |
| Sub Device ID field | The PCI subdevice ID, in hexadecimal. |
| Drive Status field | Status of the drive. |
| Performance Level field | Indicates the performance of the drive. |
| Shutdown Temperature field | Temperature at which the drive shuts down. |
| Percentage of Total Power On Hours field | The percentage of time the drive was powered on. |
| Vendor ID field | The PCI vendor ID, in hexadecimal. |
| SubVendor ID field | The PCI subvendor ID, in hexadecimal. |
| LED Fault Status field | The status of the LED fault. |

| Name | Description |
|----------------------------------|---|
| Controller Temperature field | Temperature of the controller in degree centigrade. This is the overall composite temperature of the NVMe subsystem ID. |
| Running Firmware Images field | NVMe drive firmware version. |
| Throttle Start Temperature field | Temperature at which the drive starts to throttle. |

Viewing PCI Switch Details

Before you begin

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

Procedure

Step 1 In the **Navigation** pane, click the **Storage** menu.

Step 2 In the **Storage** menu, click the appropriate **PCI Switch** controller. Review the following information:

Controller Area

| Name | Description |
|-------------------------|---|
| Composite Health field | Indicates the overall health status of the PCI switch. Displays if there are any correctable or uncorrectable errors and also reflects the status of the upstream and downstream ports. |
| PCI Slot field | PCI slot in which the controller is installed. |
| Controller Type field | Type of PCI controller present in the slot. |
| Product Name column | Name of the PCI controller. |
| Product Revision column | Displays the controller configuration revision information. |

Switch Information Area

| Name | Description |
|-------------------|--|
| Temperature field | Temperature of the switch in degree Celsius. |

Manufacturer Information Area

| Name | Description |
|---------------------|--------------------------------|
| Manufacturer column | Manufacture of the PCI switch. |

| Name | Description |
|----------------------|---|
| Vendor ID column | The switch ID assigned by the vendor. |
| Sub Vendor ID column | The secondary switch ID assigned by the vendor. |
| Device ID column | The device ID assigned by the vendor. |
| Sub Device ID column | The secondary device ID assigned by the vendor. |

GPU and PCI Adapters Area

| Name | Description |
|--------------------------|---|
| Slot column | Slot IDs in which GPUs or PCI Adapters are present. |
| Link Status column | The current status of the link. This field indicates if any of the upstream or downstream links in the switch are down. |
| Link Speed (GT/s) column | Displays the speed of an adapter card installed in the PCI slot. |
| Link Width column | The number of data lanes of the link. |
| Status column | Status of the adapter. |

Starting Copyback Operation

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
- Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
- Step 4** In the **Physical Drives** area, select a drive, which is in online state.
- Step 5** In the **Actions** area, click **Start Copyback**.
- Step 6** A **Start Copyback Operation** dialog box appears.
- Step 7** Select the **Destination Physical Drive** to which the copyback operation needs to be done.
- Step 8** Click **Start Copyback**.
- Step 9** You can also perform the following copyback operations:
 - **Pause Copyback** - If the drive is in copyback state, you can pause the copyback operation.
 - **Resume Copyback**- The paused copyback operation can be resumed.
 - **Abort Copyback** - If the drive is in copyback state, you can abort the copyback operation.

Managing the Flexible Flash Controller

Cisco Flexible Flash

On the M5 servers, Flexible Flash Controller is inserted into the mini storage module socket. The mini storage socket is inserted into the M.2 slot on the motherboard. M.2 slot also supports SATA M.2 SSD slots.



Note M.2 slot does not support NVMe in this release.

Some C-Series Rack-Mount Servers support an internal Secure Digital (SD) memory card for storage of server software tools and utilities. The SD card is hosted by the Cisco Flexible Flash storage adapter.

The SD storage is available to Cisco IMC as a single hypervisor (HV) partition configuration. Prior versions had four virtual USB drives. Three were preloaded with Cisco UCS Server Configuration Utility, Cisco drivers and Cisco Host Upgrade Utility, and the fourth as user-installed hypervisor. A single HV partition configuration is also created when you upgrade to the latest version of Cisco IMC or downgrade to the prior version, and reset the configuration.

For more information about installing and configuring the M.2 drives, see the **Storage Controller Considerations (Embedded SATA RAID Requirements)** and **Replacing an M.2 SSD in a Mini-Storage Carrier For M.2** sections in the Cisco UCS Server Installation and Service Guide for the C240 M5 servers at this URL:

<https://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-c-series-rack-servers/products-installation-guides-list.html>

For information about the Cisco software utilities and packages, see the *Cisco UCS C-Series Servers Documentation Roadmap* at this URL:

<http://www.cisco.com/go/unifiedcomputing/c-series-doc>

Card Management Feature in the Cisco Flexible Flash Controller

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



- Note**
- If you want to upgrade from version 1.4(5e) to 1.5(4) or higher versions, you must first upgrade to version 1.5(2) and then upgrade to a higher version of Cisco IMC.
 - Reset the Cisco Flexible Flash controller to load the latest Flex Flash firmware after every Cisco IMC firmware upgrade.

| Action | Description |
|--------------------------|--|
| Reset Cisco Flex Flash | Allows you to reset the controller. |
| Reset Partition Defaults | Allows you to reset the configuration in the selected slot to the default configuration. |

| Action | Description |
|---------------------------------------|---|
| Synchronize Card Configuration | Allows you to retain the configuration for an SD card that supports firmware version 253 and later. |
| Configure Operational Profile | Allows you to configure the SD cards on the selected Cisco Flexible Flash controller. |

RAID Partition Enumeration

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

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

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

Upgrading from Single Card to Dual Card Mirroring with FlexFlash

You can upgrade from a single card mirroring to dual card mirroring with FlexFlash in one of the following methods:

- Add an empty FlexFlash card to the server, and then upgrade its firmware to the latest version.
- Upgrade the FlexFlash firmware to the latest version and then add an empty card to the server.

Prior to using either of these methods, you must keep in mind the following guidelines:

- To create RAID1 mirroring, the empty card that you want to add to the server must be of the exact size of the card that is already in the server. Identical card size is a must to set up RAID1 mirroring.

- Ensure that the card with valid data in the Hypervisor partition is marked as the primary healthy card. You can determine this state either in the Cisco IMC GUI or from the Cisco IMC CLI. To mark the state of the card as primary healthy, you can either use the **Reset Configuration** option in the Cisco IMC GUI or run the **reset-config** command in the Cisco IMC CLI. When you reset the configuration of a particular card, the secondary card is marked as secondary active unhealthy.
- In a Degraded RAID health state all read-write transactions are done on the healthy card. In this scenario, data mirroring does not occur. Data mirroring occurs only in the Healthy RAID state.
- Data mirroring is only applicable to RAID partitions. In the C-series servers, only Hypervisor partitions operate in the RAID mode.
- If you have not configured SD cards for use with prior versions, then upgrading to the latest version loads the latest 253 firmware and enumerates all four partitions to the host.

While upgrading versions of the FlexFlash, you may see the following error message:

```
Unable to communicate with Flexible Flash controller: operation ffCardsGet, status  
CY_AS_ERROR_INVALID_RESPONSE"
```

In addition, the card status may be shown as **missing**. This error occurs because you accidentally switched to an alternate release or a prior version, such as 1.4(x). In this scenario, you can either revert to the latest version, or you can switch back to the FlexFlash 1.4(x) configuration. If you choose to revert to the latest Cisco IMC version, then the Cisco FlexFlash configuration remains intact. If you choose to switch back to the prior version configuration, you must reset the Flexflash configuration. In this scenario, you must be aware of the following:

- If multiple cards are present, and you revert to a prior version, then the second card cannot be discovered or managed.
- If the card type is SD253, then you must run the **reset-config** command twice from the Cisco IMC CLI - once to reload the old firmware on the controller and to migrate SD253 to SD247 type, and the second time to start the enumeration.

Configuring the Flexible Flash Controller Properties

After you upgrade to the latest version of Cisco IMC or downgrade to a prior version, and reset the configuration, the server will access HV partition only.

Before you begin

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



Note This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives, or power down the host prior to starting this task

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
- Step 3** In the **Controller Info** tab, click **Configure Operational Profile**.
- Step 4** In the Operational Profile dialog box, update the following fields:

Table 2: Operational Profile Fields for M5 Servers

| Name | Description |
|---|--|
| Controller field | The system-defined name of the selected Cisco Flexible Flash controller. This name cannot be changed. |
| Firmware Operating Mode field | System displayed message. Displays the firmware operating mode as Mirror. |
| SLOT-1 Read Error Threshold field | The number of read errors that are permitted while accessing Slot 1 of the Cisco Flexible Flash card. If the number of read errors exceeds this threshold on a card, the card is marked unhealthy. 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). |
| SLOT-1 Write Error Threshold field | The number of write errors that are permitted while accessing Slot 1 of the Cisco Flexible Flash card. If the number of write errors exceeds this threshold on a card, the card is marked unhealthy. To specify a write error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter 0 (zero). |

- Step 5** Click **Save**.

Configuring the Flexible Flash Controller Cards

Before you begin

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



Note This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives, or power down the host prior to starting this task.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
- Step 3** In the **Actions** area, click **Configure Cards**. **Configure Cards** dialog box appears.
- Step 4** In the **Configure Cards** dialog box, update the following fields:

| Name | Description |
|--------------------------------------|--|
| Mode field | Displays the mode type as Mirror. |
| Mirror Partition Name field | The name that you want to assign to the partition. |
| Auto Sync checkbox | <p>If selected, data from the selected primary card syncs automatically with the secondary card.</p> <p>Note</p> <ul style="list-style-type: none"> • There must be two cards for you to choose this option. • If this option is selected, data on the secondary card is erased and overwritten by the data on the primary card. • The status of this is displayed under the Virtual Drive tab. |
| Select Primary Card drop-down | <p>Slot that you want to set as the primary card. This can be one of the following:</p> <ul style="list-style-type: none"> • Slot1 • Slot2 |
| Virtual Drive drop-down | <p>The virtual drive type. This can be one of the following:</p> <ul style="list-style-type: none"> • Removable • Non Removable |

- Step 5** Click **Save**.

The cards are configured in the chosen mode.

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

- Step 1** On the **Storage Adapters** pane, click **Cisco FlexFlash**.
- Step 2** In the **Cisco FlexFlash** pane, click the **Controller Info** tab.
- Step 3** In the **Actions** area, click **Reset FlexFlash Controller**.
- Step 4** Click **OK** to confirm.
-

Enabling Virtual Drives

Before you begin

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



Note This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
- Step 3** Click the **Virtual Drive Info** tab.
- Step 4** In the **Virtual Drive Info** tab, click **Enable/Disable Virtual Drive(s)**.
- Step 5** In the **Enable/Disable VD(s)** dialog box, select the virtual drives that you want to enable.
- Step 6** Click **Save**.
The selected virtual drives are enabled to the host.
-

Erasing Virtual Drives

Before you begin

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

- Cisco Flexible Flash must be supported by your platform.



Note This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
- Step 3** Click the **Virtual Drive Info** tab.
- Step 4** In the **Virtual Drive Info** tab, click **Erase Virtual Drive(s)**.
- Step 5** In the **Erase Virtual Drive(s)** dialog box, select the virtual drives that you want to erase.
- Step 6** Click **Save**.
Data on the selected virtual drives is erased.
-

Syncing Virtual Drives

Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.
- Cards must be in mirror mode.



Note This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** tab.
- Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
- Step 3** Click the **Virtual Drive Info** tab.
- Step 4** In the **Virtual Drive Info** tab, click **Sync Virtual Drive**.
- Step 5** Click **OK** in the confirmation dialog box.
Syncs the virtual drive hypervisor with the primary card.
-

Viewing FlexFlash Log Details

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the Cisco Flexible Flash Controller.
- Step 3** In the **FlexFlash Logs** tab's **FlexFlash LogTable** area, review the following fields:

| Name | Description |
|--------------------|---|
| Time column | The date and time the event occurred. |
| Severity column | The event severity. This can be one of the following: <ul style="list-style-type: none"> • Emergency • Alert • Critical • Error • Warning • Info • Notice • Debug |
| Description column | A description of the event. |

- Step 4** In the **FlexFlash Logs** tab's **Actions** area, review the following fields:

| Name | Description |
|-----------------------|--|
| Show drop-down list | <p>Customize the way you want to view Cisco IMC log entries using filters. These can be:</p> <ul style="list-style-type: none"> • Quick Filter— Default view • Advanced Filter— Filter options to display the log entries based on one or more criteria. Using the matching rule, you can view entries matching all the rules or any one combination of rules you specified in the Filter fields. Click + to add new filtering criteria. Click Go to view the entries matching the filter criteria that you set. Click the Save icon to save the filter criteria that you set. This becomes a user-defined filter which you can use later. <p>Note The user-defined filter appears in the Manage Preset Filters dialog box.</p> <ul style="list-style-type: none"> • All—Displays all entries • Manage Preset Filters—Displays user-defined filters. You can edit or remove the user-defined filter from this dialog box. • List of pre-defined filters— Displays the system-defined filters. |
| Filter icon | Displays or hides the quick filter fields. |
| Column drop-down list | Allows you to choose the columns you want to view. |

Step 5 In the **FlexFlash Logs** tab's **Log Navigation Toolbar** area, review the following fields:

| Name | Description |
|-------------------|---|
| <<Newest | <p>If there are more events than can fit on a single page, click this link to view the newest entries.</p> <p>The total number of entries displayed depends on the setting in the Entries per Page drop-down list.</p> |
| <Newer | <p>If there are more events than can fit on a single page, click this link to view the next page of entries that are newer than the set you are currently viewing.</p> |
| Log Entries field | <p>This field displays which log entries are currently being shown in the table.</p> |

| Name | Description |
|-----------------------------------|---|
| Older> | If there are more events than can fit on a single page, click this link to view the next page of entries that are older than the set you are currently viewing. |
| Oldest>> | If there are more events than can fit on a single page, click this link to view the oldest entries. |
| Page Number drop-down list | Allows you to navigate to a specific page. Select the page number from the drop-down list. |
| Number of Rows field | Displays the rows displayed in the current page. |

Managing the FlexUtil Controller

The C-Series M5 Rack-Mount servers support microSD memory card for storage of server software tools and utilities. Riser 1 has this microSD memory card slot. Cisco FlexUtil supports only 32GB microSD card.

The following user visible partitions are present on the microSD card:

- Server Configuration Utility (SCU) – 1.25 GB
- Diagnostics – 0.25 GB
- Host Update Utility (HUU) – 1.5 GB
- Drivers – 8 GB
- User



Note The number of partitions and size of each partition on microSD is fixed.

At any time, two partitions can be mapped onto the host. These partitions (except the user partition) can also be updated through a CIFS or NFS share. A second level BIOS boot order support is also available for all the bootable partitions.



Note User partition must be used only for storage. This partition does not support OS installations.

Configuring FlexUtil Controller Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
- Step 3** In the **General** tab's **Actions** area, click **Configure Operational Profile**.
- Step 4** In the **Operational Profile** dialog box, update the following fields.

| Name | Description |
|------------------------------------|---|
| Controller field | The system-defined name of the selected Flex Util controller. This name cannot be changed. |
| Read Error Threshold field | The number of read errors that are permitted while accessing the Flex Util card. If the number of read errors exceeds this threshold on a card, the card is marked unhealthy. 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). |
| Write Error Threshold field | The number of write errors that are permitted while accessing the Flex Util card. If the number of write errors exceeds this threshold on a card, the card is marked unhealthy. 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). |

Resetting FlexUtil Card Configuration

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
- Step 3** In the **General** tab's **Actions** area, click **Reset Card Configuration**.
This action resets the FlexUtil card configuration to its default settings.

Viewing Cisco FlexUtil Controller Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
- Step 3** In the **General** tab's **General** area, review the following fields:

| Name | Description |
|-------------------------|--|
| Product Name field | The name of the product. |
| Controller Name field | The name for the controller. |
| Controller Status field | The current status of the FlexUtil card. This can be one of the following: <ul style="list-style-type: none"> • Card is absent • Card is Unhealthy • Metadata Read Error • Card access error • Invalid Card size • Metadata is in failed state • No partition, reset required • Invalid partition, reset required • Card is write protected |

| Name | Description |
|----------------------|--|
| Internal State field | <p>The internal state of the controller. This can be one of the following:</p> <ul style="list-style-type: none"> • Uninitialized—FlexUtil monitoring is not initialized. • Initializing—FlexUtil monitoring is initializing. • Configuring—The controller is determining the FlexUtil card configuration. • OK—The FlexUtil card is not connected to the host. • Connecting—The controller is connecting to the host. • Connected—The controller is connected to the host. • Failed—The controller has failed. See the Controller Status field for more details. • Erasing—The FlexUtil card is being erased. • Updating—The FlexUtil card is being updated. • Resetting—The configuration on the card is reset. |

Step 4 In the **General** tab's **Physical Drive Count** area, review the following fields:

| Name | Description |
|----------------------------|--|
| Physical Drive Count field | The number of FlexUtil cards detected in the server. |

Step 5 In the **General** tab's **Virtual Drive Count** area, review the following fields:

| Name | Description |
|---------------------------|--|
| Virtual Drive Count field | The number of virtual drives configured on the FlexUtil cards installed in the server. |

Viewing Physical Drive Properties

Procedure

Step 1 In the **Navigation** pane, click the **Storage** menu.

Step 2 In the **Storage** menu, click the Cisco FlexUtil Controller.

Step 3 In the **Physical Drive** tab's **General** area, review the following fields:

| Name | Description |
|---------------------------------|--|
| Drive | Name of the drive. |
| Drive Status | Indicates whether the drive is present. |
| Serial Number field | The serial number for the FlexUtil card. |
| Manufacturer ID field | The manufacturer ID for the FlexUtil card. |
| OEM ID field | The OEM ID for the FlexUtil card, if any. |
| Product Name field | The name of the FlexUtil card. |
| Product Revision field | The revision number for the FlexUtil card. |
| Manufacturing Date field | The date the FlexUtil card was manufactured, in the format mm/yy. |
| Write Enabled field | If this field displays true , the FlexUtil card accepts writes. |
| Block Size field | The block size on the FlexUtil card, in bytes. |
| Capacity field | The capacity of the FlexUtil card, in megabytes. |
| Health | This can be one of the following: <ul style="list-style-type: none"> • Healthy • Unhealthy |

Step 4 In the **Physical Drive** tab's **Error Counters** area, review the following fields.

| Name | Description |
|------------------------------------|--|
| Read Error Threshold field | The number of read errors that are permitted while accessing the FlexUtil card. |
| Read Error Count field | The number of read errors encountered while handling I/O traffic since the FlexUtil card was first installed. |
| Write Error Threshold field | The number of write errors that are permitted while accessing the FlexUtil card. |
| Write Error Count field | The number of write errors encountered while handling I/O traffic since the FlexUtil card was first installed. |

Step 5 In the **Physical Drive** tab's **Partition** area, review the following fields.

| Name | Description |
|-----------------------|---|
| Partition Count field | The number of partitions on the FlexUtil card. |
| Drives Enabled field | The virtual drives enabled for access on the FlexUtil card. |

Viewing Virtual Drive Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
- Step 3** In the **Virtual Drive** tab's **Virtual Drives** area, review the following fields.

| Name | Description |
|------------------------|---|
| Virtual Drive column | The name of the virtual drive. |
| ID column | Virtual drive ID. |
| LUN ID | The LUN ID, if available. |
| Drive Scope column | How the virtual drive is configured. This will always be NON RAID . |
| Size column | The size of the virtual drive in megabytes. |
| Drive Status column | Status of the drive. This can be one of the following: <ul style="list-style-type: none"> • Healthy • Unhealthy |
| Host Accessible column | Indicates whether the virtual drive is mapped to the host. This can be one of the following: <ul style="list-style-type: none"> • Connected • Not-Connected <p>If this field displays connected, it means the virtual drive is mapped to the host.</p> |
| Drive Type column | Type of the drive. This will always be Removable . |

| Name | Description |
|------------------------------|---|
| Operation in Progress column | <p>Operation that is in progress. This can be one of the following:</p> <ul style="list-style-type: none"> • Erasing • Erase-Pending • Updating • Update-Pending • NA <p>Note If your reboot Cisco IMC while any operation is running, the operation will be aborted and after the reboot the state of the operation will be set to NA.</p> |
| Last Operation Status column | <p>Status of the last operation. This can be one of the following:</p> <ul style="list-style-type: none"> • Erase-Success • Erase-Failed • Update-Success • Update-Failed |
| Resident Image | Displays the name of the image file present in the virtual drive. |

Step 4 In the **Virtual Drive** tab's **Actions** area, review the following fields.

| Name | Description |
|---------------------------------|--|
| Enable/Disable Virtual Drive(s) | Allows you to enable or disable a virtual drive. |
| Erase Virtual Drive(s) | <p>Allows you to format the virtual drives to FAT 32 format.</p> <p>Note You cannot cancel an erase operation in progress or a pending erase operation.</p> |
| Add Image | Allows you to add an ISO image configuration for the SCU, HUU, Diagnostics, and Drivers. |

| Name | Description |
|----------------------|--|
| Update Image | Allows you to update virtual drive with the ISO image. Note <ul style="list-style-type: none"> • When erase or update is in progress or pending on any virtual drive, you cannot perform any actions available on the Virtual tab. • Use the Cancel Update button to cancel an ongoing update operation. |
| Cancel Update | Cancels any ongoing update operation. |
| Unmap Image | Allows you to delete the ISO image configuration. |

Mapping an Image to a Virtual Drive

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
- Step 3** Click the **Virtual Drives** tab.
- Step 4** In the **Virtual Drives** area, select the virtual drive, and click **Add Image**.
- Step 5** In the **Add New Image** dialog box, update the following fields:

| Name | Description |
|---------------------|---|
| Volume field | The identity of the image mounted for mapping. This can be one of the following: <ul style="list-style-type: none"> • SCU • Diagnostics • HUU • Drivers |

| Name | Description |
|----------------------------------|---|
| Mount Type drop-down list | The type of mapping. This can be one of the following: <ul style="list-style-type: none"> • NFS—Network File System. • CIFS—Common Internet File System. • WWW(HTTP/HTTPS)—HTTP-based or HTTPS-based system. |
| Remote Share field | The URL of the image to be mapped. The format depends on the selected Mount Type : <ul style="list-style-type: none"> • NFS—Use serverip:/share path. • CIFS—Use //serverip/share path. • WWW(HTTP/HTTPS)—Use http[s]://serverip/share. |
| Remote File field | The name and location of the .iso file in the remote share. Following are the example of remote share files: <ul style="list-style-type: none"> • NFS — /softwares/ucs-cxx-scu-3.1.9.iso • CIFS — /softwares/ucs-cxx-scu-3.1.9.iso • WWW(HTTP/HTTPS) — http[s]://softwares/ucs-cxx-scu-3.1.9.iso |

| Name | Description |
|---------------------|---|
| Mount Options field | <p>Industry-standard mount options entered in a comma separated list. The options vary depending on the selected Mount Type.</p> <p>If you are using NFS, leave the field blank or enter one or more of the following:</p> <ul style="list-style-type: none"> • ro • rw • noexec • noexec • soft • port=VALUE • timeo=VALUE • retry=VALUE <p>If you are using CIFS, leave the field blank or enter one or more of the following:</p> <ul style="list-style-type: none"> • soft • nounix • noserverino <p>If you are using WWW(HTTP/HTTPS), leave the field blank or enter the following:</p> <ul style="list-style-type: none"> • noauto <p>Note Before mounting the image, Cisco IMC tries to verify reachability to the end server by pinging the server.</p> <ul style="list-style-type: none"> • username=VALUE • password=VALUE |

Step 6 Optional: The **Add Image** button is a toggle button. After you map an image, if you want to unmap the same image from the drive, select the virtual drive, and click **Unmap Image**.

Updating an Image on the Virtual Drive

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
 - Step 3** Click the **Virtual Drives** tab.
 - Step 4** In the **Virtual Drives** area, select the virtual drive for which you want to update an image and click **Update Image**.
 - Step 5** Optional: If you want to cancel an ongoing update operation, click **Cancel Update**.
-

Unmapping an Image From a Virtual Drive

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
 - Step 3** Click the **Virtual Drives** tab.
 - Step 4** In the **Virtual Drives** area, select the virtual drive for which you want to delete the image and click **Unmap Image**.
-

Erasing a Virtual Drive

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
 - Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
 - Step 3** Click the **Virtual Drives** tab.
 - Step 4** In the **Virtual Drives** area, select the virtual drive you want to erase, and click **Erase Virtual Drive**.
-

Cisco Boot Optimized M.2 Raid Controller

Viewing Cisco Boot Optimized M.2 Raid Controller Details

Before you begin

The server must be powered on.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate M.2 Raid controller.
- Step 3** In the **Controller** area, the **Controller Info** tab displays by default.
- Step 4** In the Work pane's **Health/Status** area, review the following information:

| Name | Description |
|--------------------------------|--|
| Composite Health field | The combined health of the controller, the attached drives, and the battery backup unit. This can be one of the following: <ul style="list-style-type: none"> • Good • Moderate Fault • Severe Fault • N/A |
| Controller Status field | The current status of the controller. This can be one of the following: <ul style="list-style-type: none"> • Optimal — The controller is functioning properly. • Failed — The controller is not functioning. |

- Step 5** In the **Firmware Versions** area, review the following information:

| Name | Description |
|----------------------------|--|
| Product Name field | The name of the Cisco Boot optimized M.2 Raid controller. |
| Product PID field | The product PID of the Cisco Boot optimized M.2 Raid controller. |
| Serial Number field | The serial number of the Cisco Boot optimized M.2 Raid controller. |

| Name | Description |
|-------------------------------------|---|
| Firmware Package Build field | The active firmware package version number. For the firmware component version numbers, see the Running Firmware Images area. |

Step 6 In the **PCI Info** area, review the following information:

| Name | Description |
|---------------------------|---|
| PCI Slot field | The name of the PCIe slot in which the controller is located. |
| Vendor ID field | The PCI vendor ID, in hexadecimal. |
| Device ID field | The PCI device ID, in hexadecimal. |
| SubVendor ID field | The PCI subvendor ID, in hexadecimal. |
| SubDevice ID field | The PCI subdevice ID, in hexadecimal. |

Step 7 In the **Manufacturing Data** area, review the following information:

| Name | Description |
|--------------------------------|---|
| Manufactured Date field | The manufacturing date of the Cisco Boot optimized M.2 Raid controller, in the format yyyy-mm-dd. |
| Revision No field | The board revision number, if any. |

Step 8 In the **Next Patrol Read Schedule** area, review the following information:

| Name | Description |
|-------------------------------|--|
| PR State field | The patrol read state of the M.2 Raid controllers. It can be one of the following: <ul style="list-style-type: none"> • ready • stopped • active Default state: N/A . |
| PR Schedule Mode field | The patrol read schedule mode of the M.2 Raid controllers. The PR Schedule Mode is manual by default. |

Step 9 In the **Running Firmware Images** area, review the following information:

| Name | Description |
|--------------------------|--------------------------------------|
| BIOS Version field | The BIOS option PROM version number. |
| Firmware Version field | The active firmware version number. |
| Boot Block Version field | The boot block version number. |

Step 10 In the **Virtual Drive Count** area, review the following information:

| Name | Description |
|----------------------------|---|
| Virtual Drive Count field | The number of virtual drives configured on the controller. |
| Degraded Drive Count field | The number of virtual drives in a degraded state on the controller. |
| Offline Drive Count field | The number of virtual drives that have failed on the controller. |

Step 11 In the **Physical Drive Count** area, review the following information:

| Name | Description |
|---------------------------|--|
| Disk Present Count field | The number of physical drives present on the controller. |
| Critical Disk Count field | The number of physical drives in a critical state on the controller. |
| Failed Disk Count field | The number of physical drives that have failed on the controller. |

Step 12 In the **Capabilities** area, review the following information:

| Name | Description |
|-----------------------------|--|
| RAID Levels Supported field | The RAID levels supported by the controller. Raid 1 —Simple mirroring. |

Step 13 In the **HW Configuration** area, review the following information:

| Name | Description |
|-------------------------------|---|
| Number of Backend Ports field | The number of SATA ports on the controller. |

Viewing Physical Drive Info for Cisco Boot Optimized M.2 Raid Controller

Before you begin

The server must be powered on.

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the appropriate M.2 raid controller.
- Step 3** Click **Physical Drive Info** tab and in the **Physical Drives** area, review the following information:

| Name | Description |
|-------------------------------------|---|
| Controller column | The name of the PCIe slot in which the controller drive is located. |
| Physical Drive Number column | The physical drive number. |
| Status column | The physical drive status. This can be one of the following: <ul style="list-style-type: none"> • JBOD—The drive is in JBOD mode. • Failed—The drive was in use, but it has failed. • Offline—The drive is offline and cannot be accessed. • Online—The drive is in use as part of a drive group. • Predicted Failure—The drive is marked as due to fail soon by the controller. • Rebuild—The drive is currently being rebuilt. • Unknown—The drive status is unknown. |
| State column | The state of the physical drive. This can be one of the following: <ul style="list-style-type: none"> • JBOD— The physical drive is in JBOD state. • Online— The physical drive is in use as part of a drive group. • Failed— The physical drive is in failed state. • Rebuild— The physical drive is in rebuild state. |

| Name | Description |
|------------------------------|---|
| Health column | <p>The health of the physical drive. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Moderate Fault • Severe Fault <p>The health field includes both text and a color-coded icon. If the color-coded icon is:</p> <ul style="list-style-type: none"> • Green — It indicates normal operation. • Yellow — It is an informational message. • Red — It indicates warning, critical, and non-recoverable errors. |
| Drive Firmware column | The firmware version running on the drive. |
| Model column | The drive vendor name. |
| Type column | Whether the drive is a hard drive (HDD) or a solid state drive (SSD). |

Step 4 In the **Health/Status** area, review the following information:

| Name | Description |
|---------------|--|
| Health | <p>The health of the physical drive. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Moderate Fault • Severe Fault |
| State | <p>The state of the physical drive. This can be one of the following:</p> <ul style="list-style-type: none"> • JBOD— The physical drive is in JBOD state. • Online— The physical drive is in use as part of a drive group. • Failed— The physical drive is in failed state. • Rebuild— The physical drive is in rebuild state. |

| Name | Description |
|--------|--|
| Status | <p>The physical drive status. This can be one of the following:</p> <ul style="list-style-type: none"> • JBOD—The drive is in JBOD mode. • Failed—The drive was in use, but it has failed. • Offline—The drive is offline and cannot be accessed. • Online—The drive is in use as part of a drive group. • Predicted Failure—The drive is marked as due to fail soon by the controller. • Rebuild—The drive is currently being rebuilt. • Unknown—The drive status is unknown. |
| Fault | If this field displays true , the drive is in the failed state. |
| Online | If this field displays true , the drive is in the online state. |

Step 5 In the **Smart Information** area, review the following information:

| Name | Description |
|---------------------------------------|--|
| Power Cycle Count | Number of power cycles that were performed on the drive from the time it was manufactured. Power Cycle Count this field. |
| Power On Hours | Total number of hours that the drive is in the 'Power On' mode. |
| Percentage Life Left | The number of write cycles remaining in a M.2 drive. For instance, if an M.2 drive is capable of 100 write cycles during its life time, and it has completed 15 writes, then the percentage of life left in the drive is 85%. Each percentage range is represented in a different color. For instance, green for 75% to 100% and red for 1 to 25%. |
| Wear Status in Days | The number of days an M.2 drive has gone through with the write cycles. |
| Operating Temperature (°C) | The current temperature of the drive at which the selected M.2 drive operates at the time of selection. |
| Percentage Reserved Capacity Consumed | The total capacity (out of the percentage reserved for it) consumed by the M.2 drive. |

| Name | Description |
|----------------------|---|
| Time of Last Refresh | Time period since the drive was last refreshed. |

Step 6 In the **Operation Status** area, review the following information:

| Name | Description |
|---------------|--|
| Operation | The current operation that is in progress on the drive. This can be one of the following: <ul style="list-style-type: none"> • Rebuild in progress • Patrol read in progress |
| Progress in % | The progress of the operation, in percentage. |

Step 7 In the **Inquiry Data** area, review the following information:

| Name | Description |
|---------------------|---|
| Product ID | The drive product ID. This field generally displays the drive model number. |
| Vendor | The vendor for the drive. |
| Drive Firmware | The active firmware version on the drive. |
| Drive Serial Number | The serial number for the drive. |

Step 8 In the **General** area, review the following information:

| Name | Description |
|-----------------------|--|
| Slot Number | The slot number in which the physical drive resides. |
| Raw Size | The capacity of drive in megabytes, including the space used for formatting. |
| Negotiated Link Speed | The speed of the link between the drive and the controller. |
| Media Type | The drive type is a solid state drive (SSD). |
| Interface Type | The drive interface type. |
| Enclosure Association | Indicates whether the drives are associated to the controller directly or not. This can be: <ul style="list-style-type: none"> • Direct attached—drives are directly attached to the controller. |

Viewing the Virtual Drive Info for Cisco Boot Optimized M.2 Raid Controller

Procedure

- Step 1** In the **Navigation** pane, click the **Storage** menu.
- Step 2** In the **Storage** menu, click the M.2 Raid Controller.
- Step 3** Select the **Virtual Drive Info** tab and in the **Virtual Drives** area, review the following information:

| Name | Description |
|------------------------------------|--|
| Virtual Drive Number column | The number of the virtual drive. |
| Name column | The name of the virtual drive. |
| Status column | <p>The virtual drive state. This can be one of the following:</p> <ul style="list-style-type: none"> • Partially Degraded—Virtual drive or physical drive rebuild is in progress. • Degraded—One or more spans of the drive has no redundancy. • Off Line—The drive is not visible to the host. • Unknown—The virtual drive state is unknown. • Optimal—The drive has full redundancy. |
| Health column | <p>The health of the virtual drive. This can be one of the following:</p> <ul style="list-style-type: none"> • Good • Moderate Fault • Severe Fault <p>The health field includes both text and a color-coded icon. If the color-coded icon is:</p> <ul style="list-style-type: none"> • Green — It indicates normal operation. • Yellow — It is an informational message. • Red — It indicates warning, critical, and non-recoverable errors. |
| Size column | The capacity of the drive in megabytes. |
| RAID Level column | <p>The RAID level on the virtual drive.</p> <p>Raid 1—Simple mirroring.</p> |

Step 4 In the **General** area, review the following information:

| Name | Description |
|------------|--------------------------------|
| Name | The name of the virtual drive. |
| Strip Size | The size of each strip, in KB. |

Step 5 In the **Physical Drives** area, review the following information:

| Name | Description |
|-----------------------|---|
| Physical Drive Number | The physical drive number. |
| State | The state of the physical drive. This can be one of the following: <ul style="list-style-type: none"> • JBOD— The physical drive is in JBOD state. • Online— The physical drive is in use as part of a drive group. • Failed— The physical drive is in failed state. • Rebuild— The physical drive is in rebuild state. |
| Status | The physical drive status. This can be one of the following: <ul style="list-style-type: none"> • JBOD—The drive is in JBOD mode. • Failed—The drive was in use, but it has failed. • Offline—The drive is offline and cannot be accessed. • Online—The drive is in use as part of a drive group. • Predicted Failure—The drive is marked as due to fail soon by the controller. • Rebuild—The drive is currently being rebuilt. • Unknown—The drive status is unknown. |

Step 6 In the **Operation Status** area, review the following information:

| Name | Description |
|-----------|--|
| Operation | The current operation that is in progress on the drive. This can be: <p>Rebuild in progress</p> |

| Name | Description |
|---------------|---|
| Progress in % | The progress of the operation, in percentage. |



CHAPTER 13

Configuring Communication Services

This chapter includes the following sections:

- [Configuring HTTP, on page 253](#)
- [Configuring SSH, on page 254](#)
- [Configuring XML API, on page 255](#)
- [Enabling Redfish, on page 256](#)
- [Configuring IPMI, on page 256](#)
- [Configuring SNMP, on page 258](#)
- [Configuring a Server to Send Email Alerts Using SMTP, on page 264](#)

Configuring HTTP

Beginning with release 4.1(2b), Cisco IMC supports separate HTTPS and HTTP communication services. You can disable only HTTP services using this functionality.

This functionality is supported only on the following servers:

- Cisco UCS C220 M5
- Cisco UCS C240 M5
- Cisco UCS C480 M5
- Cisco UCS C480 ML M5
- Cisco UCS C240 SD M5
- Cisco UCS C125 M5
- Cisco UCS S3260 M4/M5



Note If **Redirect HTTP to HTTPS Enabled** was disabled in any release earlier than 4.1(2b), then after upgrading to release 4.1(2b) or later, **HTTP Enabled** value is set to **Disabled** by the system.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **HTTP Properties** area, update the following properties:

| Name | Description |
|---|---|
| HTTP/S Enabled check box | Whether HTTP and HTTPS are enabled on the Cisco IMC. |
| Redirect HTTP to HTTPS Enabled check box | If enabled, all attempts to communicate via HTTP are redirected to the equivalent HTTPS address. We strongly recommend that you enable this option if you enable HTTP. |
| HTTP Port field | The port to use for HTTP communication. The default is 80. |
| HTTPS Port field | The port to use for HTTPS communication. The default is 443 |
| Session Timeout field | The number of seconds to wait between HTTP requests before the Cisco IMC times out and terminates the session. Enter an integer between 60 and 10,800. The default is 1,800 seconds. |
| Max Sessions field | The maximum number of concurrent HTTP and HTTPS sessions allowed on the Cisco IMC. This value may not be changed. |
| Active Sessions field | The number of HTTP and HTTPS sessions currently running on the Cisco IMC. |

- Step 4** Click **Save Changes**.

Configuring SSH

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **SSH Properties** area, update the following properties:

| Name | Description |
|------------------------------|--|
| SSH Enabled check box | Whether SSH is enabled on the Cisco IMC. |

| Name | Description |
|-----------------------|--|
| SSH Port field | The port to use for secure shell access. The default is 22. |
| SSH Timeout field | 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 1,800 seconds. |
| Max Sessions field | The maximum number of concurrent SSH sessions allowed on the Cisco IMC. This value may not be changed. |
| Active Sessions field | The number of SSH sessions currently running on the Cisco IMC. |

Step 4 Click **Save Changes**.

Configuring XML API

XML API for Cisco IMC

The Cisco IMC XML application programming interface (API) is a programmatic interface to Cisco IMC for a C-Series Rack-Mount Server. The API accepts XML documents through HTTP or HTTPS.

For detailed information about the XML API, see *Cisco UCS Rack-Mount Servers Cisco IMC XML API Programmer's Guide*.

Enabling the XML API

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **XML API Properties** area, update the following properties:

| Name | Description |
|---------------------------|---|
| XML API Enabled check box | Whether API access is allowed on this server. |
| Max Sessions field | The maximum number of concurrent API sessions allowed on the Cisco IMC. This value may not be changed. |

| Name | Description |
|-----------------------|--|
| Active Sessions field | The number of API sessions currently running on the Cisco IMC. |

Step 4 Click **Save Changes**.

Enabling Redfish

Before you begin

You must be logged in as admin to perform this action.

Procedure

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

Step 2 On the **Admin** tab, click **Communications Services**.

Step 3 In the **Redfish Properties** area, update the following properties:

| Name | Description |
|---------------------------|---|
| XML API Enabled check box | Whether API access is allowed on this server. |
| Max Sessions field | The maximum number of concurrent API sessions allowed on the Cisco IMC. This value may not be changed. |
| Active Sessions field | The number of API sessions currently running on the Cisco IMC. |

Step 4 Click **Save Changes**.

Configuring IPMI

IPMI Over LAN

Intelligent Platform Management Interface (IPMI) defines the protocols for interfacing with a service processor embedded in a server platform. This service processor is called a Baseboard Management Controller (BMC) and resides on the server motherboard. The BMC links to a main processor and other on-board elements using a simple serial bus.

During normal operations, IPMI lets a server operating system obtain information about system health and control system hardware. For example, IPMI enables the monitoring of sensors, such as temperature, fan speeds and voltages, for proactive problem detection. If server temperature rises above specified levels, the

server operating system can direct the BMC to increase fan speed or reduce processor speed to address the problem.

Configuring IPMI over LAN

Configure IPMI over LAN when you want to manage the Cisco IMC with IPMI messages.



Note

- If you would want to run IPMI commands without issuing an encryption key, set the **Encryption Key** field in Cisco IMC to any even number of zeroes and save. This allows you to issue IPMI commands without including an encryption key.
- You are only allowed a maximum of four concurrent IPMI sessions.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **IPMI over LAN Properties** area, update the following properties for BMC 1, BMC 2, CMC 1, or CMC 2:

| Name | Description |
|---|--|
| Enabled check box | Whether IPMI access is allowed on this server. |
| Privilege Level Limit drop-down list | The highest privilege level that can be assigned to an IPMI session on this server. This can be one of the following: <ul style="list-style-type: none"> • read-only—IPMI users can view information but cannot make any changes. If you select this option, IPMI users with the "Administrator", "Operator", or "User" user roles can only create read-only IPMI sessions, regardless of their other IPMI privileges. • user—IPMI users can perform some functions but cannot perform administrative tasks. If you select this option, IPMI users with the "Administrator" or "Operator" user role can create user and read-only sessions on this server. • admin—IPMI users can perform all available actions. If you select this option, IPMI users with the "Administrator" user role can create admin, user, and read-only sessions on this server. |
| Encryption Key field | The IPMI encryption key to use for IPMI communications. |
| Randomize button | Enables you to change the IPMI encryption key to a random value. |

Step 4 Click **Save Changes**.

Configuring SNMP

SNMP

The Cisco UCS C-Series Rack-Mount Servers support the Simple Network Management Protocol (SNMP) for viewing server configuration and status and for sending fault and alert information by SNMP traps. For information on Management Information Base (MIB) files supported by Cisco IMC, see the *MIB Quick Reference for Cisco UCS* at this URL: http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/sw/mib/b-series/b_UCS_MIBRef.html.

Configuring SNMP Properties

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **Communications Services** pane, click the **SNMP** tab.
- Step 4** In the **SNMP Properties** area, update the following properties:

| Name | Description |
|--------------------------------------|---|
| SNMP Enabled check box | Whether this server sends SNMP traps to the designated host. Note After you check this check box, you need to click Save Changes before you can configure SNMP users or traps. |
| SNMP Port field | The port on which Cisco IMC SNMP agent runs. Enter an SNMP port number within the range 1 to 65535. The default port number is 161. Note The port numbers that are reserved for system calls, such as 22,23,80,123,443,623,389,636,3268,3269 and 2068, cannot be used as an SNMP port. |
| Access Community String field | The default SNMP v1 or v2c community name Cisco IMC includes on any SNMP get operations. Enter a string up to 18 characters. |

| Name | Description |
|--------------------------------------|---|
| SNMP Community Access drop-down list | <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled — This option blocks access to the information in the inventory tables. • Limited — This option provides partial access to read the information in the inventory tables. • Full — This option provides full access to read the information in the inventory tables. <p>Note SNMP Community Access is applicable only for SNMP v1 and v2c users.</p> |
| Trap Community String field | <p>The name of the SNMP community group used for sending SNMP trap to other devices.</p> <p>Enter a string up to 18 characters.</p> <p>Note This field is visible only for SNMP v1 and v2c users. SNMP v3 version need to use SNMP v3 credentials.</p> |
| System Contact field | <p>The system contact person responsible for the SNMP implementation.</p> <p>Enter a string up to 254 characters, such as an email address or a name and telephone number.</p> |
| System Location field | <p>The location of the host on which the SNMP agent (server) runs.</p> <p>Enter a string up to 254 characters.</p> |
| SNMP Input Engine ID field | <p>User-defined unique identification of the static engine.</p> |
| SNMP Engine ID field | <p>Unique string to identify the device for administration purpose. This is generated from the SNMP Input Engine ID if it is already defined, else it is derived from the BMC serial number.</p> |

Step 5 Click **Save Changes**.

What to do next

Configure SNMP trap settings.

Configuring SNMP Trap Settings

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **Communications Services** pane, click the **SNMP** tab.
- Step 4** Click on **Trap Destinations** tab.
- Step 5** In the **Trap Destinations** area, you can perform one of the following:
- Select an existing user from the table and click **Modify Trap**.
 - Click **Add Trap** to create a new user.

Note If the fields are not highlighted, select **Enabled**.

- Step 6** In the **Trap Details** dialog box, complete the following fields:

| Name | Description |
|---------------------------------------|--|
| ID field | The trap destination ID. This value cannot be modified. |
| Enabled check box | If checked, then this trap is active on the server. |
| Version drop-down list | The SNMP version and model used for the trap. This can be one of the following: <ul style="list-style-type: none"> • V2 • V3 |
| Trap Type radio button | The type of trap to send. This can be one of the following: <ul style="list-style-type: none"> • Trap: If this option is chosen, the trap will be sent to the destination but you do not receive any notifications. • Inform: You can choose this option only for V2 users. If chosen, you will receive a notification when a trap is received at the destination. |
| User drop-down list | The drop-down list displays all available users, select a user from the list. |
| Trap Destination Address field | Address to which the SNMP trap information is sent. You can set an IPv4 or IPv6 address or a domain name as the trap destination. |
| Port | The port the server uses to communicate with the trap destination. Enter a trap destination port number within the range 1 to 65535. |

- Step 7** Click **Save Changes**.
- Step 8** If you want to delete a trap destination, select the row and click **Delete**.

Click **OK** in the delete confirmation prompt.

Sending a Test SNMP Trap Message

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **Communication Services** pane, click **SNMP**.
- Step 4** In the **Trap Destinations** area, select the row of the desired SNMP trap destination.
- Step 5** Click **Send SNMP Test Trap**.

An SNMP test trap message is sent to the trap destination.

Note The trap must be configured and enabled in order to send a test message.

Managing SNMP Users

Before you begin

- You must log in as a user with admin privileges to perform this task.
- SNMP must be enabled.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **Communications Services** pane, click the **SNMP** tab.
- Step 4** In the **User Settings** area, update the following properties:

| Name | Description |
|----------------------|--|
| Add button | Click an available row in the table then click this button to add a new SNMP user. |
| Modify button | Select the user you want to change in the table then click this button to modify the selected SNMP user. |

| Name | Description |
|---------------------|--|
| Delete button | Select the user you want to delete in the table then click this button to delete the selected SNMP user. |
| ID column | The system-assigned identifier for the SNMP user. |
| Name column | The SNMP user name. |
| Auth Type column | The user authentication type. |
| Privacy Type column | The user privacy type. |

Step 5 Click **Save Changes**.

Configuring SNMP Users

Before you begin

- You must log in as a user with admin privileges to perform this task.
- SNMP must be enabled.

Procedure

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

Step 2 In the **Admin** menu, click **Communication Services**.

Step 3 In the **Communications Services** pane, click the **SNMP** tab.

Step 4 In the **User Settings** area, perform one of the following actions:

- Select an existing user from the table and click **Modify User**.
- Select a row in the **Users** area and click **Add User** to create a new user.

Step 5 In the **SNMP User Details** dialog box, update the following properties:

| Name | Description |
|------------|---|
| ID field | The unique identifier for the user. This field cannot be changed. |
| Name field | The SNMP username. Enter between 1 and 31 characters or spaces. Note Cisco IMC automatically trims leading or trailing spaces. |

| Name | Description |
|---------------------------------------|---|
| Security Level drop-down list | The security level for this user. This can be one of the following: <ul style="list-style-type: none"> • no auth, no priv—The user does not require an authorization or privacy password. • auth, no priv—The user requires an authorization password but not a privacy password. If you select this option, Cisco IMC enables the Auth fields described below. • auth, priv—The user requires both an authorization password and a privacy password. If you select this option, Cisco IMC enables the Auth and Privacy fields. |
| Auth Type drop-down | The authorization type. This can be one of the following: <ul style="list-style-type: none"> • MD5 • SHA |
| Auth Password field | The authorization password for this SNMP user. Enter between 8 and 64 characters or spaces. Note Cisco IMC automatically trims leading or trailing spaces. |
| Confirm Auth Password field | The authorization password again for confirmation purposes. |
| Privacy Type drop-down | The privacy type. This can be one of the following: <ul style="list-style-type: none"> • DES • AES |
| Privacy Password field | The privacy password for this SNMP user. Enter between 8 and 64 characters or spaces. Note Cisco IMC automatically trims leading or trailing spaces. |
| Confirm Privacy Password field | The authorization password again for confirmation purposes. |

Step 6 Click **Save Changes**.

Step 7 If you want to delete a user, select the user and click **Delete User**.

Click **OK** in the delete confirmation prompt.

Configuring a Server to Send Email Alerts Using SMTP

The Cisco IMC supports email-based notification of server faults to recipients without relying on the SNMP. The system uses the Simple Mail Transfer Protocol (SMTP) to send server faults as email alerts to the configured SMTP server.

A maximum of four recipients is supported.

Configuring SMTP Server For Receiving Email Alerts

Configure the SMTP properties and add email recipients on the **Mail Alert** tab to receive email notifications for server faults.

Before you begin

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

Procedure

Step 1

Step 2

In the **Admin** menu, click **Communication Services**.

Step 3

In the **Communications Services** pane, click the **Mail Alert** tab.

Step 4

In the **SMTP Properties** area, update the following properties.

| Name | Description |
|--|--|
| SMTP Enabled check box | If checked, it enables the SMTP service. |
| SMTP Server Address field | Allows you to enter the SMTP server address. |
| SMTP Port field | Allows you to enter the SMTP port number. The default port number is 25. |
| Minimum Severity to Report drop-down list | <p>Allows you to choose the minimum severity level for receiving the email alert. This can be one of the following:</p> <ul style="list-style-type: none"> • Condition • Warning • Minor • Major • Critical <p>If you choose a minimum severity level, the mail alerts are sent for that level and the other higher severity levels. For example, if you choose 'Minor' as the minimum severity level, you will receive email alerts for the minor, major, and critical fault events.</p> |

| Name | Description |
|-------------------|---|
| SMTP From Address | <p>Allows you to set the From address of the SMTP mail alerts that are sent. The email address that you enter in this field will be displayed as the from address (mail received from address) of all the SMTP mail alerts that you receive.</p> <p>Note This is an optional field. If you do not enter an email address in this field, by default the server hostname ID is displayed as the from address (mail received from address).</p> |

Step 5

In the **SMTP Recipients** area, do the following:

- a) Click the **Add (+)** button to add the email recipients to whom notifications should be sent. Enter the email ID and click **Save**.

To delete an email recipient, select the email recipient and click the **Delete (X)** button.

- b) Click **Send Test Mail** to check whether the email recipient you added is reachable. If the email address and the SMTP settings are valid, a confirmation pop-up window appears with the message that an email has been sent. If the settings are not valid, a confirmation pop-up window appears with the message that no email has been sent. The **Reachability** column indicates whether test mails have been sent successfully to the email recipient. The **Reachability** column has one of the following values:

- **Yes** (if the test mail has been sent successfully)
- **No** (if the test mail has not been sent successfully)
- **na** (if no test mail has been sent)

Step 6

Click **Save Changes**.

Troubleshooting

The following table describes troubleshooting suggestions for SMTP mail alert configuration issues (when the reachability status is **No**) that may appear in the Cisco IMC logs:

| Issue | Suggested Solution |
|---------------------------------|---|
| Timeout was reached | This could occur when you are not able to reach the configured SMTP IP address. Enter a valid IP address. |
| Couldn't resolve host name | This could occur when you are not able to reach the configured SMTP domain name. Enter a valid domain name. |
| Couldn't connect to server | This could occur when the SMTP IP or domain name or port number is/are incorrectly configured. Enter valid configuration details. |
| Failed sending data to the peer | This could occur when the an invalid recipient email ID is configured. Enter a valid email ID. |

Adding SMTP Email Recipients

Add email recipients on the **Mail Alert** tab to receive email notifications for server faults.

Before you begin

- You must log in as a user with admin privileges to perform this task.
- Configure the SMTP server properties in the SMTP Properties area. See [Configuring SMTP Server For Receiving Email Alerts, on page 264](#)

Procedure

- Step 1** In the Navigation pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Communication Services**.
- Step 3** In the **Communications Services** pane, click the **Mail Alert** tab.
- Step 4** In the **SMTP Recipients** area, do the following:
- a) Click the **Add (+)** button to add the email recipients to whom notifications should be sent. Enter the email ID and click **Save**.
 - b) Click **Send Test Mail** to check whether the email recipient you added is reachable. If the email address and the SMTP settings are valid, a confirmation pop-up window appears with the message that an email has been sent. If the settings are not valid, a confirmation pop-up window appears with the message that no email has been sent. The **Reachability** column indicates whether test mails have been sent successfully to the email recipient. The **Reachability** column has one of the following values:
 - **Yes** (if the test mail has been sent successfully)
 - **No** (if the test mail has not been sent successfully)
 - **na** (if no test mail has been sent)
-



CHAPTER 14

Managing Certificates and Server Security

This chapter includes the following sections:

- [Managing the Server Certificate, on page 267](#)
- [Generating a Certificate Signing Request, on page 268](#)
- [Creating a Self-Signed Certificate, on page 270](#)
- [Creating a Self-Signed Certificate Using Windows, on page 272](#)
- [Uploading a Server Certificate, on page 273](#)
- [Key Management Interoperability Protocol, on page 274](#)
- [FIPS 140-2 Compliance in Cisco IMC, on page 291](#)

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 Cisco IMC to replace the current server certificate. The server certificate may be signed either by a public Certificate Authority (CA), such as Verisign, or by your own certificate authority. The generated certificate key length is 2048 bits.



Note Before performing any of the following tasks in this chapter, ensure that the Cisco IMC time is set to the current time.

Procedure

- Step 1** Generate the CSR from the Cisco IMC.
- Step 2** Submit the CSR file to a certificate authority that will issue and sign your certificate. If your organization generates its own self-signed certificates, you can use the CSR file to generate a self-signed certificate.
- Step 3** Upload the new certificate to the Cisco IMC.

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

Generating a Certificate Signing Request



Note Do not use special characters (For example ampersand (&)) in the **Common Name** and **Organization Unit** fields.

Before you begin

- You must log in as a user with admin privileges to configure certificates.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

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

Step 2 In the **Admin** menu, click **Security Management**.

Step 3 In the **Actions** area, click the **Generate New Certificate Signing Request** link.

The **Generate New Certificate Signing Request** dialog box appears.

Step 4 In the **Generate New Certificate Signing Request** dialog box, update the following properties:

| Name | Description |
|-------------------------------------|--|
| Common Name field | <p>The fully qualified name of the Cisco IMC.</p> <p>By default the CN of the servers appears in CXXX-YYYYYY format, where XXX is the model number and YYYYYY is the serial number of the server.</p> <p>When you upgrade to latest version, CN is retained as is.</p> |
| Subject Alternate Name (SAN) | <p>You can now provide additional input parameter for Subject Alternate Name. This allows various values to be associated using the subject field of the certificate.</p> <p>The various options of SAN includes:</p> <ul style="list-style-type: none"> • Email • DNS name • IP address • Uniform Resource Identifier (URI) <p>Note This field is optional. You can configure any number of SAN instances of each type, but all together the instances count must not exceed 10.</p> |
| Organization Name field | The organization requesting the certificate. |

| Name | Description |
|-------------------------------------|---|
| Organization Unit field | The organizational unit. |
| Locality field | The city or town in which the company requesting the certificate is headquartered. |
| State Name field | The state or province in which the company requesting the certificate is headquartered. |
| Country Code drop-down list | The country in which the company resides. |
| Email field | The email contact at the company. |
| Signature Algorithm | <p>Allows you to select the signature algorithm for generating certificate signing request. This can be one of the following:</p> <ul style="list-style-type: none"> • SHA384 • SHA1 • SHA256 • SHA512 <p>The default signature algorithm selected for generating certificate signing request is SHA384.</p> |
| Challenge Password check box | <p>A Challenge Password is to be embedded in the Certificate Signing Request (CSR) dialog box, which the issuer Certificate Authority (CA) uses to authenticate the certificate.</p> <p>If Challenge Password option is selected, then Challenge Password String will be populated for the user to enter the valid password string.</p> <p>Note The user has an option not to select the Challenge Password in which case the Challenge Password String is not populated. However, the user can proceed with generating the CSR successfully.</p> |
| String Mask drop-down list | <p>This sets a mask for permitted string types in Certificate Signing Request (CSR) dialog box. This option masks out the use of certain string types in certain fields. The string types are as follows:</p> <ul style="list-style-type: none"> • Default: Uses PrintableString, T61String, BMPString. • pkix: Uses PrintableString, BMPString. • utf8only: Uses only UTF8Strings. • nombstr: Uses PrintableString, T61String (no BMPStrings or UTF8Strings). |

| Name | Description |
|-----------------------------------|--|
| Self Signed Certificate check box | <p>Generates a Self Signed Certificate.</p> <p>Warning After successful certificate generation, the Cisco IMC Web GUI restarts. Communication with the management controller may be lost momentarily and you will need to re-login.</p> <p>Note If enabled, CSR is generated, signed and uploaded automatically.</p> |

Note If Self-signed certificate is enabled, ignore steps 5 and 6.

Step 5 Click **Generate CSR**.

The **Opening csr.txt** dialog box appears.

Step 6 Perform any one of the following steps to manage the CSR file, csr.txt:

- a) Click **Open With** to view csr.txt.
- b) Click **Save File** and then click **OK** to save csr.txt to your local machine.

What to do next

- 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.
- Ensure that the certificate is of type **Server**.

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 Cisco IMC.

Before you begin

- Obtain and install a certificate server software package on a server within your organization.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

| | Command or Action | Purpose |
|---------------|--|---|
| Step 1 | <p>openssl genrsa -out CA_keyfilename keysize</p> <p>Example:</p> <pre># openssl genrsa -out ca.key 2048</pre> | <p>This command generates an RSA private key that will be used by the CA.</p> <p>Note 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> |
| Step 2 | <p>openssl req -new -x509 -days numdays -key CA_keyfilename -out CA_certfilename</p> <p>Example:</p> <pre># openssl req -new -x509 -days 365 -key ca.key -out ca.crt</pre> | <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> |
| Step 3 | <p>echo "nsCertType = server" > openssl.conf</p> <p>Example:</p> <pre># echo "nsCertType = server" > openssl.conf</pre> | <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> |
| Step 4 | <p>openssl x509 -req -days numdays -in CSR_filename -CA CA_certfilename -set_serial 04 -CAkey CA_keyfilename -out server_certfilename -extfile openssl.conf</p> <p>Example:</p> <pre># openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 04 -CAkey ca.key -out myserver05.crt -extfile openssl.conf</pre> | <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> |
| Step 5 | <p>openssl x509 -noout -text -purpose -in <cert file></p> <p>Example:</p> <pre>openssl x509 -noout -text -purpose -in <cert file></pre> | <p>Verifies if the generated certificate is of type Server.</p> <p>Note If the values of the fields Server SSL and Netscape SSL server are not yes, ensure that <code>openssl.conf</code> is configured to generate certificates of type server.</p> |
| Step 6 | <p>(Optional) If the generated certificate does not have the correct validity dates, ensure the Cisco IMC time is set to the current time, and</p> | <p>Certificate with the correct validity dates is created.</p> |

| | Command or Action | Purpose |
|--|--|---------|
| | regenerate the certificate by repeating steps 1 through 5. | |

Example

This example shows how to create a CA and to generate a server certificate signed by the new CA. These commands are entered on a Linux server running OpenSSL.

```
# /usr/bin/openssl genrsa -out ca.key 2048
Generating RSA private key, 2048 bit long modulus
.....+++++
.....+++++
e is 65537 (0x10001)
# /usr/bin/openssl req -new -x509 -days 365 -key ca.key -out ca.crt
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [GB]:US
State or Province Name (full name) [Berkshire]:California
Locality Name (eg, city) [Newbury]:San Jose
Organization Name (eg, company) [My Company Ltd]:Example Incorporated
Organizational Unit Name (eg, section) []:Unit A
Common Name (eg, your name or your server's hostname) []:example.com
Email Address []:admin@example.com
# echo "nsCertType = server" > openssl.conf
# /usr/bin/openssl x509 -req -days 365 -in csr.txt -CA ca.crt -set_serial 01
-CAkey ca.key -out server.crt -extfile openssl.conf
Signature ok
subject=/C=US/ST=California/L=San Jose/O=Example Inc./OU=Unit
A/CN=example.com/emailAddress=john@example.com
Getting CA Private Key
#
```

What to do next

Upload the new certificate to the Cisco IMC.

Creating a Self-Signed Certificate Using Windows

Before you begin

- You must log in as a user with admin privileges to configure certificates.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

- Step 1** Open **IIS Manager** and navigate to the level you want to manage.
- Step 2** In the **Features** area, double-click **Server Certificate**.
- Step 3** In the **Action** pane, click **Create Self-Signed Certificate**.
- Step 4** On the **Create Self-Signed Certificate** window, enter name for the certificate in the **Specify a friendly name for the certificate** field.
- Step 5** Click **Ok**.
- Step 6** (Optional) If the generated certificate does not have the correct validity dates, ensure the Cisco IMC time is set to the current time, and regenerate the certificate by repeating steps 1 through 5. Certificate with the correct validity dates is created.
-

Uploading a Server Certificate

You can either browse and select the certificate to be uploaded to the server or copy the entire content of the signed certificate and paste it in the **Paste certificate content** text field and upload it.

Before you begin

- You must log in as a user with admin privileges to upload a certificate.
- The certificate file to be uploaded must reside on a locally accessible file system.
- Ensure that the generated certificate is of type server.
- The following certificate formats are supported:
 - .crt
 - .cer
 - .pem



Note You must first generate a CSR using the Cisco IMC Certificate Management menu, and you must use that CSR to obtain the certificate for uploading. Do not upload a certificate that was not obtained by this method.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Certificate Management**.
- Step 3** In the **Actions** area, click **Upload Server Certificate**.
- The **Upload Certificate** dialog box appears.

Step 4 In the **Upload Certificate** dialog box, update the following properties:

| Name | Description |
|---|--|
| File field | The certificate file you want to upload. |
| Browse button | Opens a dialog box that allows you to navigate to the appropriate certificate file. |
| Paste Certificate content radio button | Opens a dialog box that allows you to copy the entire content of the signed certificate and paste it in the Paste certificate content text field. Note Ensure the certificate is signed before uploading. |
| Upload Certificate button | Allows you to upload the certificate. |

Step 5 Click **Upload Certificate**.

Key Management Interoperability Protocol

Key Management Interoperability Protocol (KMIP) is a communication protocol that defines message formats to handle keys or classified data on a key management server. KMIP is an open standard and is supported by several vendors. Key management involves multiple interoperable implementations, so a KMIP client works effectively with any KMIP server.

Self-Encrypting Drives (SEDs) contain hardware that encrypts incoming data and decrypts outgoing data in realtime. A drive or media encryption key controls this function. However, the drives need to be locked in order to maintain security. A security key identifier and a security key (key encryption key) help achieve this goal. The key identifier provides a unique ID to the drive.

Different keys have different usage requirements. Currently, the responsibility of managing and tracking local keys lies primarily with the user, which could result in human error. The user needs to remember the different keys and their functions, which could prove to be a challenge. KMIP addresses this area of concern to manage the keys effectively without human involvement.

Viewing Secure Key Management Settings

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Work** pane, review the following field:

| Name | Description |
|---|---|
| Enable Secure Key Management check box | If checked, allows you to enable the secure key management feature. |

Step 5 In the **Actions** Area, review the following fields:

| Name | Description |
|--|--|
| Download Root CA Certificate link | This allows you to download the root CA certificate to Cisco IMC. |
| Export Root CA Certificate link | This allows you to export the downloaded root CA certificate to a local file or remote server. |
| Delete Root CA Certificate link | This allows you to delete the root CA certificate. |
| Download Client Certificate link | This allows you to download the client certificate to Cisco IMC. |
| Export Client Certificate link | This allows you to export the downloaded client certificate to a local file or remote server. |
| Delete Client Certificate link | This allows you to delete the client certificate. |
| Download Client Private Key link | This allows you to download the client private key to Cisco IMC. |
| Export Client Private Key link | This allows you to export the downloaded root CA certificate to local file or remote server. |
| Delete Client Private Key link | This allows you to delete the root CA certificate. |
| Delete KMIP Login link | This allows you to delete the KMIP login details. |

Step 6 In the **KMIP Servers** Area, review the following fields:

| Name | Description |
|-------------------------------|---|
| ID field | ID for the KMIP server configuration. |
| IP Address field | IP address of the KMIP server. |
| Port field | Communication port to the KMIP server. |
| Timeout field | Time period that Cisco IMC waits for a response from the KMIP server. |
| Delete button | Deletes the KMIP server configuration. |
| Test Connection button | Tests whether or not the KMIP connection was successful. |

Step 7 In the **KMIP Root CA Certificate** Area, review the following fields:

| Name | Description |
|---|---|
| Server Root CA Certificate field | Indicates the availability of the root CA certificate. |
| Download Status field | This field displays the status of the root CA certificate download. |

| Name | Description |
|-------------------------|---|
| Download Progress field | This field displays the progress of the root CA certificate download. |
| Export Status field | This field displays the status of the root CA certificate export. |
| Export Progress field | This field displays the progress of the root CA certificate export. |

Step 8 In the **KMIP Client Certificate** Area, review the following fields:

| Name | Description |
|--------------------------|--|
| Client Certificate field | Indicates the availability of the client certificate. |
| Download Status field | This field displays the status of the client certificate download. |
| Download Progress field | This field displays the progress of the client certificate download. |
| Export Status field | This field displays the status of the client certificate export. |
| Export Progress field | This field displays the progress of the client certificate export. |

Step 9 In the **KMIP Login Details** Area, review the following fields:

| Name | Description |
|---------------------------------|---|
| Use KMIP Login check box | Allows you to choose whether or not to use KMIP login details. |
| Login name to KMIP Server field | User name of the KMIP server. |
| Password to KMIP Server field | Password of the KMIP server. |
| Change Password check box | Allows you to change the KMIP password. |
| New Password field | Allows you to enter the new password that you want to assign to the KMIP server. Note This option is only visible when you enable the Change Password check box. |
| Confirm Password field | Enter the new password again in this field. Note This option is only visible when you enable the Change Password check box. |

Step 10 In the **KMIP Client Private Key** Area, review the following fields:

| Name | Description |
|--------------------------|--|
| Client Private Key field | Indicates the availability of the client private key. |
| Download Status field | This field displays the status of the client private key download. |
| Download Progress field | This field displays the progress of the client private key download. |
| Export Status field | This field displays the status of the client private key export. |
| Export Progress field | This field displays the progress of the client private key export. |

Creating a Client Private Key and Client Certificate for KMIP Configuration

As an alternative to using a public Certificate Authority (CA) to generate and sign a server certificate, you can operate your own CA and sign your own certificates. This section shows commands for creating a CA and generating a server certificate using the OpenSSL certificate server running on Linux. For detailed information about OpenSSL, see <http://www.openssl.org>.



Note These commands are to be entered on a Linux server with the OpenSSL package, not in the Cisco IMC.

Before you begin

- Obtain and install a certificate server software package on a server within your organization.
- Ensure that the Cisco IMC time is set to the current time.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | <p>openssl genrsa -out <i>Client_Privatekeyfilename</i> <i>keysize</i></p> <p>Example:</p> <pre># openssl genrsa -out client_private.pem 2048</pre> | <p>This command generates a client private key that will be used to generate the client certificate.</p> <p>The specified file name contains an RSA key of the specified key size.</p> |
| Step 2 | <p>openssl req -new -x509 -days <i>numdays</i> -key <i>Client_Privatekeyfilename</i> -out <i>Client_certfilename</i></p> <p>Example:</p> | <p>This command generates a new self-signed client certificate using the client private key obtained from the previous step. The certificate is valid for the specified period. The command prompts the user for additional certificate information.</p> |

| | Command or Action | Purpose |
|---------------|--|---|
| | # openssl req -new -x509 -key client_private.pem -out client.pem -days 365 | A new self-signed client certificate is created. |
| Step 3 | Obtain the KMIP root CA certificate from the KMIP server. | Refer to the KMIP vendor documentation for details on obtaining the root CA certificate. |

What to do next

Upload the new certificate to the Cisco IMC.

Downloading a Client Certificate

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Download Client Certificate**.
- Step 5** In the **Download Client Certificate** dialog box, complete these fields:

| Name | Description |
|--|---|
| <p>Download From Remote Location radio button</p> | <p>Selecting this option allows you to choose the certificate from a remote location and download it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the client certificate file should be stored. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the file to the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| <p>Download Through Browser Client radio button</p> | <p>Selecting this option allows you to navigate to the certificate stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a Browse button that lets you navigate to the file you want to import.</p> |
| <p>Paste Content radio button</p> | <p>Selecting this option allows you to copy the entire content of the signed certificate and paste it in the Paste Certificate Content text field.</p> <p>Note Ensure the certificate is signed before uploading.</p> |

Exporting a Client Certificate

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Export Client Certificate**.
- Step 5** In the **Export Client Certificate** dialog box, complete these fields:

| Name | Description |
|---|---|
| <p>Export to Remote Location</p> | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the certificate file should be exported. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the certificate from the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

| Name | Description |
|----------------------|---|
| Export to Local File | Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it. |

Deleting a Client Certificate

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
 - Step 2** In the **Admin** menu, click **Security Management**.
 - Step 3** In the **Security Management** pane, click **Secure Key Management**.
 - Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Delete Client Certificate**.
 - Step 5** At the prompt, click **OK** to delete the client certificate, or **Cancel** to cancel the action.
-

Downloading a Root CA Certificate

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Download Root CA Certificate**.
- Step 5** In the **Download Root CA Certificate** dialog box, complete these fields:

| Name | Description |
|--|--|
| <p>Download From Remote Location radio button</p> | <p>Selecting this option allows you to choose the certificate from a remote location and download it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the root CA certificate file should be stored. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the file to the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| <p>Download Through Browser Client radio button</p> | <p>Selecting this option allows you to navigate to the certificate stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a Browse button that lets you navigate to the file you want to import.</p> |
| <p>Paste Content radio button</p> | <p>Selecting this option allows you to copy the entire content of the signed certificate and paste it in the Paste Certificate Content text field.</p> <p>Note Ensure the certificate is signed before uploading.</p> |

Exporting a Root CA Certificate

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Export Root CA Certificate**.
- Step 5** In the **Export Root CA Certificate** dialog box, complete these fields:

| Name | Description |
|----------------------------------|---|
| Export to Remote Location | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the certificate file should be exported. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the certificate from the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

| Name | Description |
|----------------------|---|
| Export to Local File | Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it. |

Deleting a Root CA Certificate

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
 - Step 2** In the **Admin** menu, click **Security Management**.
 - Step 3** In the **Security Management** pane, click **Secure Key Management**.
 - Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Delete Root CA Certificate**.
 - Step 5** At the prompt, click **OK** or **Cancel** to delete the root CA certificate, or cancel the action.
-

Downloading a Client Private Key

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Download Client Private Key**.
- Step 5** In the **Download Client Private Key** dialog box, complete these fields:

| Name | Description |
|--|--|
| <p>Download From Remote Location radio button</p> | <p>Selecting this option allows you to choose the private key from a remote location and download it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?.</i> Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the client private key should be stored. Depending on the setting in the Download Certificate From drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the file to the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| <p>Download Through Browser Client radio button</p> | <p>Selecting this option allows you to navigate to the private key stored on a drive that is local to the computer running the Cisco IMC GUI.</p> <p>When you select this option, Cisco IMC GUI displays a Browse button that lets you navigate to the file you want to import.</p> |
| <p>Paste Content radio button</p> | <p>Selecting this option allows you to copy the entire content of the signed private key and paste it in the Paste Private Key Content text field.</p> |

What to do next

Exporting a Client Private Key

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** tab, click **Export Client Private Key**.
- Step 5** In the **Export Client Private Key** dialog box, complete these fields:

| Name | Description |
|----------------------------------|---|
| Export to Remote Location | <p>Selecting this option allows you to choose the certificate from a remote location and export it. Enter the following details:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Server IP/Hostname field — The IP address or hostname of the server on which the certificate file should be exported. Depending on the setting in the Download Certificate from drop-down list, the name of the field may vary. • Path and Filename field — The path and filename Cisco IMC should use when downloading the certificate from the remote server. • Username field — The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. • Password field — The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

| Name | Description |
|----------------------|---|
| Export to Local File | Selecting this option allows you to choose the certificate stored on a drive that is local to the computer and export it. |

Deleting a Client Private Key

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** pane, click **Delete Client Private Key**.
- Step 5** At the prompt, click **OK** or **Cancel** to delete the client private key, or cancel the action.

Testing the KMIP Server Connection

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **KMIP Servers** area of the **Secure Key Management** tab, select a row by checking the check box and click **Test Connection**.
- Step 5** If the connection is successful, a success message is displayed.

Restoring the KMIP Server to Default Settings

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **KMIP Servers** area of the **Secure Key Management** tab, select a row by checking the check box and click **Delete**.

- Step 5** At the prompt, click **OK**.
This restores the KMIP server to its default settings.
-

Deleting KMIP Login Details

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Secure Key Management**.
- Step 4** In the **Actions** area of the **Secure Key Management** pane, click **Delete KMIP Login**.
- Step 5** At the prompt, click **OK** to delete the KMIP login details, or **Cancel** to cancel the action.
-

FIPS 140-2 Compliance in Cisco IMC

The Federal Information Processing Standard (FIPS) Publication 140-2, (FIPS PUB 140-2), is a U.S. government computer security standard used to approve cryptographic modules. Prior to the 3.1(3) release, the Rack Cisco IMC is not FIPS compliant as per NIST guideline. It does not follow FIPS 140-2 approved cryptographic algorithms and modules. With this release, all CIMC services will use the Cisco FIPS Object Module (FOM), which provides the FIPS 140-2 compliant cryptographic module.

The Cisco FIPS Object Module is a software library that provides cryptographic services to a vast array of Cisco's networking and collaboration products. The module provides FIPS 140 validated cryptographic algorithms and KDF functionality for services such as IPSec (IKE), SRTP, SSH, TLS, and SNMP.

Enabling Security Configuration

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Security Management**.
- Step 3** In the **Security Management** pane, click **Security Configuration**.
- Step 4** In the **Federal Information Processing Standard Configuration (FIPS) and Common Criteria (CC) Configuration** pane, check the **Enable FIPS** check-box.

Table 3: Federal Information Processing Standard Configuration (FIPS) and Common Criteria (CC) Configuration

| Name | Description |
|-----------------------|--|
| Enable FIPS check box | <p>If checked, allows you to enable the FIPS feature. By default, this option is disabled.</p> <p>When you enable FIPS, the following is an impact on the SNMP configuration:</p> <ul style="list-style-type: none"> • The community string configuration for the SNMPv2 protocols, and the SNMPv3 users configured with noAuthNoPriv or authNoPriv security-level option are disabled. • The traps configured for SNMPv2 or SNMPv3 users with the noAuthNoPriv security-level option are disabled. • The MD5 and DES Authentication type and Privacy type are disabled. • It also ensures only FIPS-compliant ciphers in SSH, webserver, and vKVM connections. • Allows the Common Criteria (CC) to be enabled. |
| Enable CC check box | If checked, allows you to enable the CC feature. By default, this option is disabled. |

Note When you switch the FIPS or CC mode, it restarts the SSH, KVM, SNMP, webserver, XMLAPI, and redfish services. You will be prompted to continue. If you wish to continue, click **OK** else click on **Cancel**.



CHAPTER 15

Managing Firmware

This chapter includes the following sections:

- [Firmware Management Overview, on page 293](#)
- [Viewing Firmware Components, on page 294](#)
- [Updating the Firmware, on page 295](#)
- [Activating the Firmware, on page 296](#)
- [Cancelling Firmware Activation, on page 296](#)

Firmware Management Overview

You can manage the following firmware components from a single page in the web UI:

- **Adapter firmware** —The main operating firmware, consisting of an active and a backup image, can be installed from different interfaces such as:
 - Host Upgrade Utility (HUU)
 - Web UI — Local and remote protocols
 - PMCLI —Remote protocols
 - XML API — Remote protocols

You can upload a firmware image from either a local file system or a TFTP server.

- **Bootloader firmware**—The bootloader firmware cannot be installed from the Cisco IMC. You can install this firmware using the Host Upgrade Utility.

Firmware for the following individual components can be updated:

- BMC
- BIOS
- CMC
- SAS Expander
- Adapter

Firmware for the Hard Disk Drive (HDD) can also be installed from the same interfaces as the adapter firmware mentioned above.

Viewing Firmware Components

Procedure

Step 1 In the **Admin** menu, click **Firmware Management**.

Step 2 In the **General** tab's **Firmware Management** area, review the following information:

| Name | Description |
|--------------------------|---|
| Update button | Opens a dialog box that allows you to install a firmware image file that is available to your local machine or on a remote server. |
| Activate button | <p>Opens a dialog box that allows you to select which available firmware version you would like to activate on the server.</p> <p>Important If any firmware or BIOS updates are in progress, do not activate new firmware until those tasks complete.</p> |
| Cancel Activation button | <p>Note This button is displayed only when you choose a BIOS firmware that is in Activation Pending state.</p> <p>This button allows you to cancel the selected BIOS activation that is in a pending state.</p> |
| Component column | List of components available for which you can update the firmware. |
| Running Version column | The firmware version of the component that is currently active. |
| Backup Version column | <p>The alternate firmware version installed on the server, if any. The backup version is not currently running. To activate it, click Activate.</p> <p>Note When you install new firmware, any existing backup version is deleted and the new firmware becomes the backup version. You must manually activate the new firmware if you want the server to run the new version.</p> |

| Name | Description |
|----------------------------------|---|
| Bootloader Version column | The bootloader version associated with the boot-loader software of the component. |
| Status column | The status of the firmware activation on this server. |
| Progress in % column | The progress of the operation, in percentage. |

Updating the Firmware

You can install the firmware package from a local disk or from a remote server, depending on the component you choose from the **Firmware Management** area. After you confirm the installation, BMC replaces the firmware version in the component's backup memory slot with the selected version.

Procedure

- Step 1** In the **Admin** menu, click **Firmware Management**.
- Step 2** In the **Firmware Management** area, select a component from the **Component** column and click **Update**. The **Update Firmware** dialog box appears.
- Step 3** Review the following information in the dialog box:

| Name | Description |
|---|--|
| Install Firmware through Browser Client radio button | If the firmware package resides on a local machine, click this radio button. |
| Install Firmware through Remote Server radio button | If the firmware package resides on a remote server, click this radio button. |

- Step 4** To install the firmware through the browser client, click **Browse** and navigate to the firmware file that you want to install.
- Step 5** After you select the file, click **Install Firmware**.
- Step 6** To update the firmware using remote server, select the remote server type from the **Install Firmware from** drop-down list. This could be one of the following:
- TFTP
 - FTP
 - SFTP
 - SCP
 - HTTP

Step 7 Depending on the remote server type you choose, enter details in the server's **IP/Hostname** and **Image Path and Filename** fields.

Once you install the firmware, the new image replaces the non-active image. You can activate the image after it is installed.

Important For FTP, SFTP, and SCP server types, you need to provide user credentials.

Step 8 Click **Install Firmware** to begin download and installation.

Activating the Firmware

Procedure

Step 1 In the **Admin** menu, click **Firmware Management**.

Step 2 In the **Firmware Management** area, select a component from the **Component** column and click **Activate**. The **Activate Firmware** dialog box appears.

Step 3 In the **Activate Firmware** dialog box, select the desired firmware image (radio button) to activate. This image becomes the running version.

Step 4 Click **Activate Firmware**.

Depending on the firmware image you chose, the activation process begins.

Important While the activation is in progress, do not:

- Reset, power off, or shut down the server
 - Reboot or reset BMC
 - Activate any other firmware
 - Export technical support or configuration data
-

Cancelling Firmware Activation

Before you begin

BIOS firmware must be in **Activation Pending** state for you to cancel the activation.

Procedure

Step 1 In the **Admin** menu, click **Firmware Management**.

Step 2 In the **Firmware Management** area, select the BIOS firmware for which you want to cancel the activation.

Step 3 Click **Cancel Activation**.

Cancel Activation button is displayed only when you choose a BIOS firmware that is in **Activation Pending**



CHAPTER 16

Viewing Faults and Logs

This chapter includes the following sections:

- [Faults Summary](#), on page 299
- [Fault History](#), on page 301
- [Cisco IMC Log](#), on page 303
- [System Event Log](#), on page 305
- [Logging Controls](#), on page 308

Faults Summary

Viewing the Fault Summary

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** In the **Faults Summary** tab, review the following information:

Table 4: Actions Area

| Name | Description |
|------------------------------|---|
| Total | Displays the total number of rows in the Fault Entries table. |
| Column drop-down list | Allows you to choose the columns you wish to be displayed. |

| Name | Description |
|---------------------|--|
| Show drop-down list | <p>Customize the way you want to view fault entries using filters. These can be:</p> <ul style="list-style-type: none"> • Quick Filter - Default view. • Advanced Filter - Filter options to display the fault entries based on one or more criteria. Using the matching rule, you can view entries matching all the rules or any one combination of rules you specified in the Filter fields. <p>Click Go to view the entries matching the filter criteria that you set.</p> <p>Click the Save icon to save the filter criteria that you set. This becomes a user-defined filter which you can use later.</p> <p>Note The user-defined filter appears in the Manage Preset Filters dialog box.</p> <ul style="list-style-type: none"> • All - Displays all entries • Manage Preset Filters - Displays user-defined filters. You can edit or remove the user-defined filter from this dialog box. • List of pre-defined filters - Displays the system-defined filters. <p>Note You can use the Filter icon to hide or unhide the filter fields.</p> |

Table 5: Fault Entries Area

| Name | Description |
|----------|---|
| Time | The time when the fault occurred. |
| Severity | <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Cleared - A fault or condition was cleared. • Critical • Info • Major • Minor • Warning |
| Code | The unique identifier assigned to the fault. |

| Name | Description |
|-----------------------|---|
| DN | The distinguished name (DN) is a hierarchical representation of the device endpoint and its instance on the server. |
| Probable Cause | The unique identifier associated with the event that caused the fault. |
| Description | More information about the fault. It also includes a proposed solution. |

Fault History

Viewing Faults History

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** In the **Faults History** tab, review the following information

Table 6: Actions Area

| Name | Description |
|------------------------------|---|
| Total | Displays the total number of rows in the Fault History table. |
| Column drop-down list | Allows you to choose the columns you wish to be displayed. |

| Name | Description |
|---------------------|--|
| Show drop-down list | <p>Customize the way you want to view fault history entries using filters. These can be:</p> <ul style="list-style-type: none"> • Quick Filter - Default view. • Advanced Filter - Filter options to display the entries based on one or more criteria. Using the matching rule, you can view entries matching all the rules or any one combination of rules you specified in the Filter fields. <p>Click Go to view the entries matching the filter criteria that you set.</p> <p>Click the Save icon to save the filter criteria that you set. This becomes a user-defined filter which you can use later.</p> <p>Note The user-defined filter appears in the Manage Preset Filters dialog box.</p> <ul style="list-style-type: none"> • All - Displays all entries • Manage Preset Filters - Displays user-defined filters. You can edit or remove the user-defined filter from this dialog box. • List of pre-defined filters - Displays the system-defined filters. <p>Note You can use the Filter icon to hide or unhide the filter fields.</p> |

Table 7: Faults History Area

| Name | Description |
|------|-----------------------------------|
| Time | The time when the fault occurred. |

| Name | Description |
|----------------|--|
| Severity | This can be one of the following: <ul style="list-style-type: none"> • Emergency • Alert • Critical • Error • Warning • Notice • Informational • Debug |
| Source | The software module that logged the event. |
| Probable Cause | The unique identifier associated with the event that caused the fault. |
| Description | More information about the fault. It also includes a proposed solution. |

What to do next

Cisco IMC Log

Viewing the Cisco IMC Log

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** In the **Cisco IMC Log** tab, review the following information:

Table 8. Actions Area

| Name | Description |
|------------------|---|
| Clear Log button | Clears all log files. Note This option is only available if your user ID is assigned the admin or user user role. |

| Name | Description |
|------------------------------|--|
| Total | Displays the total number of rows in the Cisco IMC Log table. |
| Column drop-down list | Allows you to choose the columns you wish to be displayed. |
| Show drop-down list | <p>Customize the way you want to view Cisco IMC log entries using filters. These can be:</p> <ul style="list-style-type: none"> • Quick Filter - Default view. • Advanced Filter - Filter options to display the log entries based on one or more criteria. Using the matching rule, you can view entries matching all the rules or any one combination of rules you specified in the Filter fields. <p>Click Go to view the entries matching the filter criteria that you set.</p> <p>Click the Save icon to save the filter criteria that you set. This becomes a user-defined filter which you can use later.</p> <p>Note The user-defined filter appears in the Manage Preset Filters dialog box.</p> <ul style="list-style-type: none"> • All - Displays all entries • Manage Preset Filters - Displays user-defined filters. You can edit or remove the user-defined filter from this dialog box. • List of pre-defined filters - Displays the system-defined filters. <p>Note You can use the Filter icon to hide or unhide the filter fields.</p> |

Table 9: Cisco IMC Log Table

| Name | Description |
|--------------------|---------------------------------------|
| Time column | The date and time the event occurred. |

| Name | Description |
|--------------------|---|
| Severity column | The event severity. This can be one of the following: <ul style="list-style-type: none">• Emergency• Alert• Critical• Error• Warning• Notice• Informational• Debug |
| Source column | The software module that logged the event. |
| Description column | A description of the event. |

System Event Log

Viewing System Event Logs

The System Event Log tab displays only the recent 3008 system events, as against the total capacity of 131068 entries in the Cisco System Event Log (Cisco SEL) stored internally. When the Cisco SEL reaches its full capacity (131068 records), the oldest entries are overwritten with the most recent entries.

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** On the **System Event Log** tab, review the following information:

Table 10: Actions Area

| Name | Description |
|-------------------------------|--|
| SEL Fullness Indicator | <p>Displays, in percentage, the used space in the System Event Log tab. The percentage is calculated with 3008 entries as the reference (the System Event Log tab always displays only the most recent 3008 system events). For example, if there are 1504 entries in the System Event Log tab, then the percentage is shown as 50.</p> <p>After the first set of 3008 entries are reached, the status is always displayed as 100% until the SEL is cleared.</p> |
| Clear Log button | <p>Clears all events from the log file.</p> <p>Note This option is only available if your user ID is assigned the admin or user user role.</p> |
| Chassis drop-down list | Select a chassis or a server to view its logs. |
| Total | Displays the total number of rows in the System Event Log table. |
| Column drop-down list | Allows you to choose the columns you wish to be displayed. |

| Name | Description |
|---------------------|--|
| Show drop-down list | <p>Customize the way you want to view events using filters. These can be:</p> <ul style="list-style-type: none"> • Quick Filter - Default view. • Advanced Filter - Filter options to display the events based on one or more criteria. Using the matching rule, you can view entries matching all the rules or any one combination of rules you specified in the Filter fields. <p>Click Go to view the entries matching the filter criteria that you set.</p> <p>Click the Save icon to save the filter criteria that you set. This becomes a user-defined filter which you can use later.</p> <p>Note The user-defined filter appears in the Manage Preset Filters dialog box.</p> <ul style="list-style-type: none"> • All - Displays all entries • Manage Preset Filters - Displays user-defined filters. You can edit or remove the user-defined filter from this dialog box. • List of pre-defined filters - Displays the system-defined filters. <p>Note You can use the Filter icon to hide or unhide the filter fields.</p> |

Table 11: System Event Log Table

| Name | Description |
|---------------------------|--|
| Time column | The date and time the event occurred. |
| Severity column | The severity field includes both text and a color-coded icon. For the icon, green indicates normal operation, yellow is informational, and warning, critical, and non-recoverable errors are shown in shades of red. |
| Description column | A description of the event. |

Logging Controls

Viewing Logging Controls

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** In the **Logging Controls** tab, review the following information:

Remote Logging

| Name | Description |
|---|--|
| Enabled check box | If checked, the Cisco IMC sends log messages to the Syslog server named in the IP Address field. |
| Host Name/IP Address field | The address of the Syslog server on which the Cisco IMC log should be stored. You can set an IPv4 or IPv6 address or a domain name as the remote system address. |
| Port field | Enter a destination port number of the Syslog server within the range 1 to 65535. The default port number is 514. |
| Protocol field | The transport layer protocol for transmission of syslog messages. You can select one of the following: <ul style="list-style-type: none"> • TCP • UDP |
| Minimum Severity to Report field | Specify the lowest level of messages that will be included in the remote logs. You can select one of the following: <ul style="list-style-type: none"> • Emergency • Alert • Critical • Error • Warning • Notice • Informational • Debug |

Note The Cisco IMC does not remotely log any messages with a severity below the selected severity. For example, if you select **Error**, then the Cisco IMC remote log contains all messages with the severity **Emergency**, **Alert**, **Critical**, or **Error**. It does not show **Warning**, **Notice**, **Informational**, or **Debug** messages.

Local Logging

This area displays only the **Minimum Severity to Report** drop-down list as shown in the table above. You can specify the lowest level of messages to be included in the local log

Sending the Cisco IMC Log to a Remote Server

You can configure profiles for one or two remote syslog servers to receive Cisco IMC log entries.

Before you begin

- The remote syslog server must be configured to receive logs from a remote host.
- The remote syslog server must be configured to receive all types of logs, including authentication-related logs.
- The remote syslog server's firewall must be configured to allow syslog messages to reach the syslog server.

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** In either of the **Remote Syslog Server** areas, complete the following fields:

| Name | Description |
|-----------------------------------|--|
| Enabled check box | If checked, the Cisco IMC sends log messages to the Syslog server named in the IP Address field. |
| Host Name/IP Address field | The address of the Syslog server on which the Cisco IMC log should be stored. You can set an IPv4 or IPv6 address or a domain name as the remote system address. |
| Port field | Enter a destination port number of the Syslog server within the range 1 to 65535. The default port number is 514. |

- Step 4** (Optional) In the **Minimum Severity to Report** drop-down list, specify the lowest level of messages that will be included in the remote logs.

You can select one of the following, in decreasing order of severity:

- **Emergency**
- **Alert**

- **Critical**
- **Error**
- **Warning**
- **Notice**
- **Informational**
- **Debug**

Note Cisco IMC does not remotely log any messages with a severity below the selected severity. For example, if you select **Error**, then the Cisco IMC remote log will contain all messages with the severity Emergency, Alert, Critical, or Error. It will not show Warning, Notice, Informational, or Debug messages.

Step 5 Click **Save Changes**.

Configuring the Cisco IMC Log Threshold

Before you begin

Procedure

Step 1 In the **Navigation** pane, click the **Chassis** menu.

Step 2 In the **Chassis** menu, click **Faults and Logs**.

Step 3 Required: In the **Local Logging** area, use the **Minimum Severity to Report** drop-down list to specify the lowest level of messages that will be included in the Cisco IMC log.

You can select one of the following, in decreasing order of severity:

- **Emergency**
- **Alert**
- **Critical**
- **Error**
- **Warning**
- **Notice**
- **Informational**
- **Debug**

Note Cisco IMC does not log any messages with a severity below the selected severity. For example, if you select **Error**, then the Cisco IMC log will contain all messages with the severity Emergency, Alert, Critical, or Error. It will not show Warning, Notice, Informational, or Debug messages.

Sending a Test Cisco IMC Log to a Remote Server

Before you begin

- The remote syslog server must be configured to receive logs from a remote host.
- The remote syslog server must be configured to receive all types of logs, including authentication-related logs.
- The remote syslog server's firewall must be configured to allow syslog messages to reach the syslog server.

Procedure

- Step 1** In the **Navigation** pane, click the **Chassis** menu.
- Step 2** In the **Chassis** menu, click **Faults and Logs**.
- Step 3** In the **Faults and Logs** pane, click the **Logging Controls** tab.
- Step 4** In the **Action** area, click **Send Test Syslog**.

A test Cisco IMC log is sent to the configured remote servers.



CHAPTER 17

Server Utilities

This chapter includes the following sections:

- [Exporting Technical Support Data, on page 313](#)
- [Resetting to Factory Default, on page 316](#)
- [Exporting and Importing the Cisco IMC Configuration, on page 317](#)
- [Generating Non Maskable Interrupts to the Host, on page 323](#)
- [Adding or Updating the Cisco IMC Banner, on page 323](#)
- [Viewing Cisco IMC Last Reset Reason, on page 324](#)
- [Downloading Hardware Inventory to a Local File, on page 325](#)
- [Exporting Hardware Inventory Data to a Remote Server, on page 325](#)
- [Uploading a PID Catalog, on page 326](#)
- [Activating a PID Catalog, on page 328](#)
- [Enabling Smart Access USB, on page 328](#)
- [Enabling or Disabling Cisco Intersight Management, on page 329](#)
- [Viewing Intersight Device Connector Properties, on page 330](#)
- [Recovering PCIe Switch, on page 333](#)

Exporting Technical Support Data

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.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Export Technical Support Data**.
- Step 4** In the **Export Technical Support Data** dialog box, complete the following fields:

| Name | Description |
|---|---|
| Export Technical Support Data through drop-down list | <p>Note Front Panel USB option is visible only if Smart Access USB is enabled and a USB storage device is connected to the server.</p> <p>You can export the technical support data to a remote server or to a USB storage device connected to a server. You can choose one of the following:</p> <ul style="list-style-type: none"> • Remote— This allows you to export the technical support data to a remote server using one of the following protocols: <ul style="list-style-type: none"> • TFTP • FTP • SFTP • SCP • HTTP <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> <ul style="list-style-type: none"> • Front Panel USB—This allows you to export the technical support data to a USB storage device connected to the server. |
| Server IP/Hostname field | The IP address or hostname of the server on which the support data file should be stored. Depending on the setting in the Export Technical Support Data to drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename Cisco IMC should use when exporting the file to the remote server. <p>Note If the server includes any of the supported network adapter cards, the data file also includes technical support data from the adapter card.</p> |
| Username | The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. |
| Password | The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

Step 5 Click **Export**.

What to do next

Provide the generated report file to Cisco TAC.

Downloading Technical Support Data to a Local File

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.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Generate Technical Support Data for Local Download**.
- Step 4** In the **Download Technical Support Data to Local File** dialog box, complete the following fields:

| Name | Description |
|---|---|
| Generate Technical Support Data radio button | Cisco IMC disables this radio button when there is no technical support data file to download. Click Generate to create the data file. When data collection is complete, click Download Technical Support Data to Local File in the Actions area to download the file. |
| Regenerate Technical Support Data radio button | Cisco IMC displays this radio button when a technical support data file is available to download. To replace the existing support data file with a new one, select this option and click Regenerate . When data collection is complete, click Download Technical Support Data to Local File in the Actions area to download the file. |
| Download to local file radio button | Cisco IMC enables this radio button when a technical support data file is available to download. To download the existing file, select this option and click Download . Note If the server includes any of the supported network adapter cards, the data file also includes technical support data from the adapter card. |
| Generate button | Allows you to generate the technical support data file. |
| Download button | Allows you to download the technical support data file after it is generated. |

- Step 5** Click **Generate** to create the data file. When data collection is complete, click **Download Technical Support Data to Local File** in the **Actions** area to download the file..

What to do next

Provide the generated report file to Cisco TAC.

Resetting to Factory Default

On rare occasions, such as an issue with the current running firmware or troubleshooting a server, you might require to reset the server components 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 server components, you are logged off and must log in again. You might also lose connectivity and might need to reconfigure the network settings. Some of the inventory information might not be available during this transition.

When you reset the BMC to factory settings, the serial number is displayed in the Cisco IMCXXXXXX format, where XXXXXX is the serial number of the server.



Important

When you move VIC adapters from other generation C-Series servers (for example M4 servers) to the M5 generation C-Series servers or M5 servers to other generation servers, you must reset the adapters to factory defaults.

Before you begin

You must log in as a user with admin privileges to reset the server components to factory defaults.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Reset to Factory Default**.
- Step 4** In the **Reset to Factory Default** dialog box, review the following information:

| Name | Description |
|--------------|--|
| All checkbox | If checked, it resets all the components of the server to factory settings. Expand to select the specific component that you want to reset to factory settings. |

| Name | Description |
|-------------------------|---|
| BMC checkbox | If checked, it resets the BMC to factory settings. Note After you reset the BMC to factory settings, the serial number is displayed in the Cisco IMCXXXXXX format, where XXXXXX is the serial number of the server. After factory defaults of BMC NIC Mode, Shared LOM Extended is configured by default. |
| Storage checkbox | If checked, it resets all the available storage adapters to factory settings. When you reset a storage adapter, the data on the disk is not modified but the virtual drive meta data will be erased which may result in data loss. Expand to select the specific storage adapters that you want to reset to factory settings. Note The host must be powered on to reset storage adapters to factory defaults. |
| VIC checkbox | If checked, it resets all the available VICs to factory settings. Expand to select the specific VICs that you want to reset to factory settings. Note The host must be powered on to reset VIC adapters to factory defaults. |
| Reset button | Resets the selected components to the factory settings. |

Step 5 Click **Reset** to reset the selected components to the factory-default settings.

A reboot of Cisco IMC, while the host is performing BIOS POST (Power on Self Test) or is in EFI shell, powers down the host for a short amount of time. Cisco IMC powers on when it is ready. Upon restart, the network configuration mode is set to **Cisco Card** mode by default.

Exporting and Importing the Cisco IMC Configuration

Exporting and Importing the Cisco IMC Configuration

To perform a backup of the Cisco IMC configuration, you take a snapshot of the system configuration and export the resulting Cisco IMC configuration file to a location on your network. The export operation saves information from the management plane only; it does not back up data on the servers. Sensitive configuration information such as user accounts and the server certificate are not exported.

You can restore an exported Cisco IMC configuration file to the same system or you can import it to another Cisco IMC system, provided that the software version of the importing system is the same as or is configuration-compatible with the software version of the exporting system. When you import a configuration file to another system as a configuration template, you must modify system-specific settings such as IP addresses and host names. An import operation modifies information on the management plane only.

The Cisco IMC configuration file is an XML text file whose structure and elements correspond to the Cisco IMC command modes.

When performing an export or import operation, consider these guidelines:

- You can perform an export or an import while the system is up and running. While an export operation has no impact on the server or network traffic, some modifications caused by an import operation, such as IP address changes, can disrupt traffic or cause a server reboot.
- You cannot execute an export and an import simultaneously.

You can perform an import or an export operation on the following features:

- Cisco IMC version



Note You can only export this information.

- Network settings
- Technical support
- Logging control for local and remote logs
- Power policies
- BIOS - BIOS Parameters



Note Precision boot is not supported.

- Communication services
- Remote presence
- User management - LDAP
- Event management
- SNMP

Exporting the Cisco IMC Configuration



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

Before you begin

Obtain the backup remote server IP address.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Export Configuration**.
- Step 4** In the **Export Configuration** dialog box, complete the following fields:

| Name | Description |
|--|--|
| Select Component for Export drop-down list | The component type. This can be one of the following: <ul style="list-style-type: none"> • BMC • VIC Adapter(s) Depending on the component you choose, the configuration of that component is exported. |
| Export To drop-down list | The location where you want to save the XML configuration file. This can be one of the following: <ul style="list-style-type: none"> • Local: Select this option and click Export to save the XML configuration file to a drive that is local to the computer running the Cisco IMC GUI. <p>When you select this option, Cisco IMC GUI displays a File Download dialog box that lets you navigate to the location to which the configuration file should be saved.</p> • Remote Server: Select this option to import the XML configuration file from a remote server. <p>When you select this option, Cisco IMC GUI displays the remote server fields.</p> • Front Panel USB: Select this option to export the configuration file to a USB storage device connected to the server. <p>Note</p> <ul style="list-style-type: none"> • Front Panel USB option to export Cisco IMC configuration is available only if Smart Access USB is enabled and a USB storage device is connected to the server. • This option is available only when you choose BMC in the Select Component drop-down list. |

| Name | Description |
|---------------------------------|---|
| Export To drop-down list | <p>The remote server type. This can be one of the following:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |
| Server IP/Hostname field | The IPv4 or IPv6 address, or hostname of the server to which the configuration file will be exported. Depending on the remote server type selected in the Export to drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename Cisco IMC should use when exporting the file to the remote server. |
| Username | The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. |
| Password | The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| Passphrase | The passphrase that uses the AES256 algorithm to encrypt the LDAP and SNMP v3 user passwords in the exported configuration files. Enter a string of 6 to 127 characters. Do not enter the following characters: ! # \$ & < > ? ; ' ` ~ \ % ^ ()" |

Step 5 Click **Export**.

Importing the Cisco IMC Configuration

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, Cisco IMC does not overwrite the current values with those saved in the configuration file.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Import Configuration**.
- Step 4** In the **Import Configuration** dialog box, complete the following fields:

| Name | Description |
|--|--|
| Select Component for Import drop-down list | The component type. This can be one of the following: <ul style="list-style-type: none"> • BMC • VIC Adapter(s) Depending on the component you choose, the configuration of that component is imported. |
| Import From drop-down list | The location of the XML configuration file. This can be one of the following: <ul style="list-style-type: none"> • Local: Select this option to import the XML configuration file to a drive that is local to the computer running Cisco IMC GUI. <p>When you select this option, Cisco IMC GUI displays a Browse button that lets you navigate to the file you want to import.</p> • Remote Server: Select this option to import the XML configuration file from a remote server. <p>When you select this option, Cisco IMC GUI displays the remote server fields.</p> • Front Panel USB: Select this option to import the configuration file from a USB storage device connected to the server. <p>Note</p> <ul style="list-style-type: none"> • Front Panel USB option to import Cisco IMC configuration is available only if Smart Access USB is enabled and a USB storage device is connected to the server. • This option is available only when you choose BMC in the Select Component drop-down list. |

| Name | Description |
|-----------------------------------|--|
| Import From drop-down list | <p>Note These options are available only when you choose Remote.</p> <p>The remote server type. This can be one of the following:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |
| Server IP/Hostname field | The IPv4 or IPv6 address, or hostname of the server on which the configuration file resides. Depending on the remote server type selected in the Import From drop-down list, the name of the field might vary. |
| Path and Filename field | The path and filename of the configuration file on the remote server. |
| Username | The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. |
| Password | The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |
| Passphrase | <p>The passphrase that uses the AES256 algorithm to encrypt the LDAP and SNMP v3 user passwords in the imported configuration files. Enter a string of 6 to 127 characters. Do not enter the following characters: ! # \$ % & < > ? ; ' ` ~ \ % ^ ()"</p> <p>Note If you edit the encrypted sections in the configuration file and try to import it, the edits will be ignored and the import operation displays a partially successful message.</p> |

Step 5 Click **Import**.

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.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Generate NMI to Host**.
- Step 4** In the **Generate NMI to Host** dialog box, review the following information:

| Actions | Description |
|--------------------------------|---|
| Generate NMI to drop-down list | Allows you to select the server for which you want to generate the non maskable interrupt (NMI). This can be one of the following: <ul style="list-style-type: none"> • Server 1 • Server 2 |

- Step 5** Click **Send**.
- This action sends an NMI signal to the host, which might restart the OS.

Adding or Updating the Cisco IMC Banner

You can add or update the Cisco IMC banner by entering important information such as copyright or customized messages. Complete the following steps:

Before you begin**Procedure**

-
- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Add/Update Cisco IMC Banner**.
- Step 4** In the **Add/Update Cisco IMC Banner** dialog box, complete the following fields:

| Name | Description |
|--|--|
| Banner (80 Chars per line. Max 2K Chars.) field | Enter copyright information or messages that you want to display on the login screen, before logging on to the Web UI or the command line interface. |
| Restart SSH checkbox | When checked, the active SSH sessions are terminated after you click the Save Banner button. |

- Step 5** Click **Save Banner**.
-

What to do next

Viewing Cisco IMC Last Reset Reason

Procedure

-
- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, view the following information under the **Last Reset Reason** area.

| Name | Description |
|------------------------|--|
| Component field | The component that was last reset. |
| Status field | The reason why the component was last reset. This can be one of the following: <ul style="list-style-type: none"> • watchdog-reset—The watchdog-timer resets when the Cisco IMC memory reaches full capacity. • ac-cycle— PSU power cables are removed (no power input). • graceful-reboot— Cisco IMC reboot occurs. |

Downloading Hardware Inventory to a Local File

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Generate Inventory Data**.
- Step 4** In the **Generate Inventory Data** dialog box, complete the following fields:

| Name | Description |
|---|---|
| Generate Inventory Data radio button | Cisco IMC displays this radio button when there is no hardware inventory data file to download. |
| Download to local file radio button | Cisco IMC enables this radio button when a inventory data file is available to download. To download the existing file, select this option and click Download . |

- Step 5** Click **Generate** to create the data file. When data collection is complete, select the **Download Inventory Data to Local File** radio button and click **Download** to download the file locally.
-

Exporting Hardware Inventory Data to a Remote Server

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Export Hardware Inventory Data to Remote**.
- Step 4** In the **Export Hardware Inventory Data** dialog box, complete the following fields:

| Name | Description |
|---|---|
| Export Hardware Inventory Data to drop-down list | <p>The remote server type. This can be one of the following:</p> <ul style="list-style-type: none"> • TFTP Server • FTP Server • SFTP Server • SCP Server • HTTP Server <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |
| Server IP/Hostname field | The IP address or hostname of the server on which the data file should be stored. Depending on the setting in the Export Hardware Inventory Data to drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename Cisco IMC should use when exporting the file to the remote server. |
| Username | The username the system should use to log in to the remote server. This field does not apply if the protocol is TFTP or HTTP. |
| Password | The password for the remote server username. This field does not apply if the protocol is TFTP or HTTP. |

Step 5 Click **Export**.

Uploading a PID Catalog

Before you begin

You must log in as a user with admin privileges to upload a PID catalog.

Procedure

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

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

Step 3 In the **Work** pane, click the **Upload PID Catalog** link.

The **Upload PID Catalog** dialog box appears.

Depending on the location of the catalog file, choose one of the options.

Step 4 In the **Upload PID Catalog from Local File** dialog box, click **Browse** and use the **Choose File to Upload** dialog box to select the catalog file that you want to upload.

| Name | Description |
|----------------------|---|
| File field | The PID catalog file that you want to upload. |
| Browse button | Opens a dialog box that allows you to navigate to the appropriate file. |

Step 5 In the **Upload PID Catalog from Remote Server** dialog box, complete the following fields:

| Name | Description |
|---|---|
| Upload PID Catalog from Remote Server drop-down list | The remote server type. This can be one of the following: <ul style="list-style-type: none"> • TFTP • FTP • SFTP • SCP • HTTP |
| Server IP/Hostname field | The IP address or hostname of the server on which the PID catalog information is available. Depending on the setting in the Upload PID Catalog from drop-down list, the name of the field may vary. |
| Path and Filename field | The path and filename of the catalog file on the remote server. |
| Username field | Username of the remote server. |
| Password field | Password of the remote server. |
| Upload button | Uploads the selected PID catalog. <p>Note If you chose SCP or SFTP as the remote server type while performing this action, a pop-up window is displayed with the message <i>Server (RSA) key fingerprint is <server_finger_print_ID> Do you wish to continue?</i>. Click Yes or No depending on the authenticity of the server fingerprint.</p> <p>The fingerprint is based on the host's public key and helps you to identify or verify the host you are connecting to.</p> |

| Name | Description |
|---------------|---|
| Cancel button | Closes the wizard without making any changes to the firmware versions stored on the server. |

Activating a PID Catalog



Caution BMC reboots automatically once a PID catalog is activated.

You must reboot the server after activating a PID catalog.

Before you begin

You must log in as a user with admin privileges to activate a PID catalog.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** tab.
- Step 2** On the **Admin** tab, click **Utilities**.
- Step 3** In the **Work** pane, click the **Activate PID Catalog** link.

The **Activate PID Catalog** dialog box appears. Complete the following fields:

| Name | Description |
|-----------------|---|
| Activate button | Allows you to activate the PID catalog. |

Note The **Activate PID Catalog** link is greyed out when you log on to the system for the first time. It gets activated once you upload a PID catalog to the server. After you upload a PID file, the link remains active and you can activate the PID multiple times.

Enabling Smart Access USB

When you enable the smart access USB feature, the front panel USB device disconnects from the host operating system and connects to Cisco IMC. After enabling the smart access USB feature, you can use the front panel USB device to export technical support data, import or export Cisco IMC configuration, or update Cisco IMC, BIOS, and VIC firmware.

The supported file systems for smart access USB are as follows:

- EXT2

- EXT3
- EXT 4
- FAT 32
- FAT 16
- DOS



Note Huge file support is not supported in BMC. For EXT 4 file system, huge file support has to be turned off.

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** tab.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area, click **Enable Smart Access USB**.

This is a toggle button. To disable smart access, click **Disable Smart Access USB**. This button is visible only after you enable smart access USB. When you disable the smart access USB feature, the front panel USB device disconnects from Cisco IMC and connects to the host operating system.

Enabling or Disabling Cisco Intersight Management

When you enable the Intersight management, it establishes a bi-directional communication between the Intersight Cloud application and the M5 server.



Note Port numbers 8888-8889 are reserved for Intersight communication.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** tab.
- Step 2** In the **Admin** tab, click **Device Connector**.
- Step 3** In the **Intersight Management** area, click **On** to enable the Intersight management. The Connection area displays the connection status of the Intersight management. If the device connector has not been able to establish a connection to Intersight management, review the recommendations provided in the **Details & Recommendations** drop-down list to fix the connection issues.

- Step 4** Select the **Access Mode** as **Read-only** or **Allow Control**.
When the **Read-only** access mode is selected, then you cannot configure the device through Intersight. Therefore, any configuration that comes to the device connector through cloud is rejected with an error code. If the **Allow Control** mode is selected, then you have full control to configure the device through Intersight.
- Step 5** To disable the Intersight management, click **Off**.
When you disable the Intersight management, the Connection area displays the connection status as **Administratively Disabled**.

Viewing Intersight Device Connector Properties

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** tab.
- Step 2** In the **Admin** tab, click **Device Connector**.
- Step 3** In the **Intersight Management** area, review the following information:

| Action Name | Description |
|----------------------|---|
| Enabled radio button | <p>Allows you to enable or disable the Intersight management. This can be one of the following:</p> <ul style="list-style-type: none"> • On—Enables the Intersight management. You can claim this system and leverage the capabilities of Cisco Intersight. • Off—Disables the Intersight management. No communication will be allowed to Cisco Intersight. |

- Step 4** In the **Connection** area, review the following information:

| Name | Description |
|---|--|
| Status field | Displays the status of the connection to Intersight. This can be one of the following: <ul style="list-style-type: none"> • Administratively Disabled—Indicates that the Intersight management has been disabled. • DNS Misconfigured— Indicates that the DNS details have not been configured in BMC. • UCS Connect Network Error—Indicates the invalid network configurations. • Certification Validation Error—Indicates invalid certificate. • Claimed—Indicates that the device is claimed in Intersight. • Not Claimed—Indicates that the device is registered, but not claimed in Intersight. |
| Access Mode | The mode will be Allow Control by default. |
| Details & Recommendations drop-down list | Lists the details and recommendations to fix the connection issues based on the status. |
| Device ID | This indicates the ID of the device. |
| Claim Code | This is the security code required to claim the device from Intersight. <p>Note This code is available only when Connection status is Not Claimed.</p> |

Step 5 In the **Settings** area, review the following information:

| Name | Description |
|--|--|
| General tab | <p>Access Mode</p> <ul style="list-style-type: none"> • Read-only — When the Read-only access mode is selected, you cannot configure the device through Intersight. • Allow Control — When the Allow Control mode is selected, you will have full control to configure the device through Intersight. <p>Configuration from Intersight only</p> <p>This option is configurable only when Allow Control mode is enabled. The Configure Lockout options are as follows:</p> <p>OFF— To manage the device both locally and from Intersight you can turn OFF the option Configuration from Intersight only . The setting will terminate all the existing sessions (webUI, XML and CLI).</p> <p>ON — To lock out Cisco IMC configuration for Intersight you can turn ON the option Configuration from Intersight only . The setting will terminate all the existing sessions (webUI, XML and CLI).</p> <p>Note When you are logged in as admin in the Configuration Lock Out mode, the admin role will be mapped to the User role, so the interfaces behave as user logged in with the User role.</p> |
| Proxy Configuration tab | Allows you to manually configure HTTPS proxy settings required for the Intersight connection. |
| HTTPS Proxy field radio button | OFF - Disables the HTTPS proxy settings. ON - Enables the HTTPS proxy settings. |
| Proxy Hostname/IP field | The IP address or the host name of the proxy server. |
| Proxy Port field | The port number of the proxy server. |
| Authentication toggle button | <p>Enabling this option allows you to provide the credentials for the proxy server.</p> <p>Note The Device Connector does not mandate the format of the login credentials. They are passed as-is to the configured HTTP proxy server.</p> <p>Whether or not the username must be qualified with a domain name will depend on the configuration of the HTTP proxy server.</p> |
| Username field Password field | The credentials for the proxy server. |

| Name | Description |
|--------------------------------|---|
| Certificate Manager tab | <p>Allows you to view a list of trusted certificates and import a valid trusted certificate.</p> <ul style="list-style-type: none"> • Import—Allows you to select and Import a CA signed certificate. <p>Note The imported certificates must be in the *.pem (base64 encoded) format.</p> <ul style="list-style-type: none"> • You can view the list of certificates with the following information: <ul style="list-style-type: none"> • Name—Common name of the CA certificate. • In Use—Whether the certificate in the trust store was used to successfully verify the remote server. • Issued By—The issuing authority for the certificate. • Expires—The expiry date of the certificate. <p>Note You cannot delete bundled certificates (certificates with the lock icon).</p> |

Recovering PCIe Switch

Before you begin

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

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** menu.
- Step 2** In the **Admin** menu, click **Utilities**.
- Step 3** In the **Actions** area of the **Utilities** pane, click **Recover PCIe Switch**.
- Step 4** In the **Recover PCIe Switch** dialog box, review the following information:

| Name | Description |
|----------------------------------|---|
| Controller drop-down | Lists the PCIe switches available on the server. You can select the switch on which you want to perform the recover controller action from this list. |
| Recover Controller button | Clicking on the recover controller button initiates the recovery of the chosen controller. |

| Name | Description |
|---------------|---|
| Cancel button | Cancels the action and closes the dialog box. |



CHAPTER 18

Troubleshooting

This chapter includes the following sections:

- [Recording the Last Boot Process, on page 335](#)
- [Recording the Last Crash, on page 336](#)
- [Downloading a DVR Player, on page 337](#)
- [Playing a Recorded Video Using the DVR Player on the KVM Console, on page 338](#)

Recording the Last Boot Process

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **TroubleShooting** tab.
- Step 3** In the **Bootstrap Process Recording** area of the **Troubleshooting** tab, check **Enable Recording** check-box. By default, this option is enabled.
- Caution** This task is for troubleshooting purpose, and might impact Cisco IMC performance if it is enabled all the time.
- Step 4** (Optional) If you want to record the boot process until BIOS POST, then check **Stop On BIOS POST** check-box.
- Step 5** Click **Save Changes**
- Step 6** On the tool bar above the **Work** pane, click **Power On Server**.
- Step 7** In the **Actions** area, of the **Bootstrap Process Recording** pane, click **Play Recording**. A confirmation dialog box with instructions on supported Java version appears.
- Step 8** Review the instructions and click **Ok**.
- The **DVR Player Controls** dialog box opens. This dialog box plays the recording of the last boot process. If you have enabled **Stop On BIOS POST** option then the system plays the recording process only till BIOS POST.
- This recording can be reviewed to analyze the factors that caused the system to reboot.

- Step 9** In the **Actions** area of the **Bootstrap Process Recording** area, click **Download Recording**.
Follow the instructions to download.
- Note** The file is saved in a `.dvc` format to a local drive. You can view this recording using KVM player or an offline player. Every time you choose **Download Recording** option, the last boot process is recorded, it autogenerate the file name, and save it in the path specified earlier.
- Step 10** Once the download is complete, you can select the file that you want play the video of the recording, and click **Open**.
A **DVR Player Controls** window opens and plays the video of the selected file.
-

Recording the Last Crash

Procedure

- Step 1** In the **Navigation** pane, click the **Compute** menu.
- Step 2** In the work pane, click the **TroubleShooting** tab.
- Step 3** In the **Crash Recording** area of the **Troubleshooting** tab, check the **Enable Recording** check-box.
- Caution** This task is for troubleshooting purpose, and might impact Cisco IMC performance if it is enabled all the time.
- Step 4** Click **Save Changes**.
Capture Recording button in the **Actions** area is enabled.
- Step 5** (Optional) In the **Actions** area, click **Capture Recording**, to capture the recording of the system that crashed automatically.
- Note** If you choose this option, it overwrites the existing crash records file. Click **OK** to continue.
- Step 6** Click **Play Recording** in the **Actions** area to view the recording of the operations that ran on the server.
A confirmation dialog box with instructions on supported Java version appears.
- Step 7** Review the instructions and click **Ok**.
The **DVR Player Controls** dialog box appears. This dialog box plays the recording of the operations that ran on the server in the last few minutes. This recording can be reviewed to analyze the factors that caused system to crash.
- Step 8** In the **Actions** area of the **Crash Recording** area, click **Download Recording**.
Follow the instructions to download.
- Note** The file is saved in a `.dvc` format to a local drive. You can view this recording using KVM player or an offline player. Every time you choose **Download Recording** option, the last crash process is recorded, it autogenerate the file name, and save it in the path specified earlier.

- Step 9** Once the download is complete, you can select the file that you want play the video of the recording, and click **Open**.
A **DVR Player Controls** window opens and plays the video of the selected file.
-

Downloading a DVR Player

Procedure

- Step 1** In the **Navigation** pane, click the **Server** tab.
- Step 2** On the **Server** tab, click **Troubleshooting**.
- Step 3** In the **Player** area of the **Troubleshooting** tab, click **Download Player**.
- Step 4** Follow the instructions to download. These files are saved to your local drive as a zipped file in a .tgz file format.
- The offline player is stored for Windows, Linux, and MAC.
- Step 5** Extract the zip file. The zip file generally gets saved below the bootstrap file, and its name follows the format `offline.tgz`
- Step 6** Open the script file that you want to review the video recording.
- Note** If you want to play the recording for Windows, then ensure that the Java version running on your system and in the script file are the same. If the Windows script file fails to play the recording, then follow these steps:
- Extract the Windows script file to your desktop.
 - Open the file using notepad.
 - Search for `jre`, and replace the Java version to match the version running on your system. By default, the Java version is set to `jre7`.
 - Save the file.
- After you update the Java version, you can delete the extracted files from your desktop.
- Note** Verification of Java version is required only for Windows OS. For Linux and MAC, the Java version is picked automatically.
- Step 7** Navigate to the folder in which these files are downloaded and open the script file that you want to play the video recording.
The DVR player is launched, playing the video of the operations that ran on the server.
-

Playing a Recorded Video Using the DVR Player on the KVM Console

Procedure

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

Step 2 On the **Server** tab, click **Sensors**.

Step 3 In the **Remote Presence** pane, click the **Virtual KVM** tab.

Step 4 In the **Actions** area of the **Virtual KVM** tab, click **Launch KVM Console**.

Note You can also launch KVM console by clicking **Launch KVM Console** button on the toolbar displayed above the **Work** pane.

The **KVM Console** opens in a separate window.

Step 5 On the **KVM Console** window, choose **Tools > Recorder /Playback Controls**.
A DVR Player Controls window opens.

Step 6 On the **DVR Player Controls** window, click **Open** button.

Step 7 Choose the file that you want to play the recording, and click **Open**.
The DVR player is launched, playing the video of the operations that ran on the server.



APPENDIX **A**

BIOS Parameters by Server Model

- For C125 Servers, on page 339
- C220 M5, C240 M5, C240 SD M5, and C480 M5 Servers, on page 353
- C460 M4 Servers, on page 374
- C220 M4 and C240 M4 Servers, on page 396

For C125 Servers

Server Management Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 12: BIOS Parameters in Server Management Tab

| Name | Description |
|--|---|
| Reboot Host Immediately checkbox | If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| OS Boot Watchdog Timer Policy drop-down list | What action the system takes if the watchdog timer expires. This can be one of the following: <ul style="list-style-type: none">• Power Off—The server is powered off if the watchdog timer expires during OS boot.• Reset—The server is reset if the watchdog timer expires during OS boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |

| Name | Description |
|---|---|
| OS Watchdog Timer drop-down list | <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"> • Disabled—The watchdog timer is not used to track how long the server takes to boot. • Enabled—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the OS Boot Watchdog Timer Timeout field, the Cisco IMC logs an error and takes the action specified in the OS Boot Watchdog Policy field. |
| Baud Rate drop-down list | <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"> • 9.6k—A 9,600 Baud rate is used. • 19.2k—A 19,200 Baud rate is used. • 38.4k—A 38,400 Baud rate is used. • 57.6k—A 57,600 Baud rate is used. • 115.2k—A 115,200 Baud rate is used. <p>This setting must match the setting on the remote terminal application.</p> |
| Console Redirection drop-down list | <p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the OS has booted, console redirection is irrelevant. This can be one of the following:</p> <ul style="list-style-type: none"> • Serial Port A—Enables console redirection on serial port A during POST. • Serial Port B—Enables console redirection on serial port B during POST. • Disabled—No console redirection occurs during POST. |

| Name | Description |
|--------------------------------------|---|
| BIOS Techlog Level | <p>This option denotes the type of messages in BIOS tech log file.</p> <p>The log file can be one of the following types:</p> <ul style="list-style-type: none"> • Minimum - Critical messages will be displayed in the log file. • Normal - Warning and loading messages will be displayed in the log file. • Maximum - Normal and information related messages will be displayed in the log file. <p>Default value: Minimum.</p> <p>Note This option is mainly for internal debugging purposes.</p> <p>Note To disable the Fast Boot option, the end user must set the following tokens as mentioned below:</p> <p>BIOS Techlog level to Normal</p> <p>OptionROM Launch Optimization to Disabled.</p> |
| OptionROM Launch Optimization | <p>When this option is Enabled, the OptionROMs only for the controllers present in the boot order policy will be launched.</p> <p>Note Onboard storage controllers though not listed in the boot order policy will have the OptionROM launched.</p> <p>When this option is Disabled, all the OptionROMs will be launched.</p> <p>Default value: Enabled</p> |
| FRB 2 Timer drop-down list | <p>Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The FRB2 timer is not used. • Enabled—The FRB2 timer is started during POST and used to recover the system if necessary. |

| Name | Description |
|---|---|
| OS Watchdog Timer Timeout drop-down list | <p>If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following:</p> <ul style="list-style-type: none"> • 5 Minutes—The OS watchdog timer expires 5 minutes after it begins to boot. • 10 Minutes—The OS watchdog timer expires 10 minutes after it begins to boot. • 15 Minutes—The OS watchdog timer expires 15 minutes after it begins to boot. • 20 Minutes—The OS watchdog timer expires 20 minutes after it begins to boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |
| Flow Control drop-down list | <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"> • None—No flow control is used. • RTS/CTS—RTS/CTS is used for flow control. <p>Note This setting must match the setting on the remote terminal application.</p> |
| Terminal type drop-down list | <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"> • PC-ANSI—The PC-ANSI terminal font is used. • VT100—A supported VT100 video terminal and its character set are used. • VT100-PLUS—A supported VT100-plus video terminal and its character set are used. • VT-UTF8—A video terminal with the UTF-8 character set is used. |

| Name | Description |
|----------------------------|---|
| CDN Control drop-down list | <p>Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled— CDN support for VIC cards is disabled. • Enabled— CDN support is enabled for VIC cards. |

Security Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 13: BIOS Parameters in Security Tab

| Name | Description |
|--|---|
| Reboot Host Immediately checkbox | <p>If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.</p> |
| Trusted Platform Module Support drop-down list | <p>Trusted Platform Module (TPM) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. It can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The server does not use the TPM. • Enabled—The server uses the TPM. <p>Note Contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Power on Password drop-down list | <p>This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Support is disabled. • Enabled—Support is enabled. |

Memory Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 14: BIOS Parameters in Memory Tab

| Name | Description |
|---|--|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| Above 4G Decoding drop-down list | <p>Enables or disables MMIO above 4GB or not. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • Enabled—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. <p>Note PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.</p> |

| Name | Description |
|--|--|
| Memory Interleaving drop-down list | <p>Whether the AMD CPU interleaves the physical memory so that the memory can be accessed while another is being refreshed. This controls fabric level memory interleaving. Channel, die and socket have requirements based on memory populations and will be ignored if the memory does not support the selected option. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU determines how to interleave memory. • Channel—Interleaves the physical address space over multiple channels, as opposed to each channel owning single consecutive address spaces. • Die—Interleaves the physical address space over multiple dies, as opposed to each die owning single consecutive address spaces. • None—Consecutive memory blocks are accessed from the same physical memory. • Socket—Interleaves the physical address space over multiple sockets, as opposed to each socket owning single consecutive address spaces. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| Memory Interleaving Size drop-down list | <p>Determines the size of the memory blocks to be interleaved. It also determines the starting address of the interleave (bit 8,9,10 or 11). This can be one of the following:</p> <ul style="list-style-type: none"> • 1 KB • 2 KB • 256 Bytes • 512 Bytes • Auto—The CPU determines the size of the memory block. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

| Name | Description |
|---|---|
| Chipselect Interleaving drop-down list | <p>Whether memory blocks across the DRAM chip selects for node 0 are interleaved. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU automatically determines how to interleave chip selects. • Disabled—Chip selects are not interleaved within the memory controller. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| Bank Group Swap drop-down list | <p>Determines how physical addresses are assigned to applications. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU automatically determines how to assign physical addresses to applications. • Disabled—Bank group swap is not used. • Enabled—Bank group swap is used to improve the performance of applications. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| IOMMU drop-down list | <p>Input Output Memory Management Unit (IOMMU) allows AMD processors to map virtual addresses to physical addresses. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU determines how map these addresses. • Disabled—IOMMU is not used. • Enabled—Address mapping takes place through the IOMMU. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

| Name | Description |
|---------------------|---|
| SMEE drop-down list | <p>Whether the processor uses the Secure Memory Encryption Enable (SMEE) function, which provides memory encryption support. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not use the SMEE function. • Enabled—The processor uses the SMEE function. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| TSME drop-down list | <p>Whether the processor uses the Transparent Secure Memory Encryption (TSME) function, which provides memory encryption support. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not use the TSME function. • Enabled—The processor uses the TSME function. • Auto —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| SEV drop-down list | <p>Enables running encrypted virtual machines (VMs) in which the code and data of the VM are isolated. This can be one of the following:</p> <ul style="list-style-type: none"> • 253 ASIDs—The value is set to 253 Minimum Address Space Identifier (ASIDs). • 509 ASIDs—The value is set to 509 Minimum Address Space Identifier (ASIDs). • Auto —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

| Name | Description |
|--|--|
| DRAM SW Thermal Throttling drop-down list | <p>Provides a protective mechanism to ensure that the software functions within the temperature limits. When the temperature exceeds the maximum threshold value, the performance is permitted to drop allowing to cool down to the minimum threshold value. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not use the function. • Enabled—The processor uses the function. • Auto —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

I/O Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 15: BIOS Parameters in I/O Tab

| Name | Description |
|--|---|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| Pcie Slotn Oprom drop-down list | <p>Whether the server can use the Option ROMs present in the PCIe card slot designated by n. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Option ROM for slot n is not available. • Enabled—Option ROM for slot n is available. |
| PCIe Slotn Link Speed drop-down list | <p>System IO Controller n (SIOCn) add-on slot (designated by n) link speed. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto— The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |

| Name | Description |
|--|---|
| IPV6 PXE Support drop-down list | <p>Enables or disables IPV6 support for PXE. This can be one of the following</p> <ul style="list-style-type: none"> • Disabled—IPV6 PXE support is not available. • Enabled—IPV6 PXE support is always available. |
| IPV4 PXE Support drop-down list | <p>Enables or disables IPV4 support for PXE. This can be one of the following</p> <ul style="list-style-type: none"> • Disabled—IPV4 PXE support is not available. • Enabled—IPV4 PXE support is always available. |
| SR-IOV Support drop-down list | <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"> • Disabled—SR-IOV is disabled. • Enabled—SR-IOV is enabled. |
| Front NVME <i>n</i> OptionROM drop-down list | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe <i>n</i> slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe <i>n</i> slot. • Enabled—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe <i>n</i> slot |
| Front NVME <i>n</i> Link Speed drop-down list | <p>Link speed for NVMe front slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto—The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |
| IPV6 HTTP Support drop-down list | <p>Enables or disables IPv6 support for HTTP. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—IPv6 HTTP support is not available. • Enabled—IPv6 HTTP support is always available. |

| Name | Description |
|---|---|
| IPv4 HTTP Support drop-down list | Enables or disables IPv4 support for HTTP. This can be one of the following: <ul style="list-style-type: none"> • Disabled—IPv4 HTTP support is not available. • Enabled—IPv4 HTTP support is always available. |

Power/Performance Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 16: BIOS Parameters in Power/Performance Tab

| Name | Description |
|--|---|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| Core Performance Boost drop-down list | Whether the AMD processor increases its frequency on some cores when it is idle or not being used much. This can be one of the following: <ul style="list-style-type: none"> • Auto—The CPU automatically determines how to boost performance. • Disabled—Core performance boost is disabled. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| Global C-state Control drop-down list | Whether the AMD processors control IO-based C-state generation and DF C-states This can be one of the following: <ul style="list-style-type: none"> • Auto—The CPU automatically determines how to control IO-based C-state generation. • Disabled—Global C-state control is disabled. • Enabled—Global C-state control is enabled. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

| Name | Description |
|--|---|
| L1 Stream HW Prefetcher drop-down list | <p>Whether the processor allows the AMD hardware prefetcher to speculatively fetch streams of data and instruction from memory into the L1 cache when necessary. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU determines how to place data from I/O devices into the processor cache. • Disabled—The hardware prefetcher is not used. • Enabled—The processor uses the hardware prefetcher when cache issues are detected. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| L2 Stream HW Prefetcher drop-down list | <p>Whether the processor allows the AMD hardware prefetcher to speculatively fetch streams of data and instruction from memory into the L2 cache when necessary. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU determines how to place data from I/O devices into the processor cache. • Disabled—The hardware prefetcher is not used. • Enabled—The processor uses the hardware prefetcher when cache issues are detected. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| Determinism Slider drop-down list | <p>Allows AMD processors to determine how to operate. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU automatically uses default power determinism settings. • Performance—Processor operates at the best performance in a consistent manner. • Power—Processor operates at the maximum allowable performance on a per die basis. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

Processor Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 17: BIOS Parameters in Processor Tab

| Name | Description |
|----------------------------------|---|
| Reboot Host Immediately checkbox | If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| SMT Mode drop-down list | <p>Whether the processor uses AMD Simultaneous MultiThreading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The processor allows for the parallel execution of multiple threads. • Off—The processor does not permit multithreading. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |
| SVM Mode drop-down list | <p>Whether the processor uses AMD Secure Virtual Machine Technology. This can be one of the following: This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not use SVM Technology. • Enabled—The processor uses SVM Technology. • Platform Default —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

| Name | Description |
|---------------------------------|--|
| Downcore control drop-down list | <p>Allows AMD processors to disable cores and, thus, select how many cores to enable. This can be one of the following:</p> <ul style="list-style-type: none"> • FOUR (2+2)—Two cores enabled on each CPU complex. • FOUR (4+0)—Four cores enabled on one CPU complex. • SIX (3+3)—Three cores enabled on each CPU complex. • THREE (3+0)—Three cores enabled on one CPU complex. • TWO (1+1)—Two cores enabled on each CPU complex. • TWO (2+0)—Two cores enabled on one CPU complex. • Auto—The CPU determines how many cores need to be enabled. • Platform Default—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor. |

C220 M5, C240 M5, C240 SD M5, and C480 M5 Servers

I/O Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 18: BIOS Parameters in I/O Tab

| Name | Description |
|--|--|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| Legacy USB Support drop-down list | <p>Whether the system supports legacy USB devices. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—USB devices are only available to EFI applications. • Enabled—Legacy USB support is always available. |

| Name | Description |
|---|---|
| Intel VT for directed IO drop-down list | <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"> • Disabled—The processor does not permit virtualization. • Enabled—The processor allows multiple operating systems in independent partitions. <p>Note If you change this option, you must power cycle the server before the setting takes effect.</p> |
| Intel VTD coherency support drop-down list | <p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not support coherency. • Enabled—The processor uses VT-d Coherency as required. |
| Intel VTD ATS support drop-down list | <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"> • Disabled—The processor does not support ATS. • Enabled—The processor uses VT-d ATS as required. |
| VMD Enable drop-down list | <p>Intel Volume Management Device (VMD) is for PCIe NVMe SSDs that provides hardware logic to manage and aggregate NVMe SSDs.</p> <p>This can be one the following:</p> <ul style="list-style-type: none"> • Enabled— Enables benefits like robust surprise hot-plug, status LED management. • Disabled— Disables benefits like robust surprise hot-plug, status LED management. <p>Default value: Disabled.</p> <p>Refer Intel® Virtual RAID on CPU User Guide and Intel® Virtual RAID on CPU (Intel® VROC) to configure VMD.</p> |
| All Onboard LOM Oprom drop-down list | <p>Whether Option ROM is available on all LOM ports. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Option ROM is disabled on all the ports. • Enabled—Option ROM is enabled on all the ports. |
| Onboard LOM Port0 Oprom drop-down list | <p>Whether Option ROM is available on the LOM port 0. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Option ROM is not available on LOM port 0. • Enabled—Option ROM is available on LOM port 0. |

| Name | Description |
|---|--|
| Onboard LOM Port1 Oprom drop-down list | <p>Whether Option ROM is available on the LOM port 1. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Option ROM is not available on LOM port 1. • Enabled—Option ROM is available on LOM port 1. |
| Pcie Slot<i>n</i> Oprom drop-down list | <p>Whether the server can use the Option ROMs present in the PCIe card slot designated by <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Option ROM for slot <i>n</i> is not available. • Enabled—Option ROM for slot <i>n</i> is available. |
| MLOM Oprom drop-down list | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Does not execute Option ROM of the PCIe adapter connected to the MLOM slot. • Enabled—Executes Option ROM of the PCIe adapter connected to the MLOM slot. |
| HBA Oprom drop-down list | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the HBA slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Does not execute Option ROM of the PCIe adapter connected to the HBA slot. • Enabled—Executes Option ROM of the PCIe adapter connected to the HBA slot. |
| Front NVME1 Oprom drop-down list | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe1 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot. • Enabled—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe1 slot |
| Front NVME2 Oprom drop-down list | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Does not execute Option ROM of the PCIe adapter connected to the SSD:NVMe2 slot. • Enabled—Executes Option ROM of the PCIe adapter connected to the SSD:NVMe2 slot |

| Name | Description |
|---|---|
| HBA Link Speed drop-down list | <p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe HBA slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The maximum speed is not restricted. • Auto—System selects the maximum speed allowed. • GEN1—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • GEN2—5GT/s is the maximum speed allowed. • GEN3—8GT/s is the maximum speed allowed. |
| MLOM Link Speed drop-down list | <p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe MLOM slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The maximum speed is not restricted. • Auto—System selects the maximum speed allowed. • GEN1—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • GEN2—5GT/s is the maximum speed allowed. • GEN3—8GT/s is the maximum speed allowed. |
| PCIe Slotn Link Speed drop-down list | <p>System IO Controller n (SIOCn) add-on slot (designated by n) link speed. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto— The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |
| Front NVME1 Link Speed drop-down list | <p>Link speed for NVMe front slot 1. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto—The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |

| Name | Description |
|--|---|
| Front NVME2 Link Speed drop-down list | <p>Link speed for NVMe front slot 2. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto—The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |
| Rear NVME1 Link Speed drop-down list | <p>Link speed for NVMe rear slot 1. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto—The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |
| Rear NVME2 Link Speed drop-down list | <p>Link speed for NVMe rear slot 2. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Slot is disabled, and the card is not enumerated. • Auto—The default link speed. Link speed is automatically assigned. • GEN1—Link speed can reach up to first generation. • GEN2—Link speed can reach up to second generation. • GEN3—Link speed can reach up to third generation. |
| VGA Priority drop-down list | <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"> • OnBoard—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port. • OffBoard—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port. • OnBoardDisabled—Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled. The vKVM does not function when the onboard VGA is disabled. |
| P-SATA OptionROM drop-down list | <p>Allows you to select the PCH SATA optionROM mode. This can be one of the following:</p> <ul style="list-style-type: none"> • LSI SW Raid— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid. • Disabled— Disables both SATA and sSATA controllers. |

| Name | Description |
|--|---|
| M2.SATA OptionROM drop-down list | <p>Mode of operation of Serial Advanced Technology Attachment (SATA) Solid State Drives (SSD). This can be one of the following:</p> <ul style="list-style-type: none"> • AHCI— Sets both SATA and sSATA controllers to AHCI mode. • LSI SW Raid— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid. • Disabled— Disables both SATA and sSATA controllers. |
| USB Port Rear drop-down list | <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"> • Disabled— Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled— Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port Front drop-down list | <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"> • Disabled— Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled— Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port Internal drop-down list | <p>Whether the internal USB devices are enabled or disabled. This can be one of the following</p> <ul style="list-style-type: none"> • Disabled— Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled— Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port KVM drop-down list | <p>Whether the vKVM ports are enabled or disabled. This can be one of the following</p> <ul style="list-style-type: none"> • Disabled— Disables the vKVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the KVM window. • Enabled— Enables the vKVM keyboard and/or mouse devices. |
| USB Port SD Card drop-down list | <p>Whether the SD card is enabled or disabled. This can be one of the following</p> <ul style="list-style-type: none"> • Disabled— Disables the SD card ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled— Enables the SD card ports. Devices connected to these ports are detected by the BIOS and operating system. |

| Name | Description |
|--|---|
| IPv6 PXE Support drop-down list | Enables or disables IPv6 support for PXE. This can be one of the following <ul style="list-style-type: none"> • Disabled—IPv6 PXE support is not available. • Enabled—IPv6 PXE support is always available. |

Server Management Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 19: BIOS Parameters in Server Management Tab

| Name | Description |
|---|--|
| Reboot Host Immediately checkbox | If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| OS Boot Watchdog Timer Policy drop-down list | What action the system takes if the watchdog timer expires. This can be one of the following: <ul style="list-style-type: none"> • Power Off—The server is powered off if the watchdog timer expires during OS boot. • Reset—The server is reset if the watchdog timer expires during OS boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |
| OS Watchdog Timer drop-down list | Whether the BIOS programs the watchdog timer with a specified timeout value. This can be one of the following: <ul style="list-style-type: none"> • Disabled—The watchdog timer is not used to track how long the server takes to boot. • Enabled—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the OS Boot Watchdog Timer Timeout field, the Cisco IMC logs an error and takes the action specified in the OS Boot Watchdog Policy field. |

| Name | Description |
|---|---|
| OS Watchdog Timer Timeout drop-down list | <p>If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following:</p> <ul style="list-style-type: none"> • 5 Minutes—The OS watchdog timer expires 5 minutes after it begins to boot. • 10 Minutes—The OS watchdog timer expires 10 minutes after it begins to boot. • 15 Minutes—The OS watchdog timer expires 15 minutes after it begins to boot. • 20 Minutes—The OS watchdog timer expires 20 minutes after it begins to boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |
| Baud Rate drop-down list | <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"> • 9.6k—A 9,600 Baud rate is used. • 19.2k—A 19,200 Baud rate is used. • 38.4k—A 38,400 Baud rate is used. • 57.6k—A 57,600 Baud rate is used. • 115.2k—A 115,200 Baud rate is used. <p>This setting must match the setting on the remote terminal application.</p> |
| Console Redirection drop-down list | <p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the OS has booted, console redirection is irrelevant. This can be one of the following:</p> <ul style="list-style-type: none"> • Serial Port A—Enables console redirection on serial port A during POST. • Serial Port B—Enables console redirection on serial port B during POST. • Disabled—No console redirection occurs during POST. |

| Name | Description |
|--|---|
| <p>Adaptive Memory Training</p> | <p>When this option is Enabled:</p> <p>The Memory training will not happen in every boot but the BIOS will use the saved memory training result in every re-boot.</p> <p>Some exceptions when memory training happens in every boot are:</p> <p>BIOS update, CMOS reset, CPU or Memory configuration change, SPD or run-time uncorrectable error or the last boot has occurred more than 24 hours before.</p> <p>When this option is Disabled, the Memory training happens in every boot.</p> <p>Default value: Enabled.</p> <p>Note To disable the Fast Boot option, the end user must set the following tokens as mentioned below:</p> <p>Adaptive Memory Training to Disabled</p> <p>BIOS Techlog level to Normal</p> <p>OptionROM Launch Optimization to Disabled.</p> |
| <p>BIOS Techlog Level</p> | <p>This option denotes the type of messages in BIOS tech log file.</p> <p>The log file can be one of the following types:</p> <ul style="list-style-type: none"> • Minimum - Critical messages will be displayed in the log file. • Normal - Warning and loading messages will be displayed in the log file. • Maximum - Normal and information related messages will be displayed in the log file. <p>Default value: Minimum.</p> <p>Note This option is mainly for internal debugging purposes.</p> |

| Name | Description |
|--------------------------------------|---|
| OptionROM Launch Optimization | <p>When this option is Enabled, the OptionROMs only for the controllers present in the boot order policy will be launched.</p> <p>Note Some controllers such as Onboard storage controllers, Emulex FC adapters, and GPU controllers though not listed in the boot order policy will have the OptionROM launched.</p> <p>When this option is Disabled, all the OptionROMs will be launched.</p> <p>Default value: Enabled</p> |
| CDN Control drop-down list | <p>Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled— CDN support for VIC cards is disabled • Enabled— CDN support is enabled for VIC cards. |
| FRB 2 Timer drop-down list | <p>Whether the FRB2 timer is used by Cisco IMC to recover the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The FRB2 timer is not used. • Enabled—The FRB2 timer is started during POST and used to recover the system if necessary. |
| Flow Control drop-down list | <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"> • None—No flow control is used. • RTS/CTS—RTS/CTS is used for flow control. <p>Note This setting must match the setting on the remote terminal application.</p> |

| Name | Description |
|------------------------------|--|
| Terminal type drop-down list | <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"> • PC-ANSI—The PC-ANSI terminal font is used. • VT100—A supported VT100 video terminal and its character set are used. • VT100-PLUS—A supported VT100-plus video terminal and its character set are used. • VT-UTF8—A video terminal with the UTF-8 character set is used. |

Security Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 20: BIOS Parameters in Security Tab

| Name | Description |
|--|---|
| Reboot Host Immediately checkbox | <p>If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.</p> |
| Trusted Platform Module Support drop-down list | <p>Trusted Platform Module (TPM) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. It can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The server does not use the TPM. • Enabled—The server uses the TPM. <p>Note Contact your operating system vendor to make sure the operating system supports this feature.</p> |

| Name | Description |
|---|---|
| Reboot Host Immediately checkbox | If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| Power on Password drop-down list | This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following: <ul style="list-style-type: none"> • Disabled—Support is disabled. • Enabled—Support is enabled. |

Processor Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 21: BIOS Parameters in Processor Tab

| Name | Description |
|---|---|
| Intel Virtualization Technology drop-down list | 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: <ul style="list-style-type: none"> • Disabled—The processor does not permit virtualization. • Enabled—The processor allows multiple operating systems in independent partitions. |
| Extended Apic drop-down list | Allows you to enable or disable extended APIC support. This can be one of the following: <ul style="list-style-type: none"> • Enabled—Enables APIC support • Disabled—Disables APIC support. |

| Name | Description |
|---|---|
| Processor C1E drop-down list | <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"> • Disabled—The CPU continues to run at its maximum frequency in C1 state. • Enabled—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state. <p>Note This option is available only on some C-Series servers.</p> |
| Processor C6 Report drop-down list | <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"> • Disabled—The BIOS does not send the C6 report. • Enabled—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. <p>Note CPUPowerManagement must be set to Custom or the server ignores the setting for this parameter.</p> <p>Note This option is available only on some C-Series servers.</p> |

| Name | Description |
|--|--|
| Execute Disable Bit drop-down list | <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"> • Disabled—The processor does not classify memory areas. • Enabled—The processor classifies memory areas. <p>Note Contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Intel Turbo Boost Tech drop-down list | <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"> • Disabled—The processor does not increase its frequency automatically. • Enabled—The processor utilizes Turbo Boost Technology if required. <p>Note CPUPowerManagement must be set to Custom or the server ignores the setting for this parameter.</p> |

| Name | Description |
|---|---|
| Enhanced Intel SpeedStep Tech drop-down list | <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"> • Disabled—The processor never dynamically adjusts its voltage or frequency. • Enabled—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> <p>Note CPUPowerManagement must be set to Custom or the server ignores the setting for this parameter.</p> |
| Intel HyperThreading Tech drop-down list | <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"> • Disabled—The processor does not permit hyperthreading. • Enabled—The processor allows for the parallel execution of multiple threads. |
| Workload Configuration drop-down list | <p>This feature allows for workload optimization. The options are Balanced and I/O Sensitive:</p> <ul style="list-style-type: none"> • NUMA • UMA |

| Name | Description |
|-------------------------------------|---|
| Core MultiProcessing drop-down list | <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"> • All—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • 1 through 28—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. <p>Note Contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Sub NUMA Clustering drop-down list | <p>Whether the CPU supports sub NUMA clustering, in which the tag directory and the memory channel are always in the same region. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled— Sub NUMA clustering does not occur. • Enabled— Sub NUMA clustering occurs. • Auto— The BIOS determines what Sub NUMA clustering is done. |
| IMC Interleave drop-down list | <p>This BIOS option controls the interleaving between the Integrated Memory Controllers (IMCs).</p> <ul style="list-style-type: none"> • 1-way Interleave—There is no interleaving. • 2-way Interleave—Addresses are interleaved between the two IMCs. • Auto—CPU determines the IMC Interleaving mode. |
| XPT Prefetch drop-down list | <p>Whether XPT prefetch is used to enable a read request sent to the last level cache to issue a copy of that request to the memory controller prefetcher. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The CPU does not use the XPT Prefetch option. • Enabled—The CPU enables the XPT prefetch option. |

| Name | Description |
|---|--|
| UPI Prefetch drop-down list | <p>UPI prefetch is a mechanism to get the memory read started early on a DDR bus. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not preload any cache data. • Enabled—The UPI prefetcher preloads the L1 cache with the data it determines to be the most relevant. |
| Energy Performance Bias Config drop-down list | <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"> • Performance — 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. • Balanced Performance — The server provides all server components with enough power to keep a balance between performance and power. • Balanced Power — The server provides all server components with enough power to keep a balance between performance and power. • Power — The server provides all server components with maximum power to keep reduce power consumption. |
| Power Performance Tuning drop-down list | <p>Determines if the BIOS or Operating System can turn on the energy performance bias tuning. The options are BIOS and OS.</p> <ul style="list-style-type: none"> • BIOS— Chooses BIOS for energy performance tuning. • OS— Chooses OS for energy performance tuning. |
| LLC Prefetch drop-down list | <p>Whether the processor uses the LLC Prefetch mechanism to fetch the date into the LLC. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not preload any cache data. • Enabled—The LLC prefetcher preloads the L1 cache with the data it determines to be the most relevant. |

| Name | Description |
|---|---|
| Package C State | <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"> • No Limit—The server may enter any available C state. • Auto —The CPU determines the physical elevation. • C0 C1 State—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • C2—When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • C6 Non Retention—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. • C6 Retention—When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. |
| Hardware P-States drop-down list | <p>Enables processor Hardware P-State. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—HWPM is disabled. • HWPM Native Mode—HWPM native mode is enabled. • HWPM OOB Mode—HWPM Out-Of-Box mode is enabled. • Native Mode with no Legacy (only GUI) |

| Name | Description |
|-----------------------------------|--|
| Intel Speed Select drop-down list | <p>Intel Speed Select modes will allow users to run the CPU with different speed and cores.</p> <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Base— It will allow users to access maximum core and Thermal Design Power (TDP) ratio. • Config 1— It will allow users to access core and TDP ratio lesser than Base. • Config 2— It will allow users to access core and TDP ratio lesser than Config 1. <p>Default value: Base.</p> |

Memory Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 22: BIOS Parameters in Memory Tab

| Name | Description |
|--|--|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| Select Memory RAS configuration drop-down list | <p>Determines 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"> • Maximum Performance—System performance is optimized. • ADDDC Sparing—Adaptive virtual lockstep is an algorithm implemented in the hardware and firmware to support the ADDDC mode. When selected, the system performance is optimized till the algorithm is activated. The algorithm is activated in case of DRAM device failure. Once the algorithm is activated, the virtual lockstep regions are activated to map out the failed region during run-time dynamically, and the performance impact is restricted at a region level. • Mirror Mode 1LM—System reliability is optimized by using half the system memory as backup. |

| Name | Description |
|--|--|
| Above 4G Decoding drop-down list | <p>Enables or disables MMIO above 4GB or not. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • Enabled—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. <p>Note PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.</p> |
| DCPMM Firmware Downgrade drop-down list | <p>Whether the BIOS supports downgrading the DCPMM firmware. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Support is disabled. • Enabled—Support is enabled. |
| NUMA drop-down list | <p>Whether the BIOS supports Non-Uniform Memory Access (NUMA). This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Support is disabled. • Enabled—Support is enabled. |

Power/Performance Tab



Note BIOS parameters listed in this tab may vary depending on the server.

Table 23: BIOS Parameters in Power/Performance Tab

| Name | Description |
|---|--|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| Hardware Prefetcher drop-down list | <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"> • Disabled—The hardware prefetcher is not used. • Enabled—The processor uses the hardware prefetcher when cache issues are detected. |

| Name | Description |
|---|--|
| Adjacent Cache Line Prefetcher drop-down list | Whether the processor fetches cache lines in even or odd pairs instead of fetching just the required line. This can be one of the following: <ul style="list-style-type: none"> • Disabled—The processor only fetches the required line. • Enabled—The processor fetches both the required line and its paired line. |
| DCU Streamer Prefetch drop-down list | 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: <ul style="list-style-type: none"> • Disabled—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • Enabled—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed. |
| DCU IP Prefetcher drop-down list | 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: <ul style="list-style-type: none"> • Disabled—The processor does not preload any cache data. • Enabled—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant. |
| CPU Performance drop-down list | Sets the CPU performance profile for the options listed above. This can be one of the following: <ul style="list-style-type: none"> • Enterprise—All options are enabled. • HPC—All options are enabled. This setting is also known as high performance computing. • High Throughput—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • Custom—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured as well. |

C460 M4 Servers

Main Tab for C460 M4 Servers

Main BIOS Parameters

| Name | Description |
|--|--|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| TPM Support | <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"> • Disabled—The server does not use the TPM. • Enabled—The server uses the TPM. <p>Note We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Power ON Password Support drop-down | <p>This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Support is disabled. • Enabled—Support is enabled. |

Actions Area

| Name | Description |
|--------------------------------|--|
| Save button | <p>Saves the settings for the BIOS parameter and closes the dialog box.</p> <p>If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted.</p> |
| Reset button | Resets the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened. |
| Restore Defaults button | Sets the BIOS parameters on all three tabs to their default settings. |

Advanced Tab for C460 M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.



Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Processor Configuration Parameters

| Name | Description |
|---|---|
| Intel Hyper-Threading Technology | <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"> • Disabled—The processor does not permit hyperthreading. • Enabled—The processor allows for the parallel execution of multiple threads. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Number of Enabled Cores | <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"> • All—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • 1 through n—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |

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

| Name | Description |
|-------------------------------------|---|
| Intel VT-d Coherency Support | <p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not support coherency. • Enabled—The processor uses VT-d Coherency as required. |
| Intel VT-d ATS Support | <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"> • Disabled—The processor does not support ATS. • Enabled—The processor uses VT-d ATS as required. |
| CPU Performance | <p>Sets the CPU performance profile for the server. The performance profile consists of the following options:</p> <ul style="list-style-type: none"> • DCU Streamer Prefetcher • DCU IP Prefetcher • Hardware Prefetcher • Adjacent Cache-Line Prefetch <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Enterprise—All options are enabled. • High Throughput—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • HPC—All options are enabled. This setting is also known as high performance computing. • Custom—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured in the fields below. |
| Hardware Prefetcher | <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"> • Disabled—The hardware prefetcher is not used. • Enabled—The processor uses the hardware prefetcher when cache issues are detected. |

| Name | Description |
|---------------------------------------|---|
| Adjacent Cache Line Prefetcher | <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"> • Disabled—The processor only fetches the required line. • Enabled— The processor fetches both the required line and its paired line. |
| DCU Streamer Prefetch | <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"> • Disabled—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • Enabled—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed. |
| DCU IP Prefetcher | <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"> • Disabled—The processor does not preload any cache data. • Enabled—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant. |
| Direct Cache Access Support | <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"> • Disabled—Data from I/O devices is not placed directly into the processor cache. • Enabled—Data from I/O devices is placed directly into the processor cache. |

| Name | Description |
|--|---|
| Power Technology | <p>Enables you to configure the CPU power management settings for the following options:</p> <ul style="list-style-type: none"> • Enhanced Intel Speedstep Technology • Intel Turbo Boost Technology • Processor Power State C6 <p>Power Technology can be one of the following:</p> <ul style="list-style-type: none"> • Custom—The server uses the individual settings for the BIOS parameters mentioned above. You must select this option if you want to change any of these BIOS parameters. • Disabled—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored. • Energy Efficient—The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters. |
| Enhanced Intel Speedstep Technology | <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"> • Disabled—The processor never dynamically adjusts its voltage or frequency. • Enabled—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |

| 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"> • Disabled—The processor does not increase its frequency automatically. • Enabled—The processor utilizes Turbo Boost Technology if required. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| Processor C3 Report | <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"> • Disabled—BIOS does not send C3 report. • Enabled—BIOS sends the C3 report, allowing the OS to transition the processor to the C3 low power state. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| Processor C6 Report | <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"> • Disabled—The BIOS does not send the C6 report. • Enabled—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| Processor Power State C1 Enhanced | <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"> • Disabled—The CPU continues to run at its maximum frequency in C1 state. • Enabled—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state. |

| Name | Description |
|----------------------------------|---|
| P-STATE Coordination | <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"> • HW_ALL—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package). • SW_ALL—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors. • SW_ANY—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| SINGLE_PCTL drop-down list | <p>Facilitates single PCTL support for better processor power management. This can be one of the following:</p> <ul style="list-style-type: none"> • No • Yes |
| Config TDP drop-down list | <p>Allows you to configure the Thermal Design Power (TDP) settings for the system. TDP is the maximum amount of power allowed for running applications without triggering an overheating event. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the TDP settings. This is the default value. • Enabled—Enables the TDP settings. |
| Energy Performance Tuning | <p>Allows you to choose BIOS or Operating System for energy performance bias tuning. This can be one of the following:</p> <ul style="list-style-type: none"> • OS— Chooses OS for energy performance tuning. • BIOS— Chooses BIOS for energy performance tuning. |

| Name | Description |
|------------------------------|---|
| Energy Performance | <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"> • Balanced Energy • Balanced Performance • Energy Efficient • Performance |
| Package C State Limit | <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"> • C0 state—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • C1 state—When the CPU is idle, the system slightly reduces the power consumption. This option requires less power than C0 and allows the server to return quickly to high performance mode. • C3 state—When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • C6 state—When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • C7 state—When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves the maximum amount of power but it also requires the longest time for the server to return to high performance mode. • No Limit—The server may enter any available C state. |
| Extended APIC | <p>Allows you to enable or disable extended APIC support. This can be one of the following:</p> <ul style="list-style-type: none"> • XAPIC—Enables APIC support. • X2APIC—Enables APIC and also enables Intel VT-d and Interrupt Remapping . |

| Name | Description |
|--|--|
| Workload Configuration | <p>Allows you to set a parameter to optimize workload characterization. This can be one of the following:</p> <ul style="list-style-type: none"> • Balanced— Chooses balanced option for optimization. • I/O Sensitive— Chooses I/O sensitive option for optimization. <p>Note We recommend you to set the workload configuration to Balanced.</p> |
| I/O Error Enable drop-down list | <p>Allows you to generate the I/O-related errors. This can be one of the following:</p> <ul style="list-style-type: none"> • Yes • No |

Memory Configuration Parameters

| Name | Description |
|--------------------------|--|
| Select Memory RAS | <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"> • Maximum Performance—System performance is optimized. • Mirroring—System reliability is optimized by using half the system memory as backup. • Lockstep—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. This option offers better system performance than Mirroring and better reliability than Maximum Performance but lower reliability than Mirroring and lower system performance than Maximum Performance. |

| Name | Description |
|---|--|
| DRAM Clock Throttling | <p>Allows you to tune the system settings between the memory bandwidth and power consumption. This can be one of the following:</p> <ul style="list-style-type: none"> • Balanced— DRAM clock throttling is reduced, providing a balance between performance and power. • Performance—DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power. • Energy Efficient—DRAM clock throttling is increased to improve energy efficiency. |
| Low Voltage DDR Mode | <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"> • Power Saving Mode—The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low. • Performance Mode—The system prioritizes high frequency operations over low voltage operations. |
| Closed Loop Therm Throt drop-down list | <p>Allows for the support of Closed-Loop Thermal Throttling, which improves reliability and reduces CPU power consumption through the automatic voltage control while the CPUs are in the idle state. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables closed loop thermal throttling. • Enabled—Enables closed loop thermal throttling. This is the default value. |
| Channel Interleaving | <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"> • Auto—The CPU determines what interleaving is done. • 1 Way—Some channel interleaving is used. • 2 Way • 3 Way • 4 Way—The maximum amount of channel interleaving is used. |

| Name | Description |
|--------------------------|---|
| Rank Interleaving | <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"> • Auto—The CPU determines what interleaving is done. • 1 Way—Some rank interleaving is used. • 2 Way • 4 Way • 8 Way—The maximum amount of rank interleaving is used. |
| Patrol Scrub | <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"> • Disabled—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • Enabled—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running. |
| Demand Scrub | <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"> • Disabled— Single bit memory errors are not corrected. • Enabled— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read. |

| Name | Description |
|-----------------|---|
| Altitude | <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"> • Auto—The CPU determines the physical elevation. • 300 M—The server is approximately 300 meters above sea level. • 900 M—The server is approximately 900 meters above sea level. • 1500 M—The server is approximately 1500 meters above sea level. • 3000 M—The server is approximately 3000 meters above sea level. |

QPI Configuration Parameters

| Name | Description |
|----------------------------------|--|
| QPI Link Frequency Select | <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"> • Auto—The CPU determines the QPI link frequency. • 6.4 GT/s • 7.2 GT/s • 8.0 GT/s |
| QPI Snoop Mode | <p>The Intel QuickPath Interconnect (QPI) snoop mode. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the QPI snoop mode. • Cluster on Die—Enables Cluster On Die. When enabled LLC is split into two parts with an independent caching agent for each. This helps increase the performance in some workloads. This mode is available only for processors that have 10 or more cores. It is the best mode for highly NUMA optimized workloads. • Auto—The CPU automatically recognizes this as Early Snoop mode. This is the default value. |

USB Configuration Parameters

| Name | Description |
|-----------------------------|---|
| Legacy USB Support | <p>Whether the system supports legacy USB devices. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—USB devices are only available to EFI applications. • Enabled—Legacy USB support is always available. • Auto—Disables legacy USB support if no USB devices are connected. |
| Port 60/64 Emulation | <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"> • Disabled—60h/64 emulation is not supported. • Enabled—60h/64 emulation is supported. <p>You should select this option if you are using a non-USB aware operating system on the server.</p> |
| All USB Devices | <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"> • Disabled—All USB devices are disabled. • Enabled—All USB devices are enabled. |
| USB Port: Rear | <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"> • Disabled—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port: Internal | <p>Whether the internal USB devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port: KVM | <p>Whether the vKVM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the vKVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the vKVM window. • Enabled—Enables the vKVM keyboard and/or mouse devices. |

| Name | Description |
|-------------------------|---|
| USB Port: vMedia | Whether the virtual media devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> • Disabled—Disables the vMedia devices. • Enabled—Enables the vMedia devices. |
| xHCI Mode | Whether the xHCI controller legacy support is enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> • Disabled—Disables the xHCI controller legacy support. • Enabled—Enables the xHCI controller legacy support. |

PCI Configuration Parameters

| Name | Description |
|--------------------------------------|--|
| Memory Mapped I/O Above 4GB | Whether to enable or disable MMIO above 4GB or not. This can be one of the following: <ul style="list-style-type: none"> • Disabled—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • Enabled—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. <p>Note PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.</p> |
| SR-IOV Support drop-down list | 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"> • Disabled—SR-IOV is disabled. • Enabled—SR-IOV is enabled. |

Serial Configuration Parameters

| Name | Description |
|------------------------------|--|
| Out-of-Band Mgmt Port | Allows you to configure the COM port 0 that can be used for Windows Emergency Management services. ACPI SPCR table is reported based on this setup option. This can be one of the following: <ul style="list-style-type: none"> • Disabled—Configures the COM port 0 as a general purpose port for use with the Windows Operating System. • Enabled—Configures the COM port 0 as a remote management port for Windows Emergency Management services. |

| Name | Description |
|----------------------------|---|
| Console Redirection | <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"> • Disabled—No console redirection occurs during POST. • COM0—Enables console redirection on COM port 0 during POST. • COM1—Enables console redirection on COM port 1 during POST. |
| 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"> • PC-ANSI—The PC-ANSI terminal font is used. • VT100—A supported vt100 video terminal and its character set are used. • VT100+—A supported vt100-plus video terminal and its character set are used. • VT-UTF8—A video terminal with the UTF-8 character set is used. <p>Note This setting must match the setting on the remote terminal application.</p> |
| Bits per second | <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"> • 9600—A 9,600 BAUD rate is used. • 19200—A 19,200 BAUD rate is used. • 38400—A 38,400 BAUD rate is used. • 57600—A 57,600 BAUD rate is used. • 115200—A 115,200 BAUD rate is used. <p>Note This setting must match the setting on the remote terminal application.</p> |

| Name | Description |
|------------------------------------|---|
| Flow Control | <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"> • None—No flow control is used. • Hardware RTS/CTS—RTS/CTS is used for flow control. <p>Note This setting must match the setting on the remote terminal application.</p> |
| Putty KeyPad | <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"> • VT100—The function keys generate ESC OP through ESC O[. • LINUX—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate ESC [A through ESC [E. • XTERMR6—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate ESC OP through ESC OS, which are the sequences produced by the top row of the keypad on Digital terminals. • SCO—The function keys F1 to F12 generate ESC [M through ESC [X. The function and shift keys generate ESC [Y through ESC [j. The control and function keys generate ESC [k through ESC [v. The shift, control and function keys generate ESC [w through ESC [f. • ESCN—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as ESC [11~ and ESC [12~. • VT400—The function keys behave like the default mode. The top row of the numeric keypad generates ESC OP through ESC OS. |
| Redirection After BIOS POST | <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"> • Always Enable—BIOS Legacy console redirection is active during the OS boot and run time. • Bootloader—BIOS Legacy console redirection is disabled before giving control to the OS boot loader. |

LOM and PCIe Slots Configuration Parameters

| Name | Description |
|------------------------------------|---|
| CDN Support for VIC | <p>Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled— CDN support for VIC cards is disabled. • Enabled— CDN support is enabled for VIC cards. <p>Note CDN support for VIC cards work with Windows 2012 or the latest OS only.</p> |
| PCI ROM CLP | <p>PCI ROM Command Line Protocol (CLP) controls the execution of different Option ROMs such as PxE and iSCSI that are present in the card. By default, it is disabled.</p> <ul style="list-style-type: none"> • Enabled— Enables you to configure execution of different option ROMs such as PxE and iSCSI for an individual ports separately. • Disabled—The default option. You cannot choose different option ROMs. A default option ROM is executed during PCI enumeration. |
| PCH SATA Mode | <p>This options allows you to select the PCH SATA mode. This can be one of the following:</p> <ul style="list-style-type: none"> • AHCI—Sets both SATA and sSATA controllers to AHCI mode. • Disabled—Disables both SATA and sSATA controllers. • LSI SW Raid— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid |
| All Onboard LOM Ports | <p>Whether all LOM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—All LOM ports are disabled. • Enabled—All LOM ports are enabled. |
| LOM Port <i>n</i> OptionROM | <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"> • Disabled—The Option ROM for slot <i>n</i> is not available. • Enabled—The Option ROM for slot <i>n</i> is available. • UEFI Only—The Option ROM for slot <i>n</i> is available for UEFI only. • Legacy Only—The Option ROM for slot <i>n</i> is available for legacy only. |

| Name | Description |
|-------------------------------------|--|
| All PCIe Slots OptionROM | <p>Whether the server can use Option ROM present in the PCIe Cards. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The Option ROM for slot <i>n</i> is not available. • Enabled—The Option ROM for slot <i>n</i> is available. • UEFI Only—The Option ROM for slot <i>n</i> is available for UEFI only. • Legacy Only—The Option ROM for slot <i>n</i> is available for legacy only. |
| PCIe Slot:<i>n</i> OptionROM | <p>Whether the server can use the Option ROMs present in the PCIe Cards. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The Option ROM for slot <i>n</i> is not available. • Enabled—The Option ROM for slot <i>n</i> is available. • UEFI Only—The Option ROM for slot <i>n</i> is available for UEFI only. • Legacy Only—The Option ROM for slot <i>n</i> is available for legacy only. |
| PCIe Slot:MLOM OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:HBA OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the HBA slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |

| Name | Description |
|--|---|
| PCIe Slot:N1 OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe1 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:N2 OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:N2 OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:HBA Link Speed PCIe SlotHBA LinkSpeed | <p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe HBA slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto— System selects the maximum speed allowed. • GEN1—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • GEN2—5GT/s is the maximum speed allowed. • GEN3—8GT/s is the maximum speed allowed. • Disabled—The maximum speed is not restricted. |

BIOS Configuration Dialog Box Button Bar



Important

The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

| Name | Description |
|--------------------------------|--|
| Save Changes button | Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| Reset Values button | Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened. |
| Restore Defaults button | Sets the BIOS parameters on all three tabs to their default settings. |
| Cancel button | Closes the dialog box without making any changes. |

Server Management Tab for C460 M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.



Note

If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Server Management BIOS Parameters

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

| Name | Description |
|----------------------------------|---|
| OS Watchdog Timer | <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"> • Disabled—The watchdog timer is not used to track how long the server takes to boot. • Enabled—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the OS Boot Watchdog Timer Timeout field, the Cisco IMC logs an error and takes the action specified in the OS Boot Watchdog Policy field. |
| OS Watchdog Timer Timeout | <p>If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following:</p> <ul style="list-style-type: none"> • 5 Minutes—The OS watchdog timer expires 5 minutes after it begins to boot. • 10 Minutes—The OS watchdog timer expires 10 minutes after it begins to boot. • 15 Minutes—The OS watchdog timer expires 15 minutes after it begins to boot. • 20 Minutes—The OS watchdog timer expires 20 minutes after it begins to boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |
| OS Watchdog Timer Policy | <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"> • Do Nothing—The server takes no action if the watchdog timer expires during OS boot. • Power Down—The server is powered off if the watchdog timer expires during OS boot. • Reset—The server is reset if the watchdog timer expires during OS boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |

BIOS Configuration Dialog Box Button Bar



Important

The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

| Name | Description |
|-------------------------|--|
| Save Changes button | Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| Reset Values button | Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened. |
| Restore Defaults button | Sets the BIOS parameters on all three tabs to their default settings. |
| Cancel button | Closes the dialog box without making any changes. |

C220 M4 and C240 M4 Servers

Main Tab for C220M4 and C240M4 Servers

Main BIOS Parameters

| Name | Description |
|--|---|
| Reboot Host Immediately checkbox | Upon checking, reboots the host server immediately. You must check the checkbox after saving changes. |
| TPM Support | 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: <ul style="list-style-type: none"> • Disabled—The server does not use the TPM. • Enabled—The server uses the TPM. <p>Note We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Power ON Password Support drop-down | This token requires that you set a BIOS password before using the F2 BIOS configuration. If enabled, password needs to be validated before you access BIOS functions such as IO configuration, BIOS set up, and booting to an operating system using BIOS. It can be one of the following: <ul style="list-style-type: none"> • Disabled—Support is disabled. • Enabled—Support is enabled. |

Actions Area

| Name | Description |
|-------------------------|--|
| Save button | Saves the settings for the BIOS parameters and closes the dialog box. If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| Reset button | Resets the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened. |
| Restore Defaults button | Sets the BIOS parameters on all three tabs to their default settings. |

Advanced Tab for C220M4 and C240M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.



Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Processor Configuration Parameters

| Name | Description |
|----------------------------------|---|
| Intel Hyper-Threading Technology | 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: <ul style="list-style-type: none"> • Disabled—The processor does not permit hyperthreading. • Enabled—The processor allows for the parallel execution of multiple threads. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |

| Name | Description |
|--------------------------------|--|
| Number of Enabled Cores | <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"> • All—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores. • 1 through <i>n</i>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Execute Disable | <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"> • Disabled—The processor does not classify memory areas. • Enabled—The processor classifies memory areas. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> |
| Intel VT | <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"> • Disabled—The processor does not permit virtualization. • Enabled—The processor allows multiple operating systems in independent partitions. <p>Note If you change this option, you must power cycle the server before the setting takes effect.</p> |
| Intel VT-d | <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"> • Disabled—The processor does not use virtualization technology. • Enabled—The processor uses virtualization technology. |

| Name | Description |
|---------------------------------------|---|
| Intel VT-d Interrupt Remapping | <p>Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not support remapping. • Enabled—The processor uses VT-d Interrupt Remapping as required. |
| Intel VT-d PassThrough DMA | <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"> • Disabled—The processor does not support pass-through DMA. • Enabled—The processor uses VT-d Pass-through DMA as required. |
| Intel VT-d Coherency Support | <p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The processor does not support coherency. • Enabled—The processor uses VT-d Coherency as required. |
| Intel VT-d ATS Support | <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"> • Disabled—The processor does not support ATS. • Enabled—The processor uses VT-d ATS as required. |

| Name | Description |
|---------------------------------------|---|
| CPU Performance | <p>Sets the CPU performance profile for the server. The performance profile consists of the following options:</p> <ul style="list-style-type: none"> • DCU Streamer Prefetcher • DCU IP Prefetcher • Hardware Prefetcher • Adjacent Cache-Line Prefetch <p>This can be one of the following:</p> <ul style="list-style-type: none"> • Enterprise—All options are enabled. • High Throughput—Only the DCU IP Prefetcher is enabled. The rest of the options are disabled. • HPC—All options are enabled. This setting is also known as high performance computing. • Custom—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured in the fields below. |
| Hardware Prefetcher | <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"> • Disabled—The hardware prefetcher is not used. • Enabled—The processor uses the hardware prefetcher when cache issues are detected. |
| Adjacent Cache Line Prefetcher | <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"> • Disabled—The processor only fetches the required line. • Enabled—The processor fetches both the required line and its paired line. |

| Name | Description |
|------------------------------------|---|
| DCU Streamer Prefetch | <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"> • Disabled—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines. • Enabled—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed. |
| DCU IP Prefetcher | <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"> • Disabled—The processor does not preload any cache data. • Enabled—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant. |
| Direct Cache Access Support | <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"> • Disabled—Data from I/O devices is not placed directly into the processor cache. • Enabled—Data from I/O devices is placed directly into the processor cache. |
| Power Technology | <p>Enables you to configure the CPU power management settings for the following options:</p> <ul style="list-style-type: none"> • Enhanced Intel Speedstep Technology • Intel Turbo Boost Technology • Processor Power State C6 <p>Power Technology can be one of the following:</p> <ul style="list-style-type: none"> • Custom—The server uses the individual settings for the BIOS parameters mentioned above. You must select this option if you want to change any of these BIOS parameters. • Disabled—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored. • Energy Efficient—The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters. |

| Name | Description |
|--|---|
| Enhanced Intel Speedstep Technology | <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"> • Disabled—The processor never dynamically adjusts its voltage or frequency. • Enabled—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p> <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| 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"> • Disabled—The processor does not increase its frequency automatically. • Enabled—The processor utilizes Turbo Boost Technology if required. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| Processor C3 Report | <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"> • Disabled—BIOS does not send C3 report. • Enabled—BIOS sends the C3 report, allowing the OS to transition the processor to the C3 low power state. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |

| Name | Description |
|--|---|
| Processor C6 Report | <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"> • Disabled—The BIOS does not send the C6 report. • Enabled—The BIOS sends the C6 report, allowing the OS to transition the processor to the C6 low power state. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |
| Processor Power State C1 Enhanced | <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"> • Disabled—The CPU continues to run at its maximum frequency in C1 state. • Enabled—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in C1 state. |
| P-STATE Coordination | <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"> • HW_ALL—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package). • SW_ALL—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors. • SW_ANY—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain. <p>Note Power Technology must be set to Custom or the server ignores the setting for this parameter.</p> |

| Name | Description |
|---|---|
| Boot Performance Mode drop-down list | <p>Allows the user to select the BIOS performance state that is set before the operating system handoff. This can be one of the following:</p> <ul style="list-style-type: none"> • Max Performance—Processor P-state ratio is maximum • Max Efficient— Processor P-state ratio is minimum |
| Energy Performance Tuning | <p>Allows you to choose BIOS or Operating System for energy performance bias tuning. This can be one of the following:</p> <ul style="list-style-type: none"> • OS— Chooses OS for energy performance tuning. • BIOS— Chooses BIOS for energy performance tuning. |
| Energy Performance | <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"> • Balanced Energy • Balanced Performance • Energy Efficient • Performance |

| Name | Description |
|-------------------------------|---|
| Package C State Limit | <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"> • C0 state—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • C1 state—When the CPU is idle, the system slightly reduces the power consumption. This option requires less power than C0 and allows the server to return quickly to high performance mode. • C3 state—When the CPU is idle, the system reduces the power consumption further than with the C1 option. This requires less power than C1 or C0, but it takes the server slightly longer to return to high performance mode. • C6 state—When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0, C1, or C3, but there may be performance issues until the server returns to full power. • C7 state—When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves the maximum amount of power but it also requires the longest time for the server to return to high performance mode. • No Limit—The server may enter any available C state. |
| Extended APIC | <p>Allows you to enable or disable extended APIC support. This can be one of the following:</p> <ul style="list-style-type: none"> • XAPIC—Enables APIC support. • X2APIC—Enables APIC and also enables Intel VT-d and Interrupt Remapping . |
| Workload Configuration | <p>Allows you to set a parameter to optimize workload characterization. This can be one of the following:</p> <ul style="list-style-type: none"> • Balanced— Chooses balanced option for optimization. • I/O Sensitive— Chooses I/O sensitive option for optimization. <p>Note We recommend you to set the workload configuration to Balanced.</p> |

| Name | Description |
|--------------------------------------|--|
| CPU HWPM drop-down list | <p>Enables the Hardware Power Management (HWPM) interface for better CPU performance and energy efficiency. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The P-States are controlled the same way as on predecessor processor generations. • Native Mode—HWPM works with the operating system through a software interface. • OOB Mode—The CPU autonomously controls its frequency based on the operating system energy efficiency. |
| CPU Autonomous Cstate drop-down list | <p>Enables CPU Autonomous C-State, which converts the HALT instructions to the MWAIT instructions. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—CPU Autonomous C-state is disabled. This is the default value. • Enabled—CPU Autonomous C-state is enabled. |
| Processor CMCI drop-down list | <p>Allows the CPU to trigger interrupts on corrected machine check events. The corrected machine check interrupt (CMCI) allows faster reaction than the traditional polling timer. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables CMCI. • Enabled—Enables CMCI. This is the default value. |

Memory Configuration Parameters

| Name | Description |
|-------------------|--|
| Select Memory RAS | <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"> • Maximum Performance—System performance is optimized. • Mirroring—System reliability is optimized by using half the system memory as backup. • Lockstep—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. This option offers better system performance than Mirroring and better reliability than Maximum Performance but lower reliability than Mirroring and lower system performance than Maximum Performance. |

| Name | Description |
|----------------------|---|
| NUMA | <p>Whether the BIOS supports Non-Uniform Memory Access (NUMA). This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The BIOS does not support NUMA. • Enabled—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms. |
| Channel Interleaving | <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"> • Auto—The CPU determines what interleaving is done. • 1 Way—Some channel interleaving is used. • 2 Way • 3 Way • 4 Way—The maximum amount of channel interleaving is used. |
| Rank Interleaving | <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"> • Auto—The CPU determines what interleaving is done. • 1 Way—Some rank interleaving is used. • 2 Way • 4 Way • 8 Way—The maximum amount of rank interleaving is used. |
| Patrol Scrub | <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"> • Disabled—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • Enabled—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running. |

| Name | Description |
|---------------------|---|
| Demand Scrub | <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"> • Disabled— Single bit memory errors are not corrected. • Enabled— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read. |
| Altitude | <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"> • Auto—The CPU determines the physical elevation. • 300 M—The server is approximately 300 meters above sea level. • 900 M—The server is approximately 900 meters above sea level. • 1500 M—The server is approximately 1500 meters above sea level. • 3000 M—The server is approximately 3000 meters above sea level. |

QPI Configuration Parameters

| Name | Description |
|----------------------------------|---|
| QPI Link Frequency Select | <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"> • Auto—The CPU determines the QPI link frequency. • 6.4 GT/s • 7.2 GT/s • 8.0 GT/s |

| Name | Description |
|-----------------------|---|
| QPI Snoop Mode | <p>The Intel QuickPath Interconnect (QPI) snoop mode. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto—The CPU automatically recognizes this as Early Snoop mode. • Early Snoop—The distributed cache ring stops can send a snoop probe or a request to another caching agent directly. This mode has lower latency and it is best for workloads that have shared data sets across threads and can benefit from a cache-to-cache transfer, or for workloads that are not NUMA optimized. • Home Snoop—The snoop is always spawned by the home agent (centralized ring stop) for the memory controller. This mode has a higher local latency than early snoop, but it provides extra resources for a larger number of outstanding transactions. • Home Directory Snoop— The home directory is an optional enabled feature that is implemented at both the HA and iMC logic in the processor. The goal of the directory is to filter snoops to the remote sockets and a node controller in scalable platforms and 2S and 4S configurations. • Home Directory Snoop with OSB— In the Opportunistic Snoop Broadcast (OSB) directory mode, the HA could choose to do speculative home snoop broadcast under very lightly loaded conditions even before the directory information has been collected and checked. • Cluster on Die—Enables Cluster On Die. When enabled LLC is split into two parts with an independent caching agent for each. This helps increase the performance in some workloads. This mode is available only for processors that have 10 or more cores. It is the best mode for highly NUMA optimized workloads. |

USB Configuration Parameters

| Name | Description |
|---------------------------|--|
| Legacy USB Support | <p>Whether the system supports legacy USB devices. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—USB devices are only available to EFI applications. • Enabled—Legacy USB support is always available. • Auto—Disables legacy USB support if no USB devices are connected. |

| Name | Description |
|---|--|
| Port 60/64 Emulation | <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"> • Disabled—60h/64 emulation is not supported. • Enabled—60h/64 emulation is supported. <p>You should select this option if you are using a non-USB aware operating system on the server.</p> |
| xHCI Mode | <p>Whether the xHCI controller legacy support is enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the xHCI controller legacy support. • Enabled—Enables the xHCI controller legacy support. |
| xHCI Legacy Support drop-down list | <p>Whether the system supports legacy xHCI controller. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables xHCI legacy support. • Enabled—Enables xHCI legacy support. This is the default value. |
| All USB Devices | <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"> • Disabled—All USB devices are disabled. • Enabled—All USB devices are enabled. |
| USB Port: Rear | <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"> • Disabled—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port: Front | <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"> • Disabled—Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled—Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system. |

| Name | Description |
|---------------------------|---|
| USB Port: Internal | <p>Whether the internal USB devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system. • Enabled—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system. |
| USB Port: KVM | <p>Whether the vKVM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the vKVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the vKVM window. • Enabled—Enables the vKVM keyboard and/or mouse devices. |
| USB Port: vMedia | <p>Whether the virtual media devices are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Disables the vMedia devices. • Enabled—Enables the vMedia devices. |

PCI Configuration Parameters

| Name | Description |
|------------------------------------|---|
| Memory Mapped I/O Above 4GB | <p>Whether to enable or disable MMIO above 4GB or not. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space. • Enabled—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. <p>Note PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled.</p> |
| Sriov | <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"> • Disabled—SR-IOV is disabled. • Enabled—SR-IOV is enabled. |

| Name | Description |
|---|---|
| ASPM Support drop-down list | <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"> • Disabled—ASPM support is disabled in the BIOS. • Force L0s—Force all links to L0 standby (L0s) state. • Auto—The CPU determines the power state |
| NVMe SSD Hot-Plug Support drop-down list | <p>Allows you to replace an NVMe SSD without powering down the server. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—NVMe SSD hot-plug support is disabled. This is the default value. • Enabled—NVMe SSD hot-plug support is enabled. |
| VGA Priority drop-down list | <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"> • Onboard—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port. • Offboard—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port. • Onboard VGA Disabled—Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled. |

Serial Configuration Parameters

| Name | Description |
|------------------------------|---|
| Out-of-Band Mgmt Port | <p>Allows you to configure the COM port 0 that can be used for Windows Emergency Management services. ACPI SPCR table is reported based on this setup option. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—Configures the COM port 0 as a general purpose port for use with the Windows Operating System. • Enabled—Configures the COM port 0 as a remote management port for Windows Emergency Management services. |

| Name | Description |
|----------------------------|---|
| Console Redirection | <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"> • Disabled—No console redirection occurs during POST. • COM0—Enables console redirection on COM port 0 during POST. • COM1—Enables console redirection on COM port 1 during POST. |
| 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"> • PC-ANSI—The PC-ANSI terminal font is used. • VT100—A supported vt100 video terminal and its character set are used. • VT100+—A supported vt100-plus video terminal and its character set are used. • VT-UTF8—A video terminal with the UTF-8 character set is used. <p>Note This setting must match the setting on the remote terminal application.</p> |
| Bits per second | <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"> • 9600—A 9,600 BAUD rate is used. • 19200—A 19,200 BAUD rate is used. • 38400—A 38,400 BAUD rate is used. • 57600—A 57,600 BAUD rate is used. • 115200—A 115,200 BAUD rate is used. <p>Note This setting must match the setting on the remote terminal application.</p> |

| Name | Description |
|------------------------------------|---|
| Flow Control | <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"> • None—No flow control is used. • Hardware RTS/CTS—RTS/CTS is used for flow control. <p>Note This setting must match the setting on the remote terminal application.</p> |
| Putty KeyPad | <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"> • VT100—The function keys generate ESC OP through ESC O[. • LINUX—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate ESC [A through ESC [E. • XTERMR6—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate ESC OP through ESC OS, which are the sequences produced by the top row of the keypad on Digital terminals. • SCO—The function keys F1 to F12 generate ESC [M through ESC [X. The function and shift keys generate ESC [Y through ESC [j. The control and function keys generate ESC [k through ESC [v. The shift, control and function keys generate ESC [w through ESC [f. • ESCN—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as ESC [11~ and ESC [12~. • VT400—The function keys behave like the default mode. The top row of the numeric keypad generates ESC OP through ESC OS. |
| Redirection After BIOS POST | <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"> • Always Enable—BIOS Legacy console redirection is active during the OS boot and run time. • Bootloader—BIOS Legacy console redirection is disabled before giving control to the OS boot loader. |

LOM and PCIe Slots Configuration Parameters

| Name | Description |
|------------------------------------|---|
| CDN Support for VIC | <p>Whether the Ethernet Network naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled— CDN support for VIC cards is disabled. • Enabled— CDN support is enabled for VIC cards. <p>Note CDN support for VIC cards work with Windows 2012 or the latest OS only.</p> |
| PCI ROM CLP | <p>PCI ROM Command Line Protocol (CLP) controls the execution of different Option ROMs such as PxE and iSCSI that are present in the card. By default, it is disabled.</p> <ul style="list-style-type: none"> • Enabled— Enables you to configure execution of different option ROMs such as PxE and iSCSI for an individual ports separately. • Disabled—The default option. You cannot choose different option ROMs. A default option ROM is executed during PCI enumeration. |
| PCH SATA Mode | <p>This options allows you to select the PCH SATA mode. This can be one of the following:</p> <ul style="list-style-type: none"> • AHCI—Sets both SATA and sSATA controllers to AHCI mode. • Disabled—Disables both SATA and sSATA controllers. • LSI SW Raid— Sets both SATA and sSATA controllers to raid mode for LSI SW Raid |
| All Onboard LOM Ports | <p>Whether all LOM ports are enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—All LOM ports are disabled. • Enabled—All LOM ports are enabled. |
| LOM Port <i>n</i> OptionROM | <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"> • Disabled—The Option ROM for slot <i>n</i> is not available. • Enabled—The Option ROM for slot <i>n</i> is available. • UEFI Only—The Option ROM for slot <i>n</i> is available for UEFI only. • Legacy Only—The Option ROM for slot <i>n</i> is available for legacy only. |

| Name | Description |
|-------------------------------------|--|
| All PCIe Slots OptionROM | <p>Whether the server can use Option ROM present in the PCIe Cards. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The Option ROM for slot <i>n</i> is not available. • Enabled—The Option ROM for slot <i>n</i> is available. • UEFI Only—The Option ROM for slot <i>n</i> is available for UEFI only. • Legacy Only—The Option ROM for slot <i>n</i> is available for legacy only. |
| PCIe Slot:<i>n</i> OptionROM | <p>Whether the server can use the Option ROMs present in the PCIe Cards. This can be one of the following:</p> <ul style="list-style-type: none"> • Disabled—The Option ROM for slot <i>n</i> is not available. • Enabled—The Option ROM for slot <i>n</i> is available. • UEFI Only—The Option ROM for slot <i>n</i> is available for UEFI only. • Legacy Only—The Option ROM for slot <i>n</i> is available for legacy only. |
| PCIe Slot:MLOM OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the MLOM slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:HBA OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the HBA slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |

| Name | Description |
|--|---|
| PCIe Slot:N1 OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe1 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:N2 OptionROM | <p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe2 slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Enabled—Executes both legacy and UEFI Option ROM. • Disabled—Both legacy and UEFI Option ROM will not be executed. • UEFI Only—Executes only UEFI Option ROM. • Legacy Only—Executes only Legacy Option ROM. |
| PCIe Slot:HBA Link Speed PCIe SlotHBA LinkSpeed | <p>This option allows you to restrict the maximum speed of an adapter card installed in PCIe HBA slot. This can be one of the following:</p> <ul style="list-style-type: none"> • Auto— System selects the maximum speed allowed. • GEN1—2.5GT/s (gigatransfers per second) is the maximum speed allowed. • GEN2—5GT/s is the maximum speed allowed. • GEN3—8GT/s is the maximum speed allowed. • Disabled—The maximum speed is not restricted. |

BIOS Configuration Dialog Box Button Bar



Important

The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

| Name | Description |
|-------------------------|--|
| Save Changes button | Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| Reset Values button | Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened. |
| Restore Defaults button | Sets the BIOS parameters on all three tabs to their default settings. |
| Cancel button | Closes the dialog box without making any changes. |

Server Management Tab for C220M4 and C240M4 Servers

Reboot Server Option

If you want your changes applied automatically after you click **Save Changes**, check the **Reboot Host Immediately** check box. Cisco IMC immediately reboots the server and applies your changes.

If you want to apply your changes at a later time, clear the **Reboot Host Immediately** check box. Cisco IMC stores the changes and applies them the next time the server reboots.



Note If there are existing BIOS parameter changes pending, Cisco IMC automatically overwrites the stored values with the current settings when you click **Save Changes**.

Server Management BIOS Parameters

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

| Name | Description |
|----------------------------------|---|
| OS Watchdog Timer | <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"> • Disabled—The watchdog timer is not used to track how long the server takes to boot. • Enabled—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified in the OS Boot Watchdog Timer Timeout field, the Cisco IMC logs an error and takes the action specified in the OS Boot Watchdog Policy field. |
| OS Watchdog Timer Timeout | <p>If OS does not boot within the specified time, OS watchdog timer expires and system takes action according to timer policy. This can be one of the following:</p> <ul style="list-style-type: none"> • 5 Minutes—The OS watchdog timer expires 5 minutes after it begins to boot. • 10 Minutes—The OS watchdog timer expires 10 minutes after it begins to boot. • 15 Minutes—The OS watchdog timer expires 15 minutes after it begins to boot. • 20 Minutes—The OS watchdog timer expires 20 minutes after it begins to boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |
| OS Watchdog Timer Policy | <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"> • Do Nothing—The server takes no action if the watchdog timer expires during OS boot. • Power Down—The server is powered off if the watchdog timer expires during OS boot. • Reset—The server is reset if the watchdog timer expires during OS boot. <p>Note This option is only applicable if you enable the OS Boot Watchdog Timer.</p> |

BIOS Configuration Dialog Box Button Bar



Important

The buttons in this dialog box affect all BIOS parameters on all available tabs, not just the parameters on the tab that you are viewing.

| Name | Description |
|--------------------------------|--|
| Save Changes button | Saves the settings for the BIOS parameters on all three tabs and closes the dialog box. If the Reboot Host Immediately check box is checked, the server is rebooted immediately and the new BIOS settings go into effect. Otherwise the changes are saved until the server is manually rebooted. |
| Reset Values button | Restores the values for the BIOS parameters on all three tabs to the settings that were in effect when this dialog box was first opened. |
| Restore Defaults button | Sets the BIOS parameters on all three tabs to their default settings. |
| Cancel button | Closes the dialog box without making any changes. |