



## **Cisco UCS Manager Server Management Using the CLI, Release 4.3**

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## CONTENTS

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### PREFACE

<b>Preface</b>	<b>xvii</b>
Audience	xvii
Conventions	xvii
Related Cisco UCS Documentation	xix
Documentation Feedback	xix

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### CHAPTER 1

<b>New and Changed Information</b>	<b>1</b>
New and Changed Information	1

---

### CHAPTER 2

<b>Server Management Overview</b>	<b>3</b>
Server Management Overview	3
Cisco UCS Manager User CLI Documentation	5
Cisco UCS Manager User Documentation	6

---

### CHAPTER 3

<b>Server License Management</b>	<b>9</b>
Licenses	9
C-Direct Rack Licensing Support	12
Obtaining the Host ID for a Fabric Interconnect	14
Obtaining a License	14
Installing a License	15
Viewing the Licenses Installed on a Fabric Interconnect	16
Viewing License Usage for a Fabric Interconnect	17
Uninstalling a License	19

---

### CHAPTER 4

<b>Registering Cisco UCS Domains with Cisco UCS Central</b>	<b>21</b>
Registration of Cisco UCS Domains	21

Policy Resolution between Cisco UCS Manager and Cisco UCS Central	21
Registering a Cisco UCS Domain with Cisco UCS Central	23
Configuring Policy Resolution between Cisco UCS Manager and Cisco UCS Central	24
Setting Cisco UCS Central Registration Properties in Cisco UCS Manager	25
Unregistering a Cisco UCS Domain from Cisco UCS Central	27

---

**CHAPTER 5****Power Capping and Power Management in Cisco UCS 29**

Power Capping in Cisco UCS	29
Power Policy Configuration	30
Power Policy for Cisco UCS Servers	30
Configuring the Power Policy	31
Power Supply for Redundancy Method	32
Power Supply for Redundancy Method for Cisco UCSX-9508 Chassis	33
Policy Driven Power Capping	33
Policy Driven Chassis Group Power Capping	33
Power Control Policy	33
Creating a Power Control Policy	34
Power Extended Policy for UCS X9508 Chassis	35
Configuring Acoustic Mode	36
Deleting a Power Control Policy	37
Power Groups in UCS Manager	37
Creating a Power Group	39
Deleting a Power Group	40
Blade Level Power Capping	40
Manual Blade Level Power Cap	40
Setting the Blade-Level Power Cap for a Server	41
Configuring a Chassis Level Fan Policy	42
Configuring Fan Speed for Power Management	42
Fan Control Policy for Cisco UCSX-9508 Chassis	42
Creating a Fan Control Policy for Cisco UCS X9508 Chassis	43
Viewing Server Statistics	44
Global Power Profiling Policy Configuration	45
Global Power Profiling Policy	45
Configuring the Global Power Profile Policy	45

Global Power Allocation Policy	46
Global Power Allocation Policy	46
Configuring the Global Power Allocation Policy	46
Viewing the Power Cap Values for Servers	47
Power Management During Power-on Operations	47
Power Sync Policy Configuration	48
Power Sync Policy	48
Power Synchronization Behavior	48
Displaying the Global Power Sync Policy	49
Setting Global Policy Reference for a Service Profile	50
Creating a Power Sync Policy	51
Deleting a Power Sync Policy	52
Displaying All Power Sync Policies	52
Creating a Local Policy	53
Showing a Local Policy	54
Deleting a Local Policy	55
Rack Server Power Management	56
UCS Mini Power Management	56

---

**CHAPTER 6**
**Blade Server Management 57**

Blade Server Management	57
Guidelines for Removing and Decommissioning Blade Servers	58
Recommendations for Avoiding Unexpected Server Power Changes	58
Booting a Blade Server	59
Shutting Down a Blade Server	60
Power Cycling a Blade Server	61
Performing a Hard Reset on a Blade Server	61
Acknowledging a Blade Server	62
Removing a Blade Server from a Chassis	63
Decommissioning a Blade Server	63
Recommissioning a Blade Server	64
Turning On the Locator LED for a Blade Server	65
Turning Off the Locator LED for a Blade Server	65
Resetting the CMOS for a Blade Server	66

Resetting the CIMC for a Blade Server	67
Clearing TPM for a Blade Server	67
Resetting the BIOS Password for a Blade Server	68
Issuing an NMI from a Blade Server	69
Health LED Alarms	69
Smart SSD	70
Viewing SSD Health Statistics	70

**CHAPTER 7****Rack-Mount Server Management 73**

Rack-Mount Server Management	73
Rack-Enclosure Server Management	74
Guidelines for Removing and Decommissioning Rack-Mount Servers	75
Recommendations for Avoiding Unexpected Server Power Changes	75
Booting a Rack-Mount Server	76
Shutting Down a Rack-Mount Server	77
Resetting a Rack-Mount Server to Factory Default Settings	78
Performing Persistent Memory Scrub	79
Power Cycling a Rack-Mount Server	79
Performing a Hard Reset on a Rack-Mount Server	80
Acknowledging a Rack-Mount Server	81
Decommissioning a Rack-Mount Server	81
Recommissioning a Rack-Mount Server	82
Renumbering a Rack-Mount Server	83
Removing a Rack-Mount Server	84
Turning On the Locator LED for a Rack-Mount Server	85
Turning Off the Locator LED for a Rack-Mount Server	86
Resetting the CMOS for a Rack-Mount Server	86
Resetting the CIMC for a Rack-Mount Server	87
Clearing TPM for a Rack-Mount Server	87
Resetting the BIOS Password for a Rack-Mount Server	88
Showing the Status for a Rack-Mount Server	89
Issuing an NMI from a Rack-Mount Server	89
Viewing the Power Transition Log	90
Viewing Rack Enclosure Slot Statistics	90

---

**CHAPTER 8****S3X60 Server Node Hardware Management 93**

- Cisco UCS S3260 Server Node Management 93
- Booting a Server from the Service Profile 94
- Acknowledging a Server 94
- Power Cycling a Server 95
- Shutting Down a Server 95
- Performing a Hard Reset on a Server 96
- Resetting a Cisco UCS S3260 Server Node to Factory Default Settings 97
- Removing a Server from a Chassis 99
- Decommissioning a Server 100
- Recommissioning a Server 100
- Turning On the Locator LED for a Server 101
- Turning Off the Locator LED for a Server 102
- Resetting All Memory Errors 102
- Resetting IPMI to Factory Default Settings 103
- Resetting the CIMC for a Server 103
- Resetting the CMOS for a Server 104
- Resetting the BIOS Password for a Cisco UCS S3260 Server Node 105
- Resetting KVM 105
- Issuing an NMI from a Server 106
- Recovering a Corrupt BIOS 106
- Health LED Alarms 107
  - Viewing Health LED Status 107

---

**CHAPTER 9****Server Boot Configuration 109**

- Boot Policy 109
- UEFI Boot Mode 110
- UEFI Secure Boot 111
- CIMC Secure Boot 112
  - Determining the CIMC Secure Boot Status 113
- Creating a Boot Policy 114
- SAN Boot 116
  - Configuring a SAN Boot for a Boot Policy 117

iSCSI Boot	119
iSCSI Boot Process	119
iSCSI Boot Guidelines and Prerequisites	120
Initiator IQN Configuration	122
Enabling MPIO on Windows	122
Configuring iSCSI Boot	123
Creating an iSCSI Adapter Policy	124
Deleting an iSCSI Adapter Policy	126
Creating an Authentication Profile	126
Deleting an Authentication Profile	128
Adding a Block of IP Addresses to the Initiator Pool	128
Deleting a Block of IP Addresses from the Initiator Pool	130
Creating an iSCSI Boot Policy	130
Deleting iSCSI Devices from a Boot Policy	133
Setting an Initiator IQN at the Service Profile Level	133
Creating an iSCSI vNIC in a Service Profile	134
Deleting an iSCSI vNIC from a Service Profile	136
Creating an iSCSI Initiator that Boots Using a Static IP Address	136
Deleting the Static IP Address Boot Parameters from an iSCSI Initiator	138
Creating an iSCSI Initiator that Boots Using an IP Address from an IP Pool	139
Deleting the IP Pool Boot Parameter from an iSCSI Initiator	140
Creating an iSCSI Initiator that Boots Using DHCP	141
Deleting the DHCP Boot Parameter from an iSCSI Initiator	142
IQN Pools	143
Creating an IQN Pool	143
Adding Blocks to an IP Pool	145
Deleting a Block from an IP Pool	146
Deleting an IQN Pool	147
Viewing IQN Pool Usage	147
Creating an iSCSI Static Target	148
Deleting an iSCSI Static Target	151
Creating an iSCSI Auto Target	151
Deleting an iSCSI Static Target	153
Verifying iSCSI Boot	154



LAN Boot	154
Configuring a LAN Boot Policy for a Boot Policy	154
Local Devices Boot	155
Configuring a Local Disk Boot for a Boot Policy	157
Configuring a Virtual Media Boot for a Boot Policy	159
Configuring a NVMe Boot for a Boot Policy	161
Creating a CIMC vMedia Boot Policy	162
Viewing a CIMC vMedia Mount	163
Configuring the Boot Policy for a Local LUN	163
Deleting a Boot Policy	165
UEFI Boot Parameters	165
Guidelines and Limitations for UEFI Boot Parameters	165
Configuring UEFI Boot Parameters for a Local LUN	166
Configuring UEFI Boot Parameters for an iSCSI LUN	168
Configuring UEFI Boot Parameters for a SAN LUN	169
<hr/>	
<b>CHAPTER 10</b>	<b>Service Profile Configuration 171</b>
Service Profiles in UCS Manager	171
Service Profiles that Override Server Identity	172
Service Profiles that Inherit Server Identity	172
Guidelines and Recommendations for Service Profiles	173
Inband Service Profiles	174
Configuring an Inband Service Profile	174
Configuring an Inband Management Service Profile	175
Deleting the Inband Configuration from a Service Profile	176
Configuring Inband Management on the CIMC	177
Deleting the Inband Configuration from the CIMC	180
Service Profile Templates	181
Creating a Service Profile Template	181
Creating a Service Profile Instance from a Service Profile Template	184
Service Profile Tasks	185
Renaming a Service Profile	185
Creating a Hardware-Based Service Profile	186
Creating vNIC Pairs on a Service Profile	189

Configuring a vNIC for a Service Profile	191
Configuring a vHBA for a Service Profile	194
Configuring a Local Disk for a Service Profile	195
Configuring Serial over LAN for a Service Profile	197
Service Profile Association	197
Associating a Service Profile with a Blade Server or Server Pool	197
Associating a Service Profile with a Rack Server	198
Disassociating a Service Profile from a Server or Server Pool	199
Clearing the Server Personality Field	200
Service Profile Boot Definition	200
Configuring a Boot Definition for a Service Profile	200
Configuring a LAN Boot for a Service Profile Boot Definition	202
Configuring a Storage Boot for a Service Profile Boot Definition	203
Configuring a Virtual Media Boot for a Service Profile Boot Definition	204
Deleting a Boot Definition for a Service Profile	205
Fibre Channel Zoning for a Service Profile	206
Configuring a vHBA Initiator Group with an Existing Storage Connection Policy	206
Configuring a vHBA Initiator Group with a local Storage Connection Policy Definition	207
Service Profile Template Management	208
Setting the Asset Tag Value	208
Viewing the Server Asset Tag	209
Resetting the UUID Assigned to a Service Profile from a Pool in a Service Profile Template	210
Resetting the MAC Address Assigned to a vNIC from a Pool in a Service Profile Template	210
Resetting the WWPN Assigned to a vHBA from a Pool in a Service Profile Template	211

---

**CHAPTER 11**
**Server-Related Policy Configuration 213**

BIOS Settings	213
Server BIOS Settings	213
Main BIOS Settings	214
Processor BIOS Settings	216
I/O BIOS Settings for Intel	247
I/O BIOS Settings for AMD	249
RAS Memory BIOS Settings	250
Intel® Optane™ DC Persistent Memory (DCPMM) BIOS Tokens	260

Serial Port BIOS Settings	263
USB BIOS Settings	263
PCI Configuration BIOS Settings	268
QPI BIOS Settings	270
Trusted Platform BIOS Settings	270
LOM and PCIe Slots BIOS Settings	272
Graphics Configuration BIOS Settings	290
Boot Options BIOS Settings	291
Server Management BIOS Settings	295
BIOS Policy	302
Default BIOS Settings	302
Creating a BIOS Policy	303
Modifying BIOS Defaults	304
Configuring BIOS Settings for M5 Servers	306
Viewing the Actual BIOS Settings for M4 Servers	307
Viewing the Actual BIOS Settings for M5 and Higher Servers	307
Displaying Details of BIOS Tokens in a BIOS Policy	308
Trusted Platform Module	311
Trusted Platform Module	311
Intel Trusted Execution Technology	312
Enabling or Disabling TPM	312
Viewing TPM Properties	313
Enabling or Disabling TXT	314
Consistent Device Naming	315
Guidelines and Limitations for Consistent Device Naming (CDN)	315
Enabling Consistent Device Naming in a BIOS Policy	317
Associating a BIOS Policy with a Service Profile	317
Configuring Consistent Device Naming for a vNIC	318
Displaying the CDN Name of a vNIC	319
Displaying the Status of a vNIC	319
CIMC Security Policies	320
IPMI Access Profile	320
Creating an IPMI Access Profile	321
Deleting an IPMI Access Profile	322

Adding an Endpoint User to an IPMI Access Profile	323
Deleting an Endpoint User from an IPMI Access Profile	324
KVM Management Policy	324
Configuring a KVM Management Policy	325
Modifying a KVM Management Policy	326
Displaying KVM Management Policy Properties	327
SPDM Security	327
Creating and Configuring a SPDM Security Certificate Policy using CLI	328
Displaying the Security Policy Fault Alert Level	329
Loading an Outside SPDM Security Certificate Policy	330
Viewing the Certificate Inventory	330
Deleting a SPDM Policy	332
Graphics Card Policies	332
Creating a Graphics Card Policy	333
Setting Mode of the Graphics Card Policy	333
Displaying Details of the Graphics Card	334
Displaying Details of the Graphics Card Policy	334
Configuring Local Disk Configuration Policies	335
Local Disk Configuration Policy	335
Guidelines for all Local Disk Configuration Policies	336
Guidelines for Local Disk Configuration Policies Configured for RAID	336
Creating a Local Disk Configuration Policy	337
Viewing a Local Disk Configuration Policy	339
Deleting a Local Disk Configuration Policy	340
FlexFlash Secure Digital Card Support	340
FlexFlash FX3S Support	342
Starting up Blade Servers with FlexFlash SD Cards	343
Enabling Auto-Sync	346
Formatting the FlexFlash Cards	347
Resetting the FlexFlash Controller	347
Viewing the FlexFlash Controller Status	348
Persistent Memory Modules	350
Scrub Policies	350
Scrub Policy Settings	350

Creating a Scrub Policy	352
Deleting a Scrub Policy	354
Configuring DIMM Error Management	355
DIMM Correctable Error Handling	355
Resetting Memory Errors	355
DIMM Blacklisting	355
Enabling DIMM Blacklisting	356
Serial over LAN Policy	357
Serial over LAN Policy Overview	357
Configuring a Serial over LAN Policy	357
Viewing a Serial over LAN Policy	358
Deleting a Serial over LAN Policy	359
Server Autoconfiguration Policy	359
Server Autoconfiguration Policy Overview	359
Configuring a Server Autoconfiguration Policy	360
Deleting a Server Autoconfiguration Policy	361
Server Discovery Policy	361
Server Discovery Policy Overview	361
Configuring a Server Discovery Policy	362
Deleting a Server Discovery Policy	363
Hardware Change Discovery Policy	364
Configuring a Hardware Change Discovery Policy	364
Viewing a Hardware Change Discovery Policy	365
Server Inheritance Policies	365
Server Inheritance Policy Overview	365
Configuring a Server Inheritance Policy	366
Deleting a Server Inheritance Policy	367
Server Pool Policy	367
Server Pool Policy Overview	367
Configuring a Server Pool Policy	368
Deleting a Server Pool Policy	369
Server Pool Policy Qualification	369
Server Pool Policy Qualification Overview	369
Creating a Server Pool Policy Qualification	370

Deleting a Server Pool Policy Qualification	371
Creating an Adapter Qualification	371
Deleting an Adapter Qualification	373
Configuring a Chassis Qualification	373
Deleting a Chassis Qualification	374
Creating a CPU Qualification	375
Deleting a CPU Qualification	376
Creating a Power Group Qualification	377
Deleting a Power Group Qualification	377
Creating a Memory Qualification	378
Deleting a Memory Qualification	379
Creating a Physical Qualification	379
Deleting a Physical Qualification	380
Creating a Storage Qualification	381
Deleting a Storage Qualification	382
Configuring vNIC/vHBA Placement Policies	383
vNIC/vHBA Placement Policies	383
vCon to Adapter Placement	384
For N20-B6620-2 and N20-B6625-2 Blade Servers	384
vCon to Adapter Placement for All Other Supported Servers	385
vNIC/vHBA to vCon Assignment	385
Configuring a vNIC/vHBA Placement Policy	387
Deleting a vNIC/vHBA Placement Policy	390
Explicitly Assigning a vNIC to a vCon	390
Explicitly Assigning a vHBA to a vCon	392
Placing Static vNICs Before Dynamic vNICs	393
vNIC/vHBA Host Port Placement	394
Configuring Host Port Placement	395
CIMC Mounted vMedia	396
Creating a CIMC vMedia Policy	397

---

**CHAPTER 12**
**Firmware Upgrades 401**

Firmware Upgrades	401
-------------------	-----

---

**CHAPTER 13****Diagnostics Configuration 403**

Overview of Cisco UCS Manager Diagnostics 403

Creating a Diagnostics Policy 403

Configuring a Memory Test for a Diagnostics Policy 404

Deleting a Diagnostic Policy 406

Running a Diagnostics Test on a Server 407

Stopping a Diagnostics Test 407

Diagnostics Troubleshooting 408







## Preface

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

## Audience

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

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

## Conventions

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

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




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

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**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.

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

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

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**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](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](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](#).

## Documentation Feedback

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





# CHAPTER 1

## New and Changed Information

- [New and Changed Information](#), on page 1

### New and Changed Information

This section provides information on new features and changed behaviors in Cisco UCS Manager, Release 4.3.

**Table 1: New Features and Changed Behavior in Cisco UCS Manager, Release 4.3(2c)**

Feature	Description	Where Documented
Support Cisco UCS X-Series M7 servers	Cisco UCS Manager now supports Cisco UCS X410c M7 Compute Node.  Cisco UCS X-Series servers support Intelligent Fabric Modules (IFM), which function similarly to the Input/Output Module (IOM) in Cisco UCS B-Series servers.	—
Support Cisco UCS VIC	Cisco UCS Manager now supports following VIC cards: <ul style="list-style-type: none"><li>• Cisco UCS VIC 15230</li><li>• Cisco UCS VIC 15427</li><li>• Cisco UCS VIC 15237 MLOM</li></ul>	—

**Table 2: New Features and Changed Behavior in Cisco UCS Manager, Release 4.3(2c)**

Feature	Description	Where Documented
Support Cisco UCS C-Series M7 servers	Cisco UCS Manager now supports Cisco UCS C220 M7 Server and Cisco UCS C240 M7 Server.	—

Feature	Description	Where Documented
Support Cisco UCS X-Series M6 and M7 servers	<p>Cisco UCS Manager now supports Cisco UCS X210c M6 Compute Node and Cisco UCS X210c M7 Compute Node.</p> <p>Cisco UCS X-Series servers support Intelligent Fabric Modules (IFM), which function similarly to the Input/Output Module (IOM) in Cisco UCS B-Series servers.</p>	—
Support for Power Capping and Power Management for Cisco UCSX-9508 Chassis	Cisco UCS Manager now supports Power Capping and Power Management for Cisco UCSX-9508 Chassis.	<a href="#">Power Capping in Cisco UCS, on page 29</a>
Deprecated support for Cisco Cisco UCS M4 servers.	Cisco UCS Manager support for Cisco UCS M4 servers are deprecated.	—
Deprecated support for Cisco UCS 6200 series Fabric Interconnect.	Cisco UCS Manager support for Cisco UCS 6200 Series Fabric Interconnect is deprecated.	—



## CHAPTER 2

# Server Management Overview

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- [Server Management Overview, on page 3](#)
- [Cisco UCS Manager User CLI Documentation, on page 5](#)
- [Cisco UCS Manager User Documentation, on page 6](#)

## Server Management Overview

Cisco UCS Manager enables you to manage general and complex server deployments. For example, you can manage a general deployment with a pair of Fabric Interconnects (FIs), which is the redundant server access layer that you get with the first chassis that can scale up to 20 chassis' and up to 160 physical servers. This can be a combination of blades and rack mount servers to support the workload in your environment. As you add more servers, you can continue to perform server provisioning, device discovery, inventory, configuration, diagnostics, monitoring, fault detection, and auditing.

Beginning with release 4.3(2c), Cisco UCS Manager introduces support for the following Cisco UCS hardware:

- Cisco UCS VIC 15230
- Cisco UCS VIC 15427
- Cisco UCS VIC 15237 MLOM

Beginning with release 4.3(2b), Cisco UCS Manager introduces support for the following Cisco UCS hardware:

- Cisco UCS X410c M7 Compute Node
- Cisco UCS X210c M7 Compute Node
- Cisco UCS X210c M6 Compute Node
- Cisco UCS C240 M7 Server
- Cisco UCS C220 M7 Server
- Cisco UCS VIC 15235 (PCIe) (Secure Boot)
- Cisco UCS VIC 14425 (PCIe) (Secure Boot)
- Cisco UCS VIC 15231 (mLOM) (Non-Secure Boot)



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**Note** Cisco UCS VIC 15231 is not supported with Cisco UCS VIC 15422 mezzanine adapter.

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- Cisco UCS VIC 15420 (mLOM) (Secure Boot)
- Cisco UCS VIC 15422 (mezz) (Secure Boot)



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**Note** Cisco UCS VIC 15422 is a mezzanine adapter that requires UCS VIC 15000 bridge connector (UCSX-V5-BRIDGE) and VIC 15420 MLOM on X210c M6 and X210c M7 compute node.

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- Cisco UCS VIC 14425 (mLOM)
- Cisco UCS VIC 14825 (mezz)



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**Note** Cisco UCS VIC 14825 is a mezzanine adapter that requires UCS 14000 bridge connector (UCSX-V4-BRIDGE) and VIC 14425 MLOM on X210c M6 compute node.

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**Important**

- Before inserting Cisco UCS VIC 15235 and VIC 15425 adapters into a server, upgrade the server with UCS 4.3(2a) or later release C-bundle software. If these adapters are inserted into the server which is running lower than 4.3(2a) release, upgrade the server to UCS 4.3(2a) or later release C-bundle software and then power cycle the server to recognize the adapters.
  - Cisco UCS VIC 15000 series and Cisco UCS VIC 14000 series adapters or Cisco UCS 15000 series and Cisco UCS VIC 1400 series adapters cannot be installed together on Cisco UCS B-Series servers.
  - Cisco UCS VIC 1400 series adapters are not supported on Cisco UCS M7 servers.
- 

Beginning with release 4.2(3b), Cisco UCS Manager introduces support for the following Cisco UCS hardware:

- Cisco UCS VIC 15411 (mLOM) (Non-Secure Boot)
- Cisco UCS VIC 15238 (mLOM) (Non-Secure Boot)
- Cisco UCS 6536 Fabric Interconnect

Beginning with release 4.2(2a), Cisco UCS Manager introduces support for the following Cisco UCS hardware:

- Cisco UCS VIC 15428 (mLOM) (Non-Secure Boot)

Beginning with release 4.2(1), Cisco UCS Manager introduces support for the following Cisco UCS hardware:

- Cisco UCS C220 M6 Server
- Cisco UCS C240 M6 Server



- Cisco UCS C225 M6 Server
- Cisco UCS C245 M6 Server
- Cisco UCS B200 M6 Server
- Cisco UCS VIC 1467 (mLOM)
- Cisco UCS VIC 1477 (mLOM)

The Cisco UCS 6536 Fabric Interconnect, Cisco UCS 6400 Series Fabric Interconnect, and Cisco UCS 6332 Fabric Interconnects include centralized management. You can manage the UCS Blade Servers and Rack-Mount Servers that are in the same domain from one console. You can also manage the UCS Mini from the Cisco UCS Manager.

To ensure the optimum server performance, you can configure the amount of power that you allocate to servers. You can also set the server boot policy, the location from which the server boots, and the order in which the boot devices are invoked. You can create service profiles and assign the service profiles to servers. In service profile, you can configure vNICs and vHBAs, enables BIOS settings, apply firmware policy, and other settings. When the service profile is associated to a server, the configured configurations, policies, and settings are pushed to the server.

## Cisco UCS Manager User CLI Documentation

Cisco UCS Manager offers you a set of smaller, use-case based documentation described in the following table:

Guide	Description
<a href="#">Cisco UCS Manager Getting Started Guide</a>	Discusses Cisco UCS architecture and Day 0 operations, including Cisco UCS Manager initial configuration, and configuration best practices.
<a href="#">Cisco UCS Manager Administration Guide</a>	Discusses password management, role-based access configuration, remote authentication, communication services, CIMC session management, organizations, backup and restore, scheduling options, BIOS tokens and deferred deployments.
<a href="#">Cisco UCS Manager Infrastructure Management Guide</a>	Discusses physical and virtual infrastructure components used and managed by Cisco UCS Manager.
<a href="#">Cisco UCS Manager Firmware Management Guide</a>	Discusses downloading and managing firmware, upgrading through Auto Install, upgrading through service profiles, directly upgrading at endpoints using firmware auto sync, managing the capability catalog, deployment scenarios, and troubleshooting.
<a href="#">Cisco UCS Manager Server Management Guide</a>	Discusses the new licenses, registering Cisco UCS domains with Cisco UCS Central, power capping, server boot, server profiles and server-related policies.

Guide	Description
<a href="#">Cisco UCS Manager Storage Management Guide</a>	Discusses all aspects of storage management such as SAN and VSAN in Cisco UCS Manager.
<a href="#">Cisco UCS Manager Network Management Guide</a>	Discusses all aspects of network management such as LAN and VLAN connectivity in Cisco UCS Manager.
<a href="#">Cisco UCS Manager System Monitoring Guide</a>	Discusses all aspects of system and health monitoring including system statistics in Cisco UCS Manager.
<a href="#">Cisco UCS S3260 Server Integration with Cisco UCS Manager</a>	Discusses all aspects of management of UCS S-Series servers that are managed through Cisco UCS Manager.

## Cisco UCS Manager User Documentation

Cisco UCS Manager offers you a new set of smaller, use-case based documentation described in the following table:

Guide	Description
<a href="#">Cisco UCS Manager Getting Started Guide</a>	Discusses Cisco UCS architecture and Day 0 operations, including Cisco UCS Manager initial configuration, and configuration best practices.
<a href="#">Cisco UCS Manager Administration Guide</a>	Discusses password management, role-based access configuration, remote authentication, communication services, CIMC session management, organizations, backup and restore, scheduling options, BIOS tokens and deferred deployments.
<a href="#">Cisco UCS Manager Infrastructure Management Guide</a>	Discusses physical and virtual infrastructure components used and managed by Cisco UCS Manager.
<a href="#">Cisco UCS Manager Firmware Management Guide</a>	Discusses downloading and managing firmware, upgrading through Auto Install, upgrading through service profiles, directly upgrading at endpoints using firmware auto sync, managing the capability catalog, deployment scenarios, and troubleshooting.
<a href="#">Cisco UCS Manager Server Management Guide</a>	Discusses the new licenses, registering Cisco UCS domains with Cisco UCS Central, power capping, server boot, server profiles and server-related policies.
<a href="#">Cisco UCS Manager Storage Management Guide</a>	Discusses all aspects of storage management such as SAN and VSAN in Cisco UCS Manager.

Guide	Description
<a href="#">Cisco UCS Manager Network Management Guide</a>	Discusses all aspects of network management such as LAN and VLAN connectivity in Cisco UCS Manager.
<a href="#">Cisco UCS Manager System Monitoring Guide</a>	Discusses all aspects of system and health monitoring including system statistics in Cisco UCS Manager.
<a href="#">Cisco UCS S3260 Server Integration with Cisco UCS Manager</a>	Discusses all aspects of management of UCS S-Series servers that are managed through Cisco UCS Manager.





## CHAPTER 3

# Server License Management

- [Licenses, on page 9](#)
- [C-Direct Rack Licensing Support, on page 12](#)
- [Obtaining the Host ID for a Fabric Interconnect, on page 14](#)
- [Obtaining a License, on page 14](#)
- [Installing a License, on page 15](#)
- [Viewing the Licenses Installed on a Fabric Interconnect, on page 16](#)
- [Viewing License Usage for a Fabric Interconnect, on page 17](#)
- [Uninstalling a License, on page 19](#)

## Licenses

Each Cisco UCS Fabric Interconnect comes with several port licenses that are factory installed and shipped with the hardware. You can purchase Fabric Interconnects fully licensed or partially licensed. You can also purchase additional licenses after delivery.

Beginning with release 4.2(3b), for Cisco UCS 6536 Fabric Interconnect (UCS-FI-6536), all ports are enabled using a term-based subscription license (Supported license term: 36-60 months).



**Note** Licensing for UCS-FI-6536 is not a port-based license like in previous FI generations.

Cisco UCS 64108 Fabric Interconnect uses the following licenses:

**Table 3: Cisco UCS 64108 Fabric Interconnect Licenses**

Ports	Licenses
Ports 1-96	ETH_PORT_ACTIVATION_PKG and ETH_PORT_C_ACTIVATION_PKG - Licenses used for 10/25 GB Ethernet ports
Ports 97-108	100G_ETH_PORT_ACTIVATION_PKG – Licenses used for 40/100 GB Ethernet ports

Cisco UCS 6454 Fabric Interconnect uses the following licenses:

**Table 4: Cisco UCS 6454 Fabric Interconnect Licenses**

Ports	Licenses
Ports 1-48	ETH_PORT_ACTIVATION_PKG and ETH_PORT_C_ACTIVATION_PKG - Licenses used for 10/25 GB Ethernet ports
Ports 49-54	100G_ETH_PORT_ACTIVATION_PKG – Licenses used for 40/100 GB Ethernet ports

The following four licenses are for the 6300 Series FI and are only valid on the 6332 and 6332-16UP FIs.

- 40G\_ETH\_PORT\_ACTIVATION\_PKG – Licenses used for 40 GB Ethernet ports
- 40G\_ETH\_C\_PORT\_ACTIVATION\_PKG – Licenses used for 40 GB Ethernet ports directly connected to rack servers (C-Direct)
- 10G\_C\_PORT\_ACTIVATION\_PKG – Licenses used for the first 16 10 GB unified ports on the 6332-16UP that are directly connected to rack servers (C-Direct)
- 10G\_PORT\_ACTIVATION\_PKG – Licenses used for the first 16 10 GB unified ports on the 6332-16UP



**Note** The 10G\_PORT\_ACTIVATION\_PKG and 10G\_C\_PORT\_ACTIVATION\_PKG licenses are only valid for the 6332-16UP FIs, and can only be installed on them.

The following licenses are used when S3260 system is connected to FI as appliance (appliance port) or Cisco UCS Manager managed node (server port):

**Table 5: S3260 system License Requirement**

FI Model	License
6454 and 64108	40G_ETH_PORT_ACTIVATION_PKG
6332-16UP	10G_PORT_ACTIVATION_PKG
6332	40G_ETH_PORT_ACTIVATION_PKG

Cisco UCS C125 M5 Servers support Cisco UCS 6500 Series Fabric Interconnect, Cisco UCS 6400 Series Fabric Interconnect and 6300 Series Fabric Interconnect.

At a minimum, each Fabric Interconnect ships with the following counted licenses pre-installed:

Fabric Interconnect	Default Base Licenses
Cisco UCS 6536	All ports are enabled using a term-based subscription license.
Cisco UCS 64108	For 36 10/25 GB ports (ports 1-96) For 4 40/100 GB ports (ports 97-108).

Fabric Interconnect	Default Base Licenses
Cisco UCS 6454	For 18 10/25 GB ports (ports 1-48) For 2 40/100 GB ports (ports 49-54).
Cisco UCS 6332	For eight 40 GB ports.
Cisco UCS 6332 16UP	For four 40 GB ports and eight 10 GB ports. <b>Note</b> The first 16 ports are 10 GB. The remaining are 40 GB.
Cisco UCS 6324	For 4 non-breakout ports only. The fifth port, which does not include a license, is further broken in to four 10 GB ports.

### Port License Consumption

Port licenses are not bound to physical ports. When you disable a licensed port, that license is retained for use with the next enabled port. To use additional fixed ports, you must purchase and install licenses for those ports. All ports, regardless of their type (fibre, ethernet) consume licenses if they are enabled.

For breakout capable ports available in the 6332 and the 6332-16UP platforms, 40 GB licenses remain applied to the main port even if that port is a breakout port, and that port continues to consume only one 40 GB license.



**Note** The initial configuration of a port will enable it, and consume a license.



**Important** Licenses are not portable across product generations.

Each Cisco UCS 6324 Fabric Interconnect comes with a factory installed port license that is shipped with the hardware. The C-direct port license is factory installed with a grace period, measured from first use of the port, and can be used for Cisco UCS rack servers. If multiple ports are acting within grace periods, the license is moved to the port whose grace period is closest to expiring.

### Grace Period

If you attempt to use a port that does not have an installed license, Cisco UCS initiates a 120 day grace period. The grace period is measured from the first use of the port without a license and is paused when a valid license file is installed. The amount of time used in the grace period is retained by the system.



**Note** Each physical port has its own grace period. Initiating the grace period on a single port does not initiate the grace period for all ports.

If a licensed port is unconfigured, that license is transferred to a port functioning within a grace period. If multiple ports are acting within grace periods, the license is moved to the port whose grace period is closest to expiring.

### High Availability Configurations

To avoid inconsistencies during failover, we recommend that both Fabric Interconnects in the cluster have the same number of ports licensed. If symmetry is not maintained and failover occurs, Cisco UCS enables the missing licenses and initiates the grace period for each port being used on the failover node.

## C-Direct Rack Licensing Support

### Release 4.2(3b)

Beginning with release 4.2(3b), Cisco introduces Cisco UCS 6536 Fabric Interconnect. In Cisco UCS 6536 Fabric Interconnect all ports are enabled using a term-based subscription license (Supported license term: 36-60 months).




---

**Note** Licensing for FI 6536 is not a port-based license like in previous FI generations.

---

**License Management** Tab in the Cisco UCS Manager GUI is deprecated for Cisco UCS 6536 Fabric Interconnect. **scope license** command is also deprecated. You can view the license status through your Cisco account.

### Release 4.1(1a) and Higher

Beginning with release 4.1(1a), Cisco UCS 64108 Fabric Interconnects use the `ETH_C_PORT_ACTIVATION_PKG` feature pack for C-Direct port licenses for ports 1-96. There are no default `ETH_C_PORT_ACTIVATION_PKG` licenses shipped with the Fabric Interconnect. You may purchase them as required.

C-direct support is only applicable on ports that are connected to the rack servers. The `ETH_C_PORT_ACTIVATION_PKG` is added to the existing license package with all the same properties as the existing licensing feature. The Subordinate Quantity property is added to the `ETH_PORT_ACTIVATION_PKG` to track ports connected to rack servers.

The License Tab in the Cisco UCS Manager GUI displays the new license and the **Subordinate Quantity** for the license. You can also use the **show feature** and **show usage** commands under **scope license** to view the license feature, the vendor version type, and the grace period for each license.

### Release 4.0(1a) and Higher

Beginning with release 4.0(1a), Cisco UCS 6454 Fabric Interconnects use the `ETH_C_PORT_ACTIVATION_PKG` feature pack for C-Direct port licenses for ports 1-48. There are no default `ETH_C_PORT_ACTIVATION_PKG` licenses shipped with the Fabric Interconnect. You may purchase them as required.

C-direct support is only applicable on ports that are connected to the rack servers. The `ETH_C_PORT_ACTIVATION_PKG` is added to the existing license package with all the same properties as the existing licensing feature. The Subordinate Quantity property is added to the `ETH_PORT_ACTIVATION_PKG` to track ports connected to rack servers.

The License Tab in the Cisco UCS Manager GUI displays the new license and the **Subordinate Quantity** for the license. You can also use the **show feature** and **show usage** commands under **scope license** to view the license feature, the vendor version type, and the grace period for each license.



### Release 3.2(3o) and Earlier

Each Cisco UCS Fabric Interconnect is shipped with a default number of port licenses that are factory licensed and shipped with the hardware. C-direct support is only applicable on ports that are connected to the rack servers. The 10G\_C\_PORT\_ACTIVATION\_PKG and the 40G\_ETH\_C\_PORT\_ACTIVATION\_PKG are added to the existing license package with all the same properties as the existing licensing feature. The **Subordinate Quantity** property is added to the 10G\_PORT\_ACTIVATION\_PKG and 40G\_ETH\_PORT\_ACTIVATION\_PKG to track ports connected to rack servers.

The License Tab in the Cisco UCS Manager GUI displays the new license and the **Subordinate Quantity** for the license. You can also use the **show feature** and **show usage** commands under **scope license** to view the license feature, the vendor version type, and the grace period for each license.

Ports connected to rack servers can use existing 10G\_PORT\_ACTIVATION\_PKG, 40G\_ETH\_PORT\_ACTIVATION\_PKG if the license is available or if the license is not in use. Otherwise, you must purchase a 10G\_C\_PORT\_ACTIVATION\_PKG, the 40G\_ETH\_C\_PORT\_ACTIVATION\_PKG to avoid the license grace period.

There is no change in the 10 GB ports. The 10G\_PORT\_ACTIVATION\_PKG and 10G\_C\_PORT\_ACTIVATION\_PKG license packages include all of the same properties as the existing the ETH\_PORT\_ACTIVATION\_PKG and the ETH\_PORT\_C\_ACTIVATION\_PKG license features.

### Configuration and Restrictions

- The C-Direct rack licensing feature accounts for the rack server ports that are directly connected to the FI, but not to a CIMC port. The default quantity for the 10G\_C\_PORT\_ACTIVATION\_PKG and the 40G\_ETH\_C\_PORT\_ACTIVATION\_PKG is always 0.
- When a 40 GB port, or a breakout port under a 40 GB breakout port is enabled without any connections, this port is allotted a license under the 40G\_ETH\_PORT\_ACTIVATION\_PKG, if available. If this port is connected to a Direct-Connect rack server after a time lag, it triggers a complete re-allocation of licenses, then this port passes through one of the following license allocation scenarios occurs:

When you enable a breakout port under a 40 GB breakout port, if that port is connected to a Direct-Connect rack server, and the 40G\_C\_PORT\_ACTIVATION\_PKG license files are installed on the FI, the following license allocation occurs:

- If no other ports under the breakout port are enabled, the parent 40 GB port is allotted a license under the 40G\_C\_PORT\_ACTIVATION\_PKG, and the used quantity is incremented for this instance.
  - If other ports are enabled, and if at least one port is not connected to a Direct Connect rack server, even if the port is not being used, the parent 40 GB port is allotted a license under the 40G\_ETH\_PORT\_ACTIVATION\_PKG, and the used quantity is incremented for this instance.
- When you enable a breakout port under a 40 GB breakout port and that port is connected to a Direct-Connect rack server, and the 40G\_C\_PORT\_ACTIVATION\_PKG license files are not installed on the FI, the following license allocation occurs:
    - If no ports under the breakout port are enabled, the parent 40 GB port is allotted a license under the 40G\_ETH\_PORT\_ACTIVATION\_PKG. The subordinate quantity is increased if the licenses are available in the 40G\_ETH\_PORT\_ACTIVATION\_PKG. If the licenses are not available, the used quantity under this feature is increased and the entire port goes in to the grace period.

- If other ports are enabled and at least one port is not connected to a Direct Connect rack server, even if the port is not being used, the parent 40 GB port is allotted a license under the 40G\_ETH\_PORT\_ACTIVATION\_PKG, and the used quantity is incremented for this instance.

## Obtaining the Host ID for a Fabric Interconnect

The host ID is also known as the serial number.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>show server-host-id</b>	Obtains the host ID or serial number for the fabric interconnect.  <b>Tip</b> Use the entire host ID that displays after the equal (=) sign.

### Example

The following example obtains the host ID for a fabric interconnect:

```
UCS-A# scope license
UCS-A /license # show server-host-id
Server host id:
  Scope Host Id
  -----
  A      VDH=SSI12121212
  B      VDH=SSI13131313
UCS-A /license #
```

### What to do next

Obtain the required licenses from Cisco.

## Obtaining a License



**Note** This process may change after the release of this document. If one or more of these steps no longer applies, contact your Cisco representative for information on how to obtain a license file.

### Before you begin

Obtain the following:

- Host ID or serial number for the fabric interconnect
- Claim certificate or other proof of purchase document for the fabric interconnect or expansion module

### Procedure

- Step 1** Obtain the product authorization key (PAK) from the claim certificate or other proof of purchase document.
- Step 2** Locate the website URL in the claim certificate or proof of purchase document.
- Step 3** Access the website URL for the fabric interconnect and enter the serial number and the PAK.

Cisco sends you the license file by email. The license file is digitally signed to authorize use on only the requested fabric interconnect. The requested features are also enabled once Cisco UCS Manager accesses the license file.

### What to do next

Install the license on the fabric interconnect.

## Installing a License



**Note** In a cluster setup, Cisco recommends that you download and install licenses to both fabric interconnects in matching pairs. An individual license is only downloaded to the fabric interconnect that is used to initiate the download.

### Before you begin

Obtain the required licenses from Cisco.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>download license</b> <i>from-filesystem</i>	Downloads the license from its source location. For the <i>from-filesystem:</i> argument, use one of the following syntaxes: <ul style="list-style-type: none"> <li>• <b>ftp:// server-ip-addr</b></li> <li>• <b>scp:// username@server-ip-addr</b></li> <li>• <b>sftp:// username@server-ip-addr</b></li> <li>• <b>tftp:// server-ip-addr : port-num</b></li> </ul>

	Command or Action	Purpose
		You cannot have spaces anywhere in the path name or the file name. For example, <code>c:\Path\Folder_Name\License.lic</code> is a valid path, but <code>c:\Path\Folder Name\License.lic</code> is invalid due to the space in "Folder Name".
<b>Step 3</b>	UCS-A /license # <b>install file</b> <i>license_filename</i>	Installs the license.  <b>Note</b> There is no downtime required or impact to traffic when installing a new port license.

**Example**

The following example uses FTP to download and install a license:

```
UCS-A # scope license
UCS-A /license # download license ftp://192.168.10.10/license/port9.lic
UCS-A /license # install file port9.lic
UCS-A /license #
```

## Viewing the Licenses Installed on a Fabric Interconnect

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>show file</b> [ <i>license_filename</i>   <b>detail</b> ]	Displays the licenses installed on the fabric interconnect with the level of detail specified in the command.

**Example**

The following example displays the full details for the licenses installed on a fabric interconnect:

```
UCS-A# scope license
UCS-A /license # show file detail

License file: UCSFEAT20100928112305377.lic
  Id: 1212121212121212
  Version: 1.0
  Scope: A
  State: Installed
  Features
  Feature Name: ETH_PORT_ACTIVATION_PKG
  Vendor: cisco
```

```

Version: 1.0
Quantity: 24
Lines
  Line Id: 1
  Type: Increment
  Expiry Date: Never
  Pak:
  Quantity: 24
  Signature: B10101010101

```

```

License file: UCSFEAT20100928112332175.lic
Id: 1313131313131313
Version: 1.0
Scope: B
State: Installed
Features
Feature Name: ETH_PORT_ACTIVATION_PKG
Vendor: cisco
Version: 1.0
Quantity: 24
Lines
  Line Id: 1
  Type: Increment
  Expiry Date: Never
  Pak:
  Quantity: 24
  Signature: F302020202020

```

```
UCS-A /license #
```

## Viewing License Usage for a Fabric Interconnect

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>show usage</b>	<p>Displays the license usage table for all license files installed on the fabric interconnect.</p> <p>This following are included:</p> <ul style="list-style-type: none"> <li>• <b>Feat Name</b> The name of the feature to which the license applies.</li> <li>• <b>Scope</b> The fabric associated with the license.</li> <li>• <b>Default</b> The default number of licenses provided for this Cisco UCS domain.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>Total Quant</b> The total number of licenses available. This value is the sum of the number of default licenses plus the number of purchased licenses.</li> <li>• <b>Used Quant</b> The number of licenses currently being used by the system. If this value exceeds the total number of licenses available, then some ports will stop functioning after their associated grace period expires.</li> <li>• <b>Subordinate Quant</b> C-Series Rack Servers that are currently being used by the system.</li> <li>• <b>State</b> The operational state of the license.</li> <li>• <b>Peer Count Comparison</b> The number of licenses on the peer fabric interconnect compared to this fabric interconnect. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>exceeds</b>—the peer fabric interconnect has more licenses installed than this fabric interconnect</li> <li>• <b>lacks</b>—the peer fabric interconnect has fewer licenses installed than this fabric interconnect</li> <li>• <b>matching</b>—the same number of licenses are installed on both fabric interconnects</li> </ul> </li> <li>• <b>Grace Used</b> The amount of time (in seconds) used in the grace period. After the grace period ends, Cisco UCS sends alert messages until a new license is purchased.</li> </ul>

### Example

The following examples display full details of the licenses installed on a fabric interconnect:

```

UCS-A# scope license
UCS-A /license # show usage
Feat Name                               Scope Default Total Quant Used Quant Subordinate Quant
State                                   Peer Count Comparison Grace Used
-----
ETH_PORT_ACTIVATION_PKG                 A      20      48      12
License Ok                               Matching
ETH_PORT_C_ACTIVATION_PKG               A      0       0       0
Not Applicable                           Matching
ETH_PORT_ACTIVATION_PKG                 B      20      48      11
License Ok                               Matching
ETH_PORT_C_ACTIVATION_PKG               B      0       0       0
Not Applicable                           Matching
UCS-A /license #

UCS-A# scope license
UCS-A /license # show feature

License feature:
Name                                     Vendor Version Type                Grace Period
-----
ETH_PORT_ACTIVATION_PKG                 cisco  1.0   Counted                        120
ETH_PORT_C_ACTIVATION_PKG               cisco  1.0   Counted                        120
UCS-A /license #

```

## Uninstalling a License



**Note** Permanent licenses cannot be uninstalled if they are in use. You can only uninstall a permanent license that is not in use. If you try to delete a permanent license that is being used, Cisco UCS Manager rejects the request and display an error message.

### Before you begin

Back up the Cisco UCS Manager configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope license</b>	Enters license mode.
<b>Step 2</b>	UCS-A /license # <b>clear file</b> <i>license-filename</i>	Uninstalls the specified license.

Cisco UCS Manager deactivates the license, removes the license from the list of licenses, and deletes the license from the fabric interconnect. The port is moved into unlicensed mode. In a cluster setup, you must uninstall the license from the other fabric interconnect.

### Example

The following example shows the uninstallation of port9.lic:

```
UCS-A # scope license
UCS-A /license # clear file port9.lic
Clearing license port9.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT ETH_PORT_ACTIVATION_PKG cisco 1.0 permanent 1 \
  VENDOR_STRING=<LIC_SOURCE>UCS_SWIFT</LIC_SOURCE><SKU>N10-L001=</SKU> \
  HOSTID=VDH=FLC12360025 \
  NOTICE="<LicFileID>20090519200954833</LicFileID><LicLineID>1</LicLineID> \
  <PAK></PAK>" SIGN=C01FAE4E87FA

Clearing license .....done
UCS-A /license #
```





## CHAPTER 4

# Registering Cisco UCS Domains with Cisco UCS Central

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- [Registration of Cisco UCS Domains, on page 21](#)
- [Policy Resolution between Cisco UCS Manager and Cisco UCS Central, on page 21](#)
- [Registering a Cisco UCS Domain with Cisco UCS Central, on page 23](#)
- [Configuring Policy Resolution between Cisco UCS Manager and Cisco UCS Central, on page 24](#)
- [Setting Cisco UCS Central Registration Properties in Cisco UCS Manager, on page 25](#)
- [Unregistering a Cisco UCS Domain from Cisco UCS Central, on page 27](#)

## Registration of Cisco UCS Domains

You can have Cisco UCS Central manage some or all of the Cisco UCS domains in your data center.

If you want Cisco UCS Central to manage a Cisco UCS domain, you need to register that domain. When you register, you must choose which types of policies and other configurations will be managed by Cisco UCS Central and Cisco UCS Manager. Cisco UCS Central can manage the same types of policies and configurations for all registered Cisco UCS domains. You can also choose to have different settings for each registered Cisco UCS domain.

Perform the following before registering a Cisco UCS domain with Cisco UCS Central:

- Configure an NTP server and the correct time zone in both Cisco UCS Manager and Cisco UCS Central to ensure that they are in sync. If the time and date in the Cisco UCS domain and Cisco UCS Central are out of sync, the registration might fail.
- Obtain the hostname or IP address of Cisco UCS Central
- Obtain the shared secret that was configured when Cisco UCS Central was deployed.

## Policy Resolution between Cisco UCS Manager and Cisco UCS Central

For each Cisco UCS domain that you register with Cisco UCS Central, you can choose which application will manage certain policies and configuration settings. This policy resolution does not have to be the same for every Cisco UCS domain that you register with the same Cisco UCS Central.



**Note** Unregistering a Cisco UCS domain with Cisco UCS Central will terminate all open sessions.

You have the following options for resolving these policies and configuration settings:

- **Local**—The policy or configuration is determined and managed by Cisco UCS Manager.
- **Global**—The policy or configuration is determined and managed by Cisco UCS Central.

The following table contains a list of the policies and configuration settings that you can choose to have managed by either Cisco UCS Manager or Cisco UCS Central:

Name	Description
<b>Infrastructure &amp; Catalog Firmware</b>	Determines whether the Capability Catalog and infrastructure firmware policy are defined locally or come from Cisco UCS Central.
<b>Time Zone Management</b>	Determines whether the date and time is defined locally or comes from Cisco UCS Central.
<b>Communication Services</b>	Determines whether HTTP, CIM XML, Telnet, SNMP, web session limits, and Management Interfaces Monitoring Policy settings are defined locally or in Cisco UCS Central.
<b>Global Fault Policy</b>	Determines whether the Global Fault Policy is defined locally or in Cisco UCS Central.
<b>User Management</b>	Determines whether authentication and native domains, LDAP, RADIUS, TACACS+, trusted points, locales, and user roles are defined locally or in Cisco UCS Central.
<b>DNS Management</b>	Determines whether DNS servers are defined locally or in Cisco UCS Central.
<b>Backup &amp; Export Policies</b>	Determines whether the Full State Backup Policy and All Configuration Export Policy are defined locally or in Cisco UCS Central.
<b>Monitoring</b>	Determines whether Call Home, Syslog, and TFTP Core Exporter settings are defined locally or in Cisco UCS Central.
<b>SEL Policy</b>	Determines whether managed endpoints are defined locally or in Cisco UCS Central.
<b>Power Management</b>	Determines whether the power management is defined locally or in Cisco UCS Central.
<b>Power Supply Unit</b>	Determines whether power supply units are defined locally or in Cisco UCS Central.
<b>Port Configuration</b>	Determines whether port configuration is defined locally or in Cisco UCS Central.

# Registering a Cisco UCS Domain with Cisco UCS Central

## Before you begin

Configure an NTP server and the correct time zone in both Cisco UCS Manager and Cisco UCS Central to ensure that they are in sync. If the time and date in the Cisco UCS domain and Cisco UCS Central are out of sync, the registration might fail.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A/system # <b>create control-ep policy</b> <i>ucs-central</i>	Creates the policy required to register the Cisco UCS Domain with Cisco UCS Central.  <i>ucs-central</i> can be the hostname or IP address of the virtual machine where Cisco UCS Central is deployed.  <b>Note</b> If you use a hostname rather than an IPv4 or IPv6 address, you must configure a DNS server. If the Cisco UCS domain is not registered with Cisco UCS Central or DNS management is set to <b>local</b> , configure a DNS server in Cisco UCS Manager. If the Cisco UCS domain is registered with Cisco UCS Central and DNS management is set to <b>global</b> , configure a DNS server in Cisco UCS Central.
<b>Step 3</b>	Shared Secret for Registration: <i>shared-secret</i>	Enter the shared secret (or password) that was configured when Cisco UCS Central was deployed.
<b>Step 4</b>	UCS-A/system/control-ep # <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example registers a Cisco UCS Domain with a Cisco UCS Central system at IP address 209.165.200.233, and commits the transaction:

```
UCS-A# scope system
UCS-A /system # create control-ep policy 209.165.200.233
Shared Secret for Registration: S3cretW0rd!
```

```
UCS-A /system/control-ep* # commit-buffer
UCS-A /system/control-ep #
```

### What to do next

Configure policy resolution between Cisco UCS Manager and Cisco UCS Central.

## Configuring Policy Resolution between Cisco UCS Manager and Cisco UCS Central

### Before you begin

You must register the Cisco UCS Domain with Cisco UCS Central before you can configure policy resolution.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A/system # <b>scope control-ep policy</b>	Enters control-ep policy mode.
<b>Step 3</b>	UCS-A/system/control-ep # <b>set backup-policy-ctrl source {local   global}</b>	Determines whether the Full State Backup Policy and All Configuration Export Policy are defined locally or in Cisco UCS Central.
<b>Step 4</b>	UCS-A/system/control-ep # <b>set communication-policy-ctrl source {local   global}</b>	Determines whether HTTP, CIM XML, Telnet, SNMP, web session limits, and Management Interfaces Monitoring Policy settings are defined locally or in Cisco UCS Central.
<b>Step 5</b>	UCS-A/system/control-ep # <b>set datetime-policy-ctrl source {local   global}</b>	Determines whether the date and time is defined locally or comes from Cisco UCS Central.
<b>Step 6</b>	UCS-A/system/control-ep # <b>set dns-policy-ctrl source {local   global}</b>	Determines whether DNS servers are defined locally or in Cisco UCS Central.
<b>Step 7</b>	UCS-A/system/control-ep # <b>set fault-policy-ctrl source {local   global}</b>	Determines whether the Global Fault Policy is defined locally or in Cisco UCS Central.
<b>Step 8</b>	UCS-A/system/control-ep # <b>set infra-pack-ctrl source {local   global}</b>	Determines whether the Capability Catalog and infrastructure firmware policy are defined locally or come from Cisco UCS Central.
<b>Step 9</b>	UCS-A/system/control-ep # <b>set mep-policy-ctrl source {local   global}</b>	Determines whether managed endpoints are defined locally or in Cisco UCS Central.
<b>Step 10</b>	UCS-A/system/control-ep # <b>set monitoring-policy-ctrl source {local   global}</b>	Determines whether Call Home, Syslog, and TFTP Core Exporter settings are defined locally or in Cisco UCS Central.

	Command or Action	Purpose
<b>Step 11</b>	UCS-A/system/control-ep # <b>set powermgmt-policy-ctrl source {local   global}</b>	Determines whether the power management is defined locally or in Cisco UCS Central.
<b>Step 12</b>	UCS-A/system/control-ep # <b>set psu-policy-ctrl source {local   global}</b>	Determines whether power supply units are defined locally or in Cisco UCS Central.
<b>Step 13</b>	UCS-A/system/control-ep # <b>set security-policy-ctrl source {local   global}</b>	Determines whether authentication and native domains, LDAP, RADIUS, TACACS+, trusted points, locales, and user roles are defined locally or in Cisco UCS Central.
<b>Step 14</b>	UCS-A/system/control-ep # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures policy resolution for a Cisco UCS Domain that is registered with Cisco UCS Central and commits the transaction:

```
UCS-A# scope system
UCS-A /system # scope control-ep policy
UCS-A /system/control-ep* # set backup-policy-ctrl source global
UCS-A /system/control-ep* # set communication-policy-ctrl source local
UCS-A /system/control-ep* # set datetime-policy-ctrl source global
UCS-A /system/control-ep* # set dns-policy-ctrl source global
UCS-A /system/control-ep* # set fault-policy-ctrl source global
UCS-A /system/control-ep* # set infra-pack-ctrl source global
UCS-A /system/control-ep* # set mep-policy-ctrl source global
UCS-A /system/control-ep* # set monitoring-policy-ctrl source global
UCS-A /system/control-ep* # set powermgmt-policy-ctrl source global
UCS-A /system/control-ep* # set psu-policy-ctrl source local
UCS-A /system/control-ep* # set security-policy-ctrl source global
UCS-A /system/control-ep* # commit-buffer
UCS-A /system/control-ep #
```

## Setting Cisco UCS Central Registration Properties in Cisco UCS Manager

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope control-ep policy</b>	Enters the registration policy.
<b>Step 3</b>	UCS-A /system/control-ep # <b>set cleanupmode {   }</b>	This can be one of the following:

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>Localize Global</b>—When a Cisco UCS domain is unregistered, all global policies in the Cisco UCS domain will be localized to Cisco UCS Manager. The policies remain in the Cisco UCS domain, policy ownership is now local to Cisco UCS Manager, and Cisco UCS Manager admin users can make changes.</li> </ul> <p><b>Note</b> If you reregister the Cisco UCS domain with Cisco UCS Central, there can be policy conflicts due to the policies existing both in Cisco UCS Central and in Cisco UCS Manager. Either delete the local policies, or set the local policies to global before you try to create and associate a global service profile.</p> <ul style="list-style-type: none"> <li>• <b>Deep Remove Global</b>—This option should only be used after careful consideration. When a Cisco UCS domain is unregistered, all global policies in the Cisco UCS domain are removed. If there are global service profiles, they will now refer to Cisco UCS Manager local default policies, and one of the following occurs: <ul style="list-style-type: none"> <li>• If there are local default policies present, the server will reboot.</li> <li>• If there are no local default policies, the service profile association fails with a configuration error.</li> </ul> </li> </ul> <p><b>Note</b> The deep remove global cleanup mode does not remove global VSANs and VLANs when you unregister from Cisco UCS Central. Those must be removed manually if desired.</p>
<b>Step 4</b>	UCS-A /system/control-ep # <b>set suspendstate on</b>	Sets the suspend state. If set automatically, the Cisco UCS domain is temporarily removed from Cisco UCS Central, and all global policies revert to their local counterparts. All service

	Command or Action	Purpose
		profiles maintain their current identities. However, global pools are no longer visible and cannot be accessible by new service profiles. To turn off suspend state, you need to acknowledge the situation.
<b>Step 5</b>	UCS-A /system/control-ep # <b>set ackstate acked</b>	Acknowledges that inconsistencies exist between Cisco UCS Manager and Cisco UCS Central and that you are still willing to reconnect the Cisco UCS domain with Cisco UCS Central. This automatically turns off suspend state.
<b>Step 6</b>	UCS-A /system/control-ep # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to change the Cisco UCS Central registration cleanup mode to deep-remove-global and commit the transaction:

```
UCS-A# scope system
UCS-A /system # scope control-ep policy
UCS-A /system/control-ep* # set cleanupmode deep-remove-global
UCS-A /system/control-ep* # commit-buffer
UCS-A /system/control-ep #
```

## Unregistering a Cisco UCS Domain from Cisco UCS Central

When you unregister a Cisco UCS domain from Cisco UCS Central, Cisco UCS Manager no longer receives updates to global policies.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A/system # <b>delete control-ep policy</b>	Deletes the policy and unregisters the Cisco UCS Domain from Cisco UCS Central.
<b>Step 3</b>	UCS-A/system # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example unregisters a Cisco UCS Domain from Cisco UCS Central and commits the transaction:

```
UCS-A# scope system  
UCS-A /system # delete control-ep policy  
UCS-A /system* # commit-buffer  
UCS-A /system #
```





## CHAPTER 5

# Power Capping and Power Management in Cisco UCS

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- [Power Capping in Cisco UCS, on page 29](#)
- [Power Policy Configuration, on page 30](#)
- [Power Supply for Redundancy Method for Cisco UCSX-9508 Chassis, on page 33](#)
- [Policy Driven Power Capping, on page 33](#)
- [Blade Level Power Capping, on page 40](#)
- [Global Power Profiling Policy Configuration, on page 45](#)
- [Global Power Allocation Policy, on page 46](#)
- [Power Management During Power-on Operations, on page 47](#)
- [Power Sync Policy Configuration, on page 48](#)
- [Rack Server Power Management, on page 56](#)
- [UCS Mini Power Management , on page 56](#)

## Power Capping in Cisco UCS

You can control the maximum power consumption on a server through power capping, as well as manage the power allocation in the Cisco UCS Manager for blade servers, UCS C220 and C240 M5/M6, and C480 M5/C480 M5 ML, C225 M6, and C245 M6 and Cisco UCS C220 M7 Server, Cisco UCS C240 M7 Server rack servers, UCS Mini, and mixed UCS domains.

Cisco UCS Manager supports power capping on the following:

- UCS 6300 Series Fabric Interconnects
- UCS 6324 Series Fabric Interconnects (Cisco UCS Mini)
- UCS 6400 Series Fabric Interconnects
- UCS 6500 Series Fabric Interconnects

You can use Policy Driven Chassis Group Power Cap, or Manual Blade Level Power Cap methods to allocate power that applies to all of the servers in a chassis.



**Note** Cisco UCSX-9508 Chassis supports Policy Driven Chassis Group Cap.

When you choose to select Policy Driven Chassis Group Cap, Cisco UCS Manager calculates the power allotment for Cisco UCSX-9508 Chassis and when you choose to select Manual Blade Level Power Cap, Chassis Management Controller (CMC) calculates the power allotment for Cisco UCSX-9508 Chassis.

Cisco UCS Manager provides the following power management policies to help you allocate power to your servers:

Power Management Policies	Description
<b>Power Policy</b>	Specifies the redundancy for power supplies in all chassis in a Cisco UCS domain.
<b>Power Control Policies</b>	Specifies the priority to calculate the initial power allocation for each blade in a chassis.
<b>Power Save Policy</b>	Globally manages the chassis to maximize energy efficiency or availability.
Cisco UCSX-9508 Chassis <b>Power Extended Policy</b>	Manages the chassis to maximize energy efficiency or availability.  Power Extended Policy is effective only when we have PSU Redundant Policy Mode. For example, the total power available can be extended when we have N+1, N+2 and Grid to PSU Redundancy modes.
Cisco UCSX-9508 Chassis <b>Fan Control Policy</b>	Manages you to control the fan speed to bring down server power consumption and noise levels.
<b>Global Power Allocation</b>	Specifies the Policy Driven Chassis Group Power Cap or the Manual Blade Level Power Cap to apply to all servers in a chassis.
<b>Global Power Profiling</b>	Specifies how the power cap values of the servers are calculated. If it is enabled, the servers will be profiled during discovery through benchmarking. This policy applies when the Global Power Allocation Policy is set to Policy Driven Chassis Group Cap.

## Power Policy Configuration

### Power Policy for Cisco UCS Servers

The power policy is global and is inherited by all of the chassis' managed by the Cisco UCS Manager instance. You can add the power policy to a service profile to specify the redundancy for power supplies in all chassis' in the Cisco UCS domain. This policy is also known as the PSU policy.

For more information about power supply redundancy, see *Cisco UCS 5108 Server Chassis Hardware Installation Guide*.

## Configuring the Power Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope psu-policy</b>	Enters PSU policy mode.
<b>Step 3</b>	UCS-A /org/psu-policy # <b>set redundancy</b> { <b>grid</b>   <b>n-plus-1</b>   <b>n-plus-2</b>   <b>non-redund</b> }	Specifies one of the following redundancy types: <ul style="list-style-type: none"> <li>• <b>grid</b> —Two power sources are turned on, or the chassis requires greater than N+1 redundancy. If one source fails (which causes a loss of power to one or two PSUs), the surviving PSUs on the other power circuit continue to provide power to the chassis.</li> <li>• <b>n-plus-1</b> —The total number of PSUs to satisfy non-redundancy, plus one additional PSU for redundancy, are turned on and equally share the power load for the chassis. If any additional PSUs are installed, Cisco UCS Manager sets them to a "turned-off" state.</li> <li>• <b>non-redund</b> —All installed power supplies (PSUs) are turned on and the load is evenly balanced. Only smaller configurations (requiring less than 2500W) can be powered by a single PSU.</li> <li>• <b>n-plus-2</b> —The total number of PSUs to satisfy non-redundancy, plus two additional PSU for redundancy, are turned on and equally share the power load for the chassis. If any additional PSUs are installed, Cisco UCS Manager sets them to a "turned-off" state.</li> </ul>

	Command or Action	Purpose
		<p><b>Note</b> <b>n-plus-2</b> redundancy mode is supported only for Cisco UCS X9508 chassis. For all other chassis, Cisco UCS Manager treats <b>n-plus-2</b> mode as <b>n-plus-1</b> mode only.</p> <p>For more information about power redundancy, see the <i>Cisco UCS 5108 Server Chassis Installation Guide</i>.</p>
<b>Step 4</b>	Required: UCS-A /org/psu-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures the power policy to use grid redundancy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope psu-policy
UCS-A /org/psu-policy # set redundancy grid
UCS-A /org/psu-policy* # commit-buffer
UCS-A /org/psu-policy #
```

The following example configures the power policy to use n-plus-2 redundancy for Cisco UCS X9508 chassis and shows the details:

```
UCS-A# scope org
UCS-A /org # scope psu-policy
UCS-A /org/psu-policy # set redundancy n-plus-2
UCS-A /org/psu-policy # commit-buffer
```

## Power Supply for Redundancy Method

PSU Redundancy	Max Power @ 240 V
Grid	5000 Watts
N+1	7500 Watts
Non-Redundant	8280 Watts



**Note** This table is valid if there are four PSUs installed in the chassis.

# Power Supply for Redundancy Method for Cisco UCSX-9508 Chassis

PSU Redundancy	Max Power @ 2800 W
Grid	8400 Watts
N+1	14000 Watts
N+2	11200 Watts
Non-Redundant	16800 Watts



**Note** This table is valid if there are six PSUs, each of 2800 watts installed in the chassis.

## Policy Driven Power Capping

### Policy Driven Chassis Group Power Capping

When you select the Policy Driven Chassis Group Power Cap in the Global Cap Policy, Cisco UCS can maintain the over-subscription of servers without risking power failures. You can achieve over-subscription through a two-tier process. For example, at the chassis level, Cisco UCS divides the amount of power available among members of the power group, and at the blade level, the amount of power allotted to a chassis is divided among blades based on priority.

Each time a service profile is associated or disassociated, Cisco UCS Manager recalculates the power allotment for each blade server within the chassis. If necessary, power from lower-priority service profiles is redistributed to higher-priority service profiles.

UCS power groups cap power in less than one second to safely protect data center circuit breakers. A blade must stay at its cap for 20 seconds before the chassis power distribution is optimized. This is intentionally carried out over a slower timescale to prevent reacting to transient spikes in demand.



**Note** The system reserves enough power to boot a server in each slot, even if that slot is empty. This reserved power cannot be leveraged by servers requiring more power. Blades that fail to comply with the power cap are penalized.

## Power Control Policy

Cisco UCS uses the priority set in the power control policy along with the blade type and configuration to calculate the initial power allocation for each blade within a chassis. During normal operation, the active blades within a chassis can borrow power from idle blades within the same chassis. If all blades are active

and reach the power cap, service profiles with higher priority power control policies take precedence over service profiles with lower priority power control policies.

Priority is ranked on a scale of 1-10, where 1 indicates the highest priority and 10 indicates lowest priority. The default priority is 5.

Starting with Cisco UCS Manager 3.2(2), chassis dynamic power rebalance mechanism is enabled by default. The mechanism continuously monitors the power usage of the blade servers and adjusts the power allocation accordingly. Chassis dynamic power rebalance mechanism operates within the overall chassis power budget set by Cisco UCS Manager, which is calculated from the available PSU power and Group power.

For mission-critical application a special priority called **no-cap** is also available. Setting the priority to **no-cap** does not guarantee that a blade server gets maximum power all the time, however, it prioritizes the blade server over other servers during the chassis dynamic power rebalance budget allocations.



**Note** If all the blade servers are set with no-cap priority and all of them run high power consuming loads, then there is a chance that some of the blade servers get capped under high power usage, based on the power distribution done through dynamic balance.

Global Power Control Policy options are inherited by all the chassis managed by the Cisco UCS Manager.

Starting with Cisco UCS Manager 4.1(3), a global policy called Power Save Mode is available. It is disabled by default, meaning that all PSUs present remain active regardless of power redundancy policy selection. Enabling the policy restores the older behavior..

Starting with Cisco UCS Manager 4.1(2), the power control policy is also used for regulating fans in Cisco UCS C220 M5 and C240 M5 rack servers in acoustically-sensitive environments. The Acoustic setting for these fans is only available on these servers. On C240 SD M5 rack servers, Acoustic mode is the default mode.

Starting with Cisco UCS Manager 4.2(1), the power control policy is also used for regulating cooling in potentially high-temperature environments. This option is only available with Cisco UCS C220 M6, C240 M6, C225 M6, and C245 M6 rack servers and can be used with any fan speed option.

Starting with Cisco UCS Manager 4.3(2), a global policy called Cisco UCS X9508 Chassis Power Extended Policy. This option is only available with Cisco UCS X9508 Chassis.



**Note** You must include the power control policy in a service profile and that service profile must be associated with a server for it to take effect.

## Creating a Power Control Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>create power-control-policy</b> <i>power-control-pol-name</i>	Creates a power control policy and enters power control policy mode.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/power-control-policy # <b>set fanspeed</b> { <i>any</i>   <b>balanced</b>   <i>high-power</i>   <i>low-power</i>   <i>max-power</i>   <i>performance</i>   <i>acoustic</i> }	Specifies the fan speed for the power control policy. <b>Note</b> The <b>performance</b> option is not supported on Cisco UCS C-Series M5 and M6 servers.
<b>Step 4</b>	UCS-A /org/power-control-policy # <b>set priority</b> { <i>priority-num</i>   <b>no-cap</b> }	Specifies the priority for the power control policy.
<b>Step 5</b>	UCS-A /org/power-control-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a power control policy called powerpolicy15, sets the priority at level 2, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create power-control-policy powerpolicy15
UCS-A /org/power-control policy* # set priority 2
UCS-A /org/power-control policy* # commit-buffer
UCS-A /org/power-control policy #
```

### What to do next

Include the power control policy in a service profile.

## Power Extended Policy for UCS X9508 Chassis

### Creating a Power Extended Policy for Cisco UCS X9508 Chassis

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>scope power-extended-policy</b> <i>power-extended-policy-name</i>	Creates a power extended policy and enters power extended policy mode.
<b>Step 3</b>	UCS-A /org/power-extended-policy # <b>set extendedmode</b> <b>Disable</b>   <b>Enable</b>	Sets the power extended mode to enable or disable.
<b>Step 4</b>	UCS-A /org/power-extended-policy # <b>show detail</b>	Shows the details of the configuration.

### Example

The following example creates a power extended policy and commits the transaction:

```
UCS-A# scope org
UCS-A /org # scope power-extended-policy
UCS-A /org/power-extended-policy # set extendedmode {Disable|Enable}
UCS-A /org/power-extended-policy # commit-buffer
```

## Configuring Acoustic Mode

### Acoustic Mode

Acoustic mode is a fan policy available only on Cisco UCS C220 M5 Server, C220 M6 Server, C240 M5 Server, C240 M6 Server, and C240 SD M5 Server Rack Servers and is supported from Cisco UCS Manager Release 4.1.1 onward.

The available fan policy options for these M5 and M6 servers are Acoustic, Low power, Balanced, High Power, and Max power.

On C240 SD M5 Server, C220 M6 Server, C240 M6 Server, and C245 M6 Server Acoustic mode is the default mode. On all other platforms, Low Power mode is the default mode.

The primary goal of Acoustic mode is to reduce the noise level emitted by the fans by reducing the fan speed. The standard fan policies are designed for optimal energy consumption and preventing any component throttling. Acoustic mode reduces noise but carries a higher probability of having short term throttling effects.

Acoustic Mode is independent of the power management features.

### Creating an Acoustic Mode Fan Policy

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>create power-control-policy</b> <i>fan-policy-name</i>	Creates a fan control policy and enters power control policy mode. Fan policies are created through the power control interface.
<b>Step 3</b>	UCS-A /org/power-control-policy # <b>set fanspeed</b> { <b>acoustic</b> }	Specifies Acoustic Mode as the fan speed for the power control policy.
<b>Step 4</b>	UCS-A /org/power-control-policy # <b>set priority</b> { <i>priority-num</i>   <b>no-cap</b> }	Specifies the priority for the fan's power control policy.
<b>Step 5</b>	UCS-A /org/power-control-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.



**What to do next**

Include the power control policy in a service profile.

**Deleting a Power Control Policy****Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>delete power-control-policy</b> <i>power-control-pol-name</i>	Deletes the specified power control policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example deletes a power control policy called powerpolicy15 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete power-control-policy powerpolicy15
UCS-A /org* # commit-buffer
UCS-A /org #
```

**Power Groups in UCS Manager**

A power group is a set of chassis that all draw power from the same power distribution unit (PDU). In Cisco UCS Manager, you can create power groups that include one or more chassis, then set a peak power cap in AC watts for that power grouping.

Implementing power capping at the chassis level requires the following:

- IOM, CIMC, and BIOS version 1.4 or higher
- Two Power Supply Units (PSUs)

The peak power cap is a static value that represents the maximum power available to all blade servers within a given power group. If you add or remove a blade from a power group, but do not manually modify the peak power value, the power group adjusts the peak power cap to accommodate the basic power-on requirements of all blades within that power group.

A minimum of 890 AC watts should be set for each chassis. This converts to 800 watts of DC power, which is the minimum amount of power required to power an empty chassis. To associate a half-width blade, the group cap needs to be set to 1475 AC watts. For a full-width blade, it needs to be set to 2060 AC watts.

After a chassis is added to a power group, all service profile associated with the blades in the chassis become part of that power group. Similarly, if you add a new blade to a chassis, that blade inherently becomes part of the chassis' power group.



**Note** Creating a power group is not the same as creating a server pool. However, you can populate a server pool with members of the same power group by creating a power qualifier and adding it to server pool policy.

When a chassis is removed or deleted, the chassis gets removed from the power group.

UCS Manager supports explicit and implicit power groups.

- **Explicit:** You can create a power group, add chassis' and racks, and assign a budget for the group.
- **Implicit:** Ensures that the chassis is always protected by limiting the power consumption within safe limits. By default, all chassis that are not part of an explicit power group are assigned to the default group and the appropriate caps are placed. New chassis that connect to UCS Manager are added to the default power group until you move them to a different power group.

The following table describes the error messages you might encounter while assigning power budget and working with power groups.

Error Message	Cause	Recommended Action
Insufficient budget for power group POWERGROUP_NAME and/or Chassis N cannot be capped as group cap is low. Please consider raising the cap. and/or Admin committed insufficient for power group GROUP_NAME, using previous value N and/or Power cap application failed for chassis N	One of these messages displays if you did not meet the minimum limit when assigning the power cap for a chassis, or the power requirement increased because of the addition of blades or change of power policies.	Increase the power cap limit to the <b>Minimum Power Cap for Allowing Operations (W)</b> value displayed on the <b>Power Group</b> page for the specified power group.
Chassis N cannot be capped as the available PSU power is not enough for the chassis and the blades. Please correct the problem by checking input power or replace the PSU	Displays when the power budget requirement for the chassis is more than the PSU power that is available.	Check the PSU input power and redundancy policy to ensure that enough power is available for the chassis.  If a PSU failed, replace the PSU.

Error Message	Cause	Recommended Action
Power cap application failed for server N	Displays when the server is consuming more power than allocated and cannot be capped, or the server is powered on when no power is allocated.	Do not power on un-associated servers.
P-State lowered as consumption hit power cap for server	Displays when the server is capped to reduce the power consumption below the allocated power.	This is an information message. If a server should not be capped, in the service profile set the value of the power control policy <b>Power Capping</b> field to <b>no-cap</b> .
Chassis N has a mix of high-line and low-line PSU input power sources.	This fault is raised when a chassis has a mix of high-line and low-line PSU input sources connected.	This is an unsupported configuration. All PSUs must be connected to similar power sources.

## Creating a Power Group

### Before you begin

Ensure that the global power allocation policy is set to Policy Driven Chassis Group Cap.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>create power-group</b> <i>power-group-name</i>	Creates a power group and enters power group mode.
<b>Step 3</b>	UCS-A /power-cap-mgmt/power-group # <b>set peak</b> { <i>peak-num</i>   <b>disabled</b>   <b>uninitialized</b> }	Specifies the maximum peak power (in watts) available to the power group.
<b>Step 4</b>	UCS-A /power-cap-mgmt/power-group # <b>create chassis</b> <i>chassis-id</i>	Adds the specified chassis to the power group and enters power group chassis mode.
<b>Step 5</b>	UCS-A /power-cap-mgmt/power-group # <b>create rack</b> <i>rack-id</i>	Adds the specified rack to the power group.
<b>Step 6</b>	UCS-A /power-cap-mgmt/power-group # <b>create fex</b> <i>fex-id</i>	Adds the specified FEX to the power group.
<b>Step 7</b>	UCS-A /power-cap-mgmt/power-group # <b>create fi</b> <i>fi-id</i>	Adds the specified FI to the power group.
<b>Step 8</b>	UCS-A /power-cap-mgmt/power-group/chassis # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example creates a power group called powergroup1, specifies the maximum peak power for the power group (10000 watts), adds chassis 1 to the group, and commits the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # create power-group powergroup1
UCS-A /power-cap-mgmt/power-group* # set peak 10000
UCS-A /power-cap-mgmt/power-group* # create chassis 1
UCS-A /power-cap-mgmt/power-group/chassis* # commit-buffer
UCS-A /power-cap-mgmt/power-group/chassis #
```

**Deleting a Power Group****Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>delete power-group</b> <i>power-group-name</i>	Deletes the specified power group.
<b>Step 3</b>	UCS-A /power-cap-mgmt/power-group/chassis # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example deletes a power group called powergroup1 and commits the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # delete power-group powergroup1
UCS-A /power-cap-mgmt* # commit-buffer
UCS-A /power-cap-mgmt #
```

**Blade Level Power Capping****Manual Blade Level Power Cap**

When manual blade-level power cap is configured in the global cap policy, you can set a power cap for each blade server in a Cisco UCS domain.



**Note** Cisco UCSX-9508 Chassis does not support Manual Blade Level Power Cap. When you choose to select Manual Blade Level Power Cap, Chassis Management Controller (CMC) calculates the power allotment for Cisco UCSX-9508 Chassis.

The following configuration options are available:

- **Watts**—You can specify the maximum amount of power that the server can consume at one time. This maximum can be any amount between 0 watts and 1300 watts.




---

**Note** B480 M5 systems using 256GB DIMMs must have a manual blade level cap at 1300W.

---

- **Unbounded**—No power usage limitations are imposed on the server. The server can use as much power as it requires.

If the server encounters a spike in power usage that meets or exceeds the maximum configured for the server, Cisco UCS Manager does not disconnect or shut down the server. Instead, Cisco UCS Manager reduces the power that is made available to the server. This reduction can slow down the server, including a reduction in CPU speed.




---

**Note** If you configure the manual blade-level power cap using **Equipment > Policies > Global Policies > Global Power Allocation Policy**, the priority set in the Power Control Policy is no longer relevant.

---

## Setting the Blade-Level Power Cap for a Server

### Before you begin

Ensure that the global power allocation policy is set to Manual Blade Level Cap.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>set power-budget committed</b> { <b>unbounded</b>   <i>watts</i> }	Commits the server to one of the following power usage levels: <ul style="list-style-type: none"> <li>• <b>unbounded</b> —Does not impose any power usage limitations on the server.</li> <li>• <i>watts</i> —Allows you to specify the upper level for power usage by the server. If you choose this setting, enter the maximum number of watts that the server can use. The range is 0 to 10000000 watts.</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 4</b>	UCS-A /chassis/server # <b>show power-budget</b>	(Optional) Displays the power usage level setting.

### Example

The following example limits the power usage for a server to unbounded and then to 1000 watts and commits the transaction:

```
UCS-A# scope server 1/7
UCS-A /chassis/server # show power-budget

Budget:
  AdminCommitted (W)
  -----
  139
UCS-A /chassis/server # set power-budget committed unbounded
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server # show power-budget

Budget:
  AdminCommitted (W)
  -----
  Unbounded

UCS-A /chassis/server # set power-budget committed 1000
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server # show power-budget

Budget:
  AdminCommitted (W)
  -----
  1000
UCS-A /chassis/server #
```

## Configuring a Chassis Level Fan Policy

### Configuring Fan Speed for Power Management

Globally managing the fan speed can help in power management by applying a single policy for all B-series server fans in an enclosure, based on general cooling needs. Set the fan speed on a per-chassis basis in the Global Policies. The two options are:

- **Balanced**—The fan runs at a faster speed when needed, based on the heat generated by the server. When possible, the fan returns to the minimum required speed. (Default.)
- **Low Power**—The fan runs at the minimum speed that is required to keep the server cool.

The new option takes effect when the new selection is saved. Use **Low Power** to save on system power.

### Fan Control Policy for Cisco UCSX-9508 Chassis

Fan Control Policy enables you to control the fan speed to bring down server power consumption and noise levels of Cisco UCSX-9508 Chassis. With the introduction of Fan Control policies, you can determine the right fan speed for the server, based on the components in the server.

Globally managing the fan speed can help in power management by applying a single policy for all B-series and X-series server fans in an enclosure, based on general cooling needs. For X-series servers, set the fan speed on a per-chassis basis in the Global Policies.

Fan Control policy options include:

- **Balanced**—The fan runs at a faster speed when needed, based on the heat generated by the server. When possible, the fan returns to the minimum required speed. This is the default option.
- **Low Power**—The fan runs at the minimum speed that is required to keep the server cool.
- **High Power**—The fan is kept at an even higher speed that emphasizes performance over power consumption.
- **Max Power**—The fan is kept at the maximum speed at all times. This option provides the most cooling and uses the most power.
- **Acoustic**—The fan speed is reduced to reduce noise levels in acoustic-sensitive environments. Rather than regulating energy consumption and preventing component throttling as in other modes, the **Acoustic** option could result in short-term throttling to achieve a lowered noise level.

## Creating a Fan Control Policy for Cisco UCS X9508 Chassis

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>scope modular-chassis-fan-policy</b>	Creates a modular chassis fan policy and enters modular chassis fan policy mode.
<b>Step 3</b>	UCS-A /org/modular-chassis-fan-policy # <b>set speed acoustic balanced high-power low-power max-power</b>	Sets the speed to high, low, max, balanced, and acoustic speeds.
<b>Step 4</b>	UCS-A /org/modular-chassis-fan-policy # <b>show detail</b>	Shows the details of the configuration. The following example creates a modular chassis fan policy:  UCS-A# <b>scope org</b> UCS-A /org # <b>scope modular-chassis-fan-policy</b> UCS-A /org/modular-chassis-fan-policy # <b>set set speed acoustic balanced high-power low-power max-power</b>  UCS-A /org/modular-chassis-fan-policy # <b>show detail</b>

## Viewing Server Statistics

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>show stats</b>	Displays the following server statistics: <ul style="list-style-type: none"> <li>• Ethernet Port Error</li> <li>• Ethernet Port Multicast</li> <li>• Ethernet Port</li> <li>• Virtual Interface</li> <li>• Motherboard Power</li> <li>• PC Ie Fatal Completion Error</li> <li>• PC Ie Fatal Protocol Error</li> <li>• PC Ie Fatal Receiving Error</li> <li>• PC Ie Fatal Error</li> <li>• Memory Error</li> <li>• DIMM Env</li> <li>• CPU Env</li> </ul>

### Example

The following example shows the section on motherboard power usage statistics:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # show stats

Motherboard Power Statistics:
Time Collected: 2016-07-11T20:51:24.722
Monitored Object: sys/chassis-1/blade-1/board/power-stats
Suspect: No
Consumed Power (W): 126.000000
Input Voltage (V): 11.859000
Input Current (A): 10.624842
Thresholded: 0

UCS-A /chassis/server #
```



# Global Power Profiling Policy Configuration

## Global Power Profiling Policy

The Global Power Profiling Policy specifies how power allocation is applied to all of the servers in a chassis. The policy applies when you set the Global Power Allocation Policy to **policy-driven-chassis-group-cap**. You can set the Global Power Profiling Policy to one of the following:

- **Disabled**—The minimum and maximum power cap values of the blades are calculated based on the static power consumption values of each of the components.
- **Enabled**—The minimum and maximum power cap values of the blades are measured as part of the server discovery. These values are similar to the actual power consumption of the blades.



**Note** After enabling the Global Power Profiling Policy, you must re-acknowledge the blades to obtain the minimum and maximum power cap.

## Configuring the Global Power Profile Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>set profile-policy</b> {no   yes}	Enables or disables the global power profiling policy.
<b>Step 3</b>	UCS-A /power-cap-mgmt # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to enable the global power profile policy and commit the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # set profile-policy yes
UCS-A /power-cap-mgmt* # commit-buffer
UCS-A /power-cap-mgmt #
```

# Global Power Allocation Policy

## Global Power Allocation Policy

The Global Power Allocation Policy allows you to specify the Policy Driven Chassis Group Power Cap or Manual Blade-level Power Cap power allocation method applied to servers in a chassis.

Cisco recommends using the default Policy Driven Chassis Group Power Cap power allocation method.



### Important

Any change to the Manual Blade level Power Cap configuration results in the loss of any groups or configuration options set for the Policy Driven Chassis Group Power Cap.



### Note

Cisco UCSX-9508 Chassis supports Policy Driven Chassis Group Cap only.

When you choose to select Policy Driven Chassis Group Cap, Cisco UCS Manager calculates the power allotment for Cisco UCS X9508 chassis and when you choose to select Manual Blade Level Power Cap, Chassis Management Controller (CMC) calculates the power allotment for Cisco UCSX-9508 Chassis.



### Note

For Cisco UCSX-9508 Chassis **Allocated (W)** and **Measured Max. (W)** will not match. The max allocated values are used to calculate the chassis-level power limit and Intelligent Fabric Modules (IFM) allocates the power based on the power limit.

## Configuring the Global Power Allocation Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>set cap-policy</b> { <b>manual-blade-level-cap</b>   <b>policy-driven-chassis-group-cap</b> }	Sets the global cap policy to the specified power cap management mode.  By default, the global cap policy is set to policy driven chassis group cap.
<b>Step 3</b>	UCS-A /power-cap-mgmt # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example sets the global cap policy to manual blade power cap and commits the transaction:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # set cap-policy manual-blade-level-cap
UCS-A /power-cap-mgmt* # commit-buffer
UCS-A /power-cap-mgmt #
```

## Viewing the Power Cap Values for Servers

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope power-cap-mgmt</b>	Enters power cap management mode.
<b>Step 2</b>	UCS-A /power-cap-mgmt # <b>show power-measured</b>	Displays the minimum and maximum power cap values.

**Example**

The following example shows how to display the minimum and maximum power cap values:

```
UCS-A# scope power-cap-mgmt
UCS-A /power-cap-mgmt # show power-measured

Measured Power:
  Device Id (W)  Minimum power (W)  Maximum power (W)  OperMethod
-----
  blade  1/1      234                353                Pnuos

UCS-A /power-cap-mgmt #
```

## Power Management During Power-on Operations

**Boot Staggering during Power on**

Cisco UCS Manager attempts to boot as many blades as possible based on the amount of available power. If the power required to boot a blade is not available, Cisco UCS Manager staggers the boot in the Finite State Machine (FSM) CheckPowerAvailability stage, and raises the following fault on the blade: Insufficient power available to power-on server x/y.

When the required power becomes available, the FSM proceeds with blade power on. After a blade powers off, the allocated power budget is reclaimed.



**Note** When the power budget that was allocated to the blade is reclaimed, the allocated power displays as 0 Watts.

**Limitation**

If you power on a blade outside of the Cisco UCS Manager and if there is not enough power available for allocation, the following fault is raised:

```
Power cap application failed for server x/y
```

**Power Allocation during Service Profile Association**

The power allocated to a blade during service profile association depends on the Power Control Policy used, and the power that is available from the power group. After the power is allocated to a server during a successful service profile association, the blade is guaranteed the minimum power cap. If the Power Control Policy priority is set to no-cap, a blade is allocated a potential maximum power cap, which might exceed the measured maximum power cap that displays.




---

**Note** If the priority of an associated blade is changed to no-cap, and is not able to allocate the maximum power cap, you might see one of the following faults:

- PSU-insufficient—There is not enough available power for the PSU.
  - Group-cap-insufficient—The group cap value is not sufficient for the blade.
- 

## Power Sync Policy Configuration

### Power Sync Policy

Cisco UCS Manager includes a global (default) power sync policy to address power synchronization issues between the associated service profiles and the servers. You can use the power sync policy to synchronize the power state when the power state of the service profile differs from the actual power state of the server. The policy allows you to control when to synchronize the power state on the associated service profiles for the servers. The power sync policy does not affect other power-related policies.

The power synchronization policy applies to all the service profiles by default. You cannot delete the default power sync policy, but you can edit the default policy. You can create your own power sync policies and apply them to the service profiles. You can also create a power sync policy that is specific to a service profile and it always takes precedence over the default policy.

Cisco UCS Manager creates a fault on the associated service profile when the power sync policy referenced in the service profile does not exist. Cisco UCS Manager automatically clears the fault once you create a power sync policy for the specified service profile or change the reference to an existing policy in the service profile.

### Power Synchronization Behavior

Cisco UCS Manager synchronizes the power state only when the actual power state of the server is OFF. The current power synchronization behavior is based on the actual power state and the preferred power state after shallow association occurs.

For example, the following events trigger shallow association:

- Fabric Interconnects(FI) and IOM disconnected.
- IOM reset
- FI power loss or reboot
- Chassis reacknowledgment
- Chassis power loss
- Service profile change

The following table describes the current power synchronization behavior:

Event	Preferred Power State	Actual Power State Before Event	Actual Power State After Event
Shallow Association	ON	OFF	ON
Shallow Association	OFF	OFF	OFF
Shallow Association	ON	ON	ON
Shallow Association	OFF	ON	ON

## Displaying the Global Power Sync Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A/org # <b>scope power-sync-policy default</b>	Enters the global power sync policy mode.
<b>Step 3</b>	UCS-A /org/power/-sync-policy # <b>show</b> { <b>detail</b>   <b>expand</b>   <b>detail expand</b> }	Displays the global power sync policy information.

### Example

The following example displays the global (default) power sync policy:

```
UCS-A # scope org
UCS-A /org # scope power-sync-policy default-sync
UCS-A /org/power-sync-policy # show expand

Power Sync Policy:
  Name                Power Sync Option
  -----
  default              Default Sync

UCS-A /org/power-sync-policy # show detail expand
```

```
Power Sync Policy:
  Full Name: org-root/power-sync-default
  Name: default
  Description:
  Power Sync Option: Default Sync
  Policy Owner: Local
```

```
UCS-A /org/power-sync-policy #
```

## Setting Global Policy Reference for a Service Profile

To refer the global power sync policy in a service profile, use the following commands in service profile mode:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A/org # <b>scope service-profile</b> <i>service-profile-name</i>	Enters the service profile mode for the specified service profile. The name of the service profile can be a minimum of two characters and a maximum up to 32 characters.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set power-sync-policy default</b>	Specifies the global power sync policy that can be referenced in the service profile. You can also change the policy reference from the default to other power sync policies using this command.
<b>Step 4</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example sets the reference to the global power sync policy for use in the service profile.

```
UCS-A # scope org
UCS-A/org # scope service-profile spnew
UCS-A/org/service-profile # set power-sync-policy default
UCS-A/org/service-profile* # commit-buffer
```

## Creating a Power Sync Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>create power-sync-policy</b> <i>power-sync-pol-name</i>	Creates a power sync policy and enters power sync policy mode. The power sync policy name can be up to 16 characters.
<b>Step 3</b>	(Optional) UCS-A /org/power-sync-policy* # <b>set descr</b> <i>optionall-description</i>	Specifies the description of the power-sync-policy. You can also modify the description using the descr keyword.
<b>Step 4</b>	UCS-A /org/power-sync-policy* # <b>set</b> <b>sync-option</b> { <b>always-sync</b>   <b>default-sync</b>   <b>initial-only-sync</b> }	Specifies the power synchronization option to the physical server. You can also modify the power synchronization option using the sync-option keyword. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Default Sync</b>—After the initial server association, any configuration change or management connectivity changes that you perform trigger a server reassociation. This option synchronizes the desired power state to the physical server if the physical server power state is off and the desired power state is on. This is the default behavior.</li> <li>• <b>Always Sync</b>—When the initial server association or the server reassociation occurs, this option always synchronizes the desired power state to the physical server even if the physical server power state is on and the desired power state is off.</li> <li>• <b>Initial Only Sync</b>—This option only synchronizes the power to a server when a service profile is associated to the server for the first time or when the server is re-commissioned. When you set this option, resetting the power state from the physical server side does not affect the desired power state on the service profile.</li> </ul>
<b>Step 5</b>	UCS-A /org/power-sync-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example creates a power sync policy called newSyncPolicy, sets the default sync-option, and commits the transaction to the system configuration:

```
UCS-A # scope org
UCS-A /org # create power-sync-policy newSyncPolicy
UCS-A /org/power-sync-policy* # set decsr newSyncPolicy
UCS-A /org/power-sync-policy* # set sync-option default-sync
UCS-A /org/power-sync-policy* # commit-buffer
UCS-A /org/power-sync-policy #
```

**What to do next**

Include the power sync policy in a service profile or in a service profile template.

## Deleting a Power Sync Policy

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>delete power-sync-policy</b> <i>power-sync-pol-name</i>	Deletes the specified power sync policy.
<b>Step 3</b>	UCS-A /org # <b>commit buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example deletes the power sync policy called spnew and commits the transaction to the system:

```
UCS-A # scope org
UCS-A /org # delete power-sync-policy spnew
UCS-A /org # commit-buffer
```

## Displaying All Power Sync Policies

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.



	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>show power-sync-policy</b> { <b>detail</b>   <b>expand</b>   <b>detail expand</b> }	Displays the default, local, and other power sync policies.

### Example

The following example displays power sync policies that are defined:

```
UCS-A # scope org
UCS-A /org # show power-sync-policy expand
Power Sync Policy:
  Name                               Power Sync Option
  -----
  default                             Default Sync
  policy-1                             Default Sync

UCS-A /org # show power-sync-policy detail expand
Power Sync Policy:
  Full Name: org-root/power-sync-default
  Name: default
  Description:
  Power Sync Option: Default Sync
  Policy Owner: Local

  Full Name: org-root/power-sync-policy-1
  Name: policy-1
  Description:
  Power Sync Option: Default Sync
  Policy Owner: Local

UCS-A /org #
```

## Creating a Local Policy

To create a local power sync policy that you want to use by any service profile, create a power sync definition for the power sync policy.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>service-profile-name</i>	Enters the service profile mode for the specified service profile. The name of the service profile can be a minimum of two characters and a maximum up to 32 characters.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create</b> <b>power-sync-definition</b>	Enters the power sync definition mode. You can create a power sync policy definition that you defined for the power sync policy.

	Command or Action	Purpose
<b>Step 4</b>	(Optional) UCS-A /org/service-profile/power-sync-definition* # <b>set descr</b> <i>optional-description</i>	Specifies the description of the power-sync-policy. You can also change the description using the descr keyword.
<b>Step 5</b>	UCS-A /org/service-profile/power-sync-definition* # <b>set sync-option</b> { <b>always-sync</b>   <b>default-sync</b>   <b>initial-only-sync</b> }	Specifies the power synchronization option to the physical server. You can also change the power synchronization option using the sync-option keyword.
<b>Step 6</b>	UCS-A /org/service-profile/power-sync-definition* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a local policy using the policy sync definition, sets the sync-option, and commits the transaction to the system configuration:

```
UCS-A # scope org
UCS-A/org # scope service-profile spnew
UCS-A/org/service-profile # create power-sync-definition
UCS-A/org/service-profile/power-sync-definition* # set descr spnew
UCS-A/org/service-profile/power-sync-definition* # set sync-option default-sync
UCS-A/org/service-profile/power-sync-definition* # commit-buffer
```

## Showing a Local Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A/org # <b>scope service-profile</b> <i>service-profile-name</i>	Enters the service profile mode for the specified service profile. The name of the service profile can be a minimum of two characters and a maximum up to 32 characters.
<b>Step 3</b>	(Optional) UCS-A /org/service-profile # <b>show power-sync-policy</b> { <b>detail</b>   <b>expand</b>   <b>detail expand</b> }	Displays the local policy in the power-sync-policy mode.

	Command or Action	Purpose
<b>Step 4</b>	UCS-A /org/service-profile # <b>show power-sync-definition {detail   expand   detail expand }</b>	Displays the local policy for the specified service policy in the power-sync-definition mode.  <b>Note</b> If you do not have a definition for the power sync policy, you can still use the command, but you cannot see anything displayed.

### Example

The following example displays the local policy in use by the service profile spnew:

```
UCS-A # scope org
UCS-A/org # scope service-profile spnew
UCS-A/org/service-profile # show power-sync-definition expand

Power Sync Definition:
  Name                Power Sync Option
  -----
  spnew                Always Sync

UCS-A/org/service-profile # show power-sync-definition detail expand

Power Sync Definition:
  Full Name: org-root/ls-sp2/power-sync-def
  Name: spnew
  Description: optional description
  Power Sync Option: Always Sync
  Policy Owner: Local

UCS-A/org/service-profile #
```

## Deleting a Local Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A/org # <b>scope service-profile</b> <i>service-profile-name</i>	Enters the service profile mode for the specified service profile. The name of the service profile can be a minimum of two characters and a maximum up to 32 characters.
<b>Step 3</b>	UCS-A /org/service-profile # <b>delete power-sync-definition</b>	Enters the power sync definition mode. You can delete a power sync policy definition that you defined for the power sync policy.

	Command or Action	Purpose
<b>Step 4</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the local policy in use by the service profile.

```
UCS-A # scope org
      UCS-A/org # scope service-profile spnew
      UCS-A/org/service-profile # delete power-sync-definition
      UCS-A/org/service-profile* # commit-buffer
```

## Rack Server Power Management

Power capping is supported for following rack servers:

- Cisco UCS C220 M5 Server
- Cisco UCS C240 M5 Server
- Cisco UCS C240 SD M5 Server
- Cisco UCS C480 M5 Server
- Cisco UCS C480 M5 ML Server
- Cisco UCS C220 M6 Server
- Cisco UCS C240 M6 Server
- Cisco UCS C225 M6 Server
- Cisco UCS C245 M6 Server

Power capping is not supported for Cisco UCS C125 M5 Servers.

## UCS Mini Power Management

You can manage power of the blade servers in the Cisco UCS 6324 Fabric Interconnect (FI), which is used for remote offices and branch sites, and for limited server deployments. UCS Manager supports Dual Line Power Supply Unit and 110V when used with the Cisco UCS 6324 Fabric Interconnect. You can manage how you want to allocate power when using 110V power supplies, because they might not provide enough power for a fully loaded chassis. Dual power supplies is standard for both AC and DC-48V on the Cisco UCS Mini 6324.



## CHAPTER 6

# Blade Server Management

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- [Blade Server Management, on page 57](#)
- [Guidelines for Removing and Decommissioning Blade Servers, on page 58](#)
- [Recommendations for Avoiding Unexpected Server Power Changes, on page 58](#)
- [Booting a Blade Server, on page 59](#)
- [Shutting Down a Blade Server, on page 60](#)
- [Power Cycling a Blade Server, on page 61](#)
- [Performing a Hard Reset on a Blade Server, on page 61](#)
- [Acknowledging a Blade Server, on page 62](#)
- [Removing a Blade Server from a Chassis, on page 63](#)
- [Decommissioning a Blade Server, on page 63](#)
- [Recommissioning a Blade Server, on page 64](#)
- [Turning On the Locator LED for a Blade Server, on page 65](#)
- [Turning Off the Locator LED for a Blade Server, on page 65](#)
- [Resetting the CMOS for a Blade Server, on page 66](#)
- [Resetting the CIMC for a Blade Server, on page 67](#)
- [Clearing TPM for a Blade Server, on page 67](#)
- [Resetting the BIOS Password for a Blade Server, on page 68](#)
- [Issuing an NMI from a Blade Server, on page 69](#)
- [Health LED Alarms, on page 69](#)
- [Smart SSD, on page 70](#)

## Blade Server Management

You can manage and monitor all blade servers in a Cisco UCS domain through Cisco UCS Manager. You can perform some blade server management tasks, such as changes to the power state, from the server and service profile.

The remaining management tasks can only be performed on the server.

The power supply units go into power save mode when a chassis has two blades or less. When a third blade is added to the chassis and is fully discovered, the power supply units return to regular mode.

If a blade server slot in a chassis is empty, Cisco UCS Manager provides information, errors, and faults for that slot. You can also re-acknowledge the slot to resolve server mismatch errors and to have Cisco UCS Manager rediscover the blade server in the slot.

# Guidelines for Removing and Decommissioning Blade Servers

Consider the following guidelines when deciding whether to remove or decommission a blade server using Cisco UCS Manager:

## Decommissioning a Blade Server

If you want to temporarily decommission a physically present and connected blade server, you can temporarily remove it from the configuration. A portion of the server's information is retained by Cisco UCS Manager for future use, in case the blade server is recommissioned.

## Removing a Blade Server

Removing is performed when you physically remove a blade server from the Cisco UCS Manager by disconnecting it from the chassis. You cannot remove a blade server from Cisco UCS Manager if it is physically present and connected to a chassis. After the physical removal of the blade server is completed, the configuration for that blade server can be removed in Cisco UCS Manager.

During removal, active links to the blade server are disabled, all entries from databases are removed, and the server is automatically removed from any server pools that it was assigned to during discovery.



---

**Note** Only servers added to a server pool automatically during discovery are removed automatically. Servers that were manually added to a server pool must be removed manually.

---

To add a removed blade server back to the configuration, it must be reconnected, then rediscovered. When a server is reintroduced to Cisco UCS Manager, it is treated as a new server and is subject to the deep discovery process. For this reason, it is possible for Cisco UCS Manager to assign the server a new ID that might be different from the ID that it held before.

# Recommendations for Avoiding Unexpected Server Power Changes

If a server is not associated with a service profile, you can use any available means to change the server power state, including the physical **Power** or **Reset** buttons on the server.

If a server is associated with, or assigned to, a service profile, you should only use the following methods to change the server power state:

- In Cisco UCS Manager GUI, go to the **General** tab for the server or the service profile associated with the server and select **Boot Server** or **Shutdown Server** from the **Actions** area.
- In Cisco UCS Manager CLI, scope to the server or the service profile associated with the server and use the **power up** or **power down** commands.



**Important** Do *not* use any of the following options on an associated server that is currently powered off:

- **Reset** in the GUI
- **cycle cycle-immediate** or **reset hard-reset-immediate** in the CLI
- The physical **Power** or **Reset** buttons on the server

If you reset, cycle, or use the physical power buttons on a server that is currently powered off, the server's actual power state might become out of sync with the desired power state setting in the service profile. If the communication between the server and Cisco UCS Manager is disrupted or if the service profile configuration changes, Cisco UCS Manager might apply the desired power state from the service profile to the server, causing an unexpected power change.

Power synchronization issues can lead to an unexpected server restart, as shown below:

Desired Power State in Service Profile	Current Server Power State	Server Power State After Communication Is Disrupted
Up	Powered Off	Powered On
Down	Powered On	Powered On <b>Note</b> Running servers are not shut down regardless of the desired power state in the service profile.

## Booting a Blade Server

### Before you begin

Associate a service profile with a blade server or server pool.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power up</b>	Boots the blade server associated with the service profile.

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

### Example

The following example boots the blade server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile* # power up
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Shutting Down a Blade Server

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.



**Note** When a blade server that is associated with a service profile is shut down, the VIF down alerts F0283 and F0479 are automatically suppressed.

### Before you begin

Associate a service profile with a blade server or server pool.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power down</b>	Shuts down the blade server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.



### Example

The following example shuts down the blade server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServProf34
UCS-A /org/service-profile # power down
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Power Cycling a Blade Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified blade server.
<b>Step 2</b>	UCS-A /chassis/server # <b>cycle</b> { <b>cycle-immediate</b>   <b>cycle-wait</b> }	Power cycles the blade server.  Use the <b>cycle-immediate</b> keyword to immediately begin power cycling the blade server; use the <b>cycle-wait</b> keyword to schedule the power cycle to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example immediately power cycles blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # cycle cycle-immediate
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Performing a Hard Reset on a Blade Server

When you reset a server, Cisco UCS Manager sends a pulse on the reset line. You can choose to gracefully shut down the operating system. If the operating system does not support a graceful shutdown, the server is power cycled. The option to have Cisco UCS Manager complete all management operations before it resets the server does not guarantee the completion of these operations before the server is reset.



**Note** If you are trying to boot a server from a power-down state, you should not use **Reset**.

If you continue the power-up with this process, the desired power state of the servers become out of sync with the actual power state and the servers might unexpectedly shut down at a later time. To safely reboot the selected servers from a power-down state, click **Cancel**, then select the **Boot Server** action.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset</b> { <b>hard-reset-immediate</b>   <b>hard-reset-wait</b> }	Performs a hard reset of the blade server.  Use the <b>hard-reset-immediate</b> keyword to immediately begin hard resetting the server; use the <b>hard-reset-wait</b> keyword to schedule the hard reset to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example performs an immediate hard reset of blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # reset hard-reset-immediate
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Acknowledging a Blade Server

Perform the following procedure to rediscover the server and all endpoints in the server. For example, you can use this procedure if a server is stuck in an unexpected state, such as the discovery state.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>acknowledge server</b> <i>chassis-num / server-num</i>	Acknowledges the specified blade server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example acknowledges server 4 in chassis 2 and commits the transaction:

```
UCS-A# acknowledge server 2/4
UCS-A* # commit-buffer
UCS-A #
```

## Removing a Blade Server from a Chassis

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>remove server</b> <i>chassis-num / server-num</i>	Removes the specified blade server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 3</b>	Go to the physical location of the chassis and remove the server hardware from the slot.	For instructions on how to remove the server hardware, see the <i>Cisco UCS Hardware Installation Guide</i> for your chassis.

**Example**

The following example removes blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# remove server 2/4
UCS-A* # commit-buffer
UCS-A #
```

**What to do next**

If you physically re-install the blade server, you must re-acknowledge the slot for the Cisco UCS Manager to rediscover the server.

For more information, see [Acknowledging a Blade Server, on page 62](#).

## Decommissioning a Blade Server

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>decommission server</b> <i>chassis-num / server-num</i>	Decommissions the specified blade server.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example decommissions blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# decommission server 2/4
UCS-A* # commit-buffer
UCS-A #
```

### What to do next

After decommissioning the blade server, you must wait for few minutes to initiate the recommissioning of the server.

## Recommissioning a Blade Server

### Before you begin

Incase of recommissioning a blade server after decommission, you should wait for few minutes to initiate the recommission of the server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>recommission server</b> <i>chassis-num</i> / <i>server-num</i>	Recommissions the specified blade server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example recommissions blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# recommission server 2/4
UCS-A* # commit-buffer
UCS-A #
```

## Turning On the Locator LED for a Blade Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>enable locator-led</b> [ <b>multi-master</b>   <b>multi-slave</b> ]	Turns on the blade server locator LED. For the Cisco UCS B460 M4 blade server, you can add the following keywords: <ul style="list-style-type: none"> <li>• <b>multi-master</b>—Turns on the LED for the master node only.</li> <li>• <b>multi-slave</b>—Turns on the LED for the slave node only.</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example turns on the locator LED on blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # enable locator-led
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

The following example turns on the locator LED for the master node only on blade server 7 in chassis 2 and commits the transaction:

```
UCS-A# scope chassis 2/7
UCS-A /chassis/server # enable locator-led multi-master
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Turning Off the Locator LED for a Blade Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis mode for the specified chassis.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /chassis/server # <b>disable locator-led</b> [ <b>multi-master</b>   <b>multi-slave</b> ]	Turns off the blade server locator LED. For the Cisco UCS B460 M4 blade server, you can add the following keywords: <ul style="list-style-type: none"> <li>• <b>multi-master</b>—Turns off the LED for the master node only.</li> <li>• <b>multi-slave</b>—Turns off the LED for the slave node only.</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example turns off the locator LED on blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope chassis 2/4
UCS-A /chassis/server # disable locator-led
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

The following example turns off the locator LED for the master node on blade server 7 in chassis 2 and commits the transaction:

```
UCS-A# scope chassis 2/7
UCS-A /chassis/server # disable locator-led multi-master
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting the CMOS for a Blade Server

Sometimes, troubleshooting a server might require you to reset the CMOS. Resetting the CMOS is not part of the normal maintenance of a server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset-cmos</b>	Resets the CMOS for the blade server.
<b>Step 3</b>	UCS-A /chassis/server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example resets the CMOS for blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # reset-cmos
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting the CIMC for a Blade Server

Sometimes, with the firmware, troubleshooting a server might require you to reset the CIMC. Resetting the CIMC is not part of the normal maintenance of a server. After you reset the CIMC, the CIMC reboots the management controller of the blade server.

If the CIMC is reset, the power monitoring functions of Cisco UCS become briefly unavailable until the CIMC reboots. Typically, the reset only takes 20 seconds; however, it is possible that the peak power cap can exceed during that time. To avoid exceeding the configured power cap in a low power-capped environment, consider staggering the rebooting or activation of CIMCs.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope CIMC</b>	Enters chassis server CIMC mode
<b>Step 3</b>	UCS-A /chassis/server/CIMC # <b>reset</b>	Resets the CIMC for the blade server.
<b>Step 4</b>	UCS-A /chassis/server/CIMC # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example resets the CIMC for blade server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # scope CIMC
UCS-A /chassis/server/cimc # reset
UCS-A /chassis/server/cimc* # commit-buffer
UCS-A /chassis/server/cimc #
```

## Clearing TPM for a Blade Server

You can clear TPM only on Cisco UCS M4 blade and rack-mount servers that include support for TPM.



**Caution** Clearing TPM is a potentially hazardous operation. The OS may stop booting. You may also see loss of data.

### Before you begin

TPM must be enabled.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> [ <i>chassis-num/server-num</i>   <i>dynamic-uuid</i> ]	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A# /chassis/server # <b>scope tpm</b> <i>tpm-ID</i>	Enters org TPM mode for the specified TPM.
<b>Step 3</b>	UCS-A# /chassis/server/tpm # <b>set adminaction clear-config</b>	Specifies that the TPM is to be cleared.
<b>Step 4</b>	UCS-A# /chassis/server/tpm # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to clear TPM for a blade server:

```
UCS-A# scope server 1/3
UCS-A# /chassis/server # scope tpm 1
UCS-A# /chassis/server/tpm # set adminaction clear-config
UCS-A# /chassis/server/tpm* # commit-buffer
```

## Resetting the BIOS Password for a Blade Server

This option allows you to reset the BIOS password without using the F2 BIOS configuration prompt. Resetting the BIOS password is not part of the normal maintenance of a server. After the BIOS password reset, the server is rebooted immediately and the new BIOS password gets updated.

### Procedure

- 
- Step 1** UCS-A# **scope server** *chassis-num / server-num*  
Enters chassis server mode for the specified chassis.
- Step 2** UCS-A /chassis/server # **reset-bios-password**  
Resets the BIOS password for the blade server.



- Step 3** UCS-A /chassis/server # **commit-buffer**  
Commits the transaction to the system configuration.

## Issuing an NMI from a Blade Server

Perform the following procedure if the system remains unresponsive and you need Cisco UCS Manager to issue a Non-Maskable Interrupt (NMI) to the BIOS or operating system from the CIMC. This action creates a core dump or stack trace, depending on the operating system installed on the server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> [ <i>chassis-num/server-num</i>   <i>dynamic-uuid</i> ]	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>diagnostic-interrupt</b>	
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

### Example

The following example sends an NMI from server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # diagnostic-interrupt
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Health LED Alarms

The blade health LED is located on the front of each Cisco UCS B-Series blade server. Cisco UCS Manager allows you to view the sensor faults that cause the blade health LED to change color from green to amber or blinking amber.

The health LED alarms display the following information:

Name	Description
<b>Severity</b> column	The severity of the alarm. This can be one of the following: <ul style="list-style-type: none"> <li>• Critical—The blade health LED is blinking amber.</li> <li>• Minor—The blade health LED is amber.</li> </ul>
<b>Description</b> column	A brief description of the alarm.
<b>Sensor ID</b> column	The ID of the sensor the triggered the alarm.

Name	Description
Sensor Name column	The name of the sensor that triggered the alarm.

## Smart SSD

Beginning with release 3.1(3), Cisco UCS Manager supports monitoring SSD health. This feature is called Smart SSD. It provides statistical information about the properties like wear status in days, percentage life remaining, and so on. For every property, a minimum, a maximum and an average value is recorded and displayed. The feature also allows you to provide threshold limit for the properties.



**Note** The Smart SSD feature is supported only for a selected range of SSDs. It is not supported for any HDDs.

The SATA range of supported SSDs are:

- Intel
- Samsung
- Micron

The SAS range of supported SSDs are:

- Toshiba
- Sandisk
- Samsung
- Micron



**Note**

- Power Cycle Count is not available on SAS SSDs.
- Smart SSD feature is supported only on M5 servers and later.

## Viewing SSD Health Statistics

Perform this procedure to view the SSD Health statistics.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /chassis/server # <b>show stats</b>	Displays the SSD health statistics for the specified server.

### Example

The following example displays the SSD health statistics for blade 3 in chassis 1:

```
UCS-A# scope server 1/3
UCS-A /chassis/server # show stats

Ssd Health Stats:
  Time Collected: 2016-12-07T19:35:15.920
  Monitored Object: sys/chassis-1/blade-3/board/storage-SAS-1/ssd-health-stats-1
  Suspect: No
  Id: 1
  Power Cycle Count: 1022
  Power On Hours: 4793
  Percentage Life Left: 92
  Wear Status In Days: 1679
  Thresholded: 0

  Time Collected: 2016-12-07T19:35:38.912
  Monitored Object: sys/chassis-1/blade-3/board/storage-SAS-1/ssd-health-stats-2
  Suspect: No
  Id: 2
  Power Cycle Count: 1017
  Power On Hours: 4270
  Percentage Life Left: 87
  Wear Status In Days: 1587
  Thresholded: 0

  Time Collected: 2016-12-07T19:35:15.920
  Monitored Object: sys/chassis-1/blade-3/board/storage-SAS-4/ssd-health-stats-1
  Suspect: No
  Id: 1
  Power Cycle Count: 1506
  Power On Hours: 5029
  Percentage Life Left: 98
  Wear Status In Days: 1788
  Thresholded: 0

  Time Collected: 2016-12-07T19:35:15.920
  Monitored Object: sys/chassis-1/blade-3/board/storage-SAS-4/ssd-health-stats-2
  Suspect: No
  Id: 2
  Power Cycle Count: 58
  Power On Hours: 4731
  Percentage Life Left: 100
  Wear Status In Days: 1825
  Thresholded: 0
UCS-A /chassis/server #
```





## CHAPTER 7

# Rack-Mount Server Management

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- [Rack-Mount Server Management, on page 73](#)
- [Rack-Enclosure Server Management, on page 74](#)
- [Guidelines for Removing and Decommissioning Rack-Mount Servers, on page 75](#)
- [Recommendations for Avoiding Unexpected Server Power Changes, on page 75](#)
- [Booting a Rack-Mount Server, on page 76](#)
- [Shutting Down a Rack-Mount Server, on page 77](#)
- [Resetting a Rack-Mount Server to Factory Default Settings, on page 78](#)
- [Performing Persistent Memory Scrub, on page 79](#)
- [Power Cycling a Rack-Mount Server, on page 79](#)
- [Performing a Hard Reset on a Rack-Mount Server, on page 80](#)
- [Acknowledging a Rack-Mount Server, on page 81](#)
- [Decommissioning a Rack-Mount Server, on page 81](#)
- [Recommissioning a Rack-Mount Server, on page 82](#)
- [Renumbering a Rack-Mount Server, on page 83](#)
- [Removing a Rack-Mount Server, on page 84](#)
- [Turning On the Locator LED for a Rack-Mount Server, on page 85](#)
- [Turning Off the Locator LED for a Rack-Mount Server, on page 86](#)
- [Resetting the CMOS for a Rack-Mount Server, on page 86](#)
- [Resetting the CIMC for a Rack-Mount Server, on page 87](#)
- [Clearing TPM for a Rack-Mount Server, on page 87](#)
- [Resetting the BIOS Password for a Rack-Mount Server, on page 88](#)
- [Showing the Status for a Rack-Mount Server, on page 89](#)
- [Issuing an NMI from a Rack-Mount Server, on page 89](#)
- [Viewing the Power Transition Log, on page 90](#)
- [Viewing Rack Enclosure Slot Statistics, on page 90](#)

## Rack-Mount Server Management

You can manage and monitor all rack-mount servers that are integrated with a Cisco UCS domain through Cisco UCS Manager. All management and monitoring features are supported for rack-mount servers except power capping. Some rack-mount server management tasks, such as changes to the power state, can be performed from both the server and service profile. The remaining management tasks can only be performed on the server.

Cisco UCS Manager provides information, errors, and faults for each rack-mount server that it has discovered.



---

**Tip** For information on how to integrate a supported Cisco UCS rack-mount server with Cisco UCS Manager, see the Cisco UCS C-series server integration guide or Cisco UCS S-series server integration guide for your Cisco UCS Manager release.

---

## Rack-Enclosure Server Management

Beginning with release 4.0(1a), Cisco UCS Manager extends support for all existing features on Cisco UCS C125 M5 Servers unless specifically noted in this guide.

Cisco UCS C125 M5 Servers are housed in the Cisco UCS C4200 Series Rack Server Chassis. Each Cisco UCS C4200 Series Rack Server Chassis supports up to four Cisco UCS C125 M5 Server nodes. To manage the Cisco UCS C125 M5 Server nodes, Cisco UCS Manager supports **rack-enclosure** object in CLI.

Rack enclosures can be scoped using the CLI interface. For example:

```
UCS-A # scope rack-enclosure 1
```

You can scope **rack-enclosure** for the following:

- fan-module
- psu
- slot

fan-module and psu can be managed the same way as other rack servers. For slot, see [Viewing Rack Enclosure Slot Statistics, on page 90](#).

You can also use the **show** command to view the following in **rack-enclosure**:

- detail
- event
- expand
- fan-module
- fault
- fsm
- psu
- slot
- stats

# Guidelines for Removing and Decommissioning Rack-Mount Servers

Consider the following guidelines when deciding whether to remove or decommission a rack-mount server using Cisco UCS Manager:

## Decommissioning a Rack-Mount server

Decommissioning is performed when a rack-mount server is physically present and connected but you want to temporarily remove it from the configuration. Because it is expected that a decommissioned rack-mount server will be eventually recommissioned, a portion of the server's information is retained by Cisco UCS Manager for future use.

## Removing a Rack-Mount server

Removing is performed when you physically remove the server from the system by disconnecting the rack-mount server from the fabric extender. You cannot remove a rack-mount server from Cisco UCS Manager if it is physically present and connected to the fabric extender. Once the rack-mount server is disconnected, the configuration for that rack-mount server can be removed in Cisco UCS Manager.

During removal, management interfaces are disconnected, all entries from databases are removed, and the server is automatically removed from any server pools that it was assigned to during discovery.



---

**Note** Only those servers added to a server pool automatically during discovery will be removed automatically. Servers that have been manually added to a server pool have to be removed manually.

---

If you need to add a removed rack-mount server back to the configuration, it must be reconnected and then rediscovered. When a server is reintroduced to Cisco UCS Manager it is treated like a new server and is subject to the deep discovery process. For this reason, it's possible that Cisco UCS Manager will assign the server a new ID that may be different from the ID that it held before.

## Recommendations for Avoiding Unexpected Server Power Changes

If a server is not associated with a service profile, you can use any available means to change the server power state, including the physical **Power** or **Reset** buttons on the server.

If a server is associated with, or assigned to, a service profile, you should only use the following methods to change the server power state:

- In Cisco UCS Manager GUI, go to the **General** tab for the server or the service profile associated with the server and select **Boot Server** or **Shutdown Server** from the **Actions** area.
- In Cisco UCS Manager CLI, scope to the server or the service profile associated with the server and use the **power up** or **power down** commands.



**Important** Do *not* use any of the following options on an associated server that is currently powered off:

- **Reset** in the GUI
- **cycle cycle-immediate** or **reset hard-reset-immediate** in the CLI
- The physical **Power** or **Reset** buttons on the server

If you reset, cycle, or use the physical power buttons on a server that is currently powered off, the server's actual power state might become out of sync with the desired power state setting in the service profile. If the communication between the server and Cisco UCS Manager is disrupted or if the service profile configuration changes, Cisco UCS Manager might apply the desired power state from the service profile to the server, causing an unexpected power change.

Power synchronization issues can lead to an unexpected server restart, as shown below:

Desired Power State in Service Profile	Current Server Power State	Server Power State After Communication Is Disrupted
Up	Powered Off	Powered On
Down	Powered On	Powered On <b>Note</b> Running servers are not shut down regardless of the desired power state in the service profile.

## Booting a Rack-Mount Server

### Before you begin

Associate a service profile with a rack-mount server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power up</b>	Boots the rack-mount server associated with the service profile.



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

### Example

The following example boots the rack-mount server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile # power up
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Shutting Down a Rack-Mount Server

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.

### Before you begin

Associate a service profile with a rack-mount server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power down</b>	Shuts down the rack-mount server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shuts down the rack-mount server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServProf34
UCS-A /org/service-profile # power down
```

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

## Resetting a Rack-Mount Server to Factory Default Settings

You can now reset a rack-mount server to its factory settings. By default, the factory reset operation does not affect storage, including storage drives and flexflash drives. This is to prevent any loss of data. However, you can choose to reset these devices to a known state as well.



**Important** Resetting storage devices will result in loss of data.

Perform the following procedure if you need to reset the server to factory default settings.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>reset factory-default</b> [ <b>delete-flexflash-storage</b>   <b>delete-storage</b> [ <b>create-initial-storage-volumes</b> ] ]	Resets server settings to factory default using the following command options: <ul style="list-style-type: none"> <li>• <b>factory-default</b>—Resets the server to factory defaults without deleting storage</li> <li>• <b>delete-flexflash-storage</b>—Resets the server to factory defaults and deletes flexflash storage</li> <li>• <b>delete-storage</b>—Resets the server to factory defaults and deletes all storage</li> <li>• <b>create-initial-storage-volumes</b>—Resets the server to factory defaults, deletes all storage, sets all disks to their initial state</li> </ul> <p><b>Important</b> Do not use the <b>create-initial-storage-volumes</b> command option if you want to use storage profiles. Creating initial volumes when you are using storage profiles may result in configuration errors.</p>
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example resets the server settings to factory default without deleting storage, and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset factory-default
UCS-A /server* # commit-buffer
UCS-A /server #
```

The following example resets the server settings to factory default, deletes flexflash storage, and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset factory-default delete-flexflash-storage
UCS-A /server* # commit-buffer
```

The following example resets the server settings to factory default, deletes all storage, and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset factory-default delete-storage
UCS-A /server* # commit-buffer
```

The following example resets the server settings to factory default, deletes all storage, sets all disks to their initial state, and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset factory-default delete-storage create-initial-storage-volumes
UCS-A /server* # commit-buffer
```

## Performing Persistent Memory Scrub

In Cisco UCS Manager, you can scrub persistent memory by using one of the following methods:

- Disassociating the Service Profile and the Scrub Policy with Persistent Memory Scrub Selected
- Resetting a Server to Factory Defaults With Persistent Memory Scrub Selected
- Deleting a Goal

## Power Cycling a Rack-Mount Server

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /server # <b>cycle</b> { <b>cycle-immediate</b>   <b>cycle-wait</b> }	Power cycles the rack-mount server.  Use the <b>cycle-immediate</b> keyword to immediately begin power cycling the rack-mount server; use the <b>cycle-wait</b> keyword to schedule the power cycle to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example immediately power cycles rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # cycle cycle-immediate
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Performing a Hard Reset on a Rack-Mount Server

When you reset a server, Cisco UCS Manager sends a pulse on the reset line. You can choose to gracefully shut down the operating system. If the operating system does not support a graceful shutdown, the server is power cycled. The option to have Cisco UCS Manager complete all management operations before it resets the server does not guarantee the completion of these operations before the server is reset.



**Note** If you are trying to boot a server from a power-down state, you should not use **Reset**.

If you continue the power-up with this process, the desired power state of the servers become out of sync with the actual power state and the servers might unexpectedly shut down at a later time. To safely reboot the selected servers from a power-down state, click **Cancel**, then select the **Boot Server** action.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>reset</b> { <b>hard-reset-immediate</b>   <b>hard-reset-wait</b> }	Performs a hard reset of the rack-mount server.  Use the <b>hard-reset-immediate</b> keyword to immediately begin hard resetting the rack-mount server; use the <b>hard-reset-wait</b> keyword to

	Command or Action	Purpose
		schedule the hard reset to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example performs an immediate hard reset of rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset hard-reset-immediate
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Acknowledging a Rack-Mount Server

Perform the following procedure to rediscover the server and all endpoints in the server. For example, you can use this procedure if a server is stuck in an unexpected state, such as the discovery state.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>acknowledge server</b> <i>server-num</i>	Acknowledges the specified rack-mount server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example acknowledges rack-mount server 2 and commits the transaction:

```
UCS-A# acknowledge server 2
UCS-A* # commit-buffer
UCS-A #
```

## Decommissioning a Rack-Mount Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>decommission server</b> <i>server-num</i>	Decommissions the specified rack-mount server.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example decommissions rack-mount server 2 and commits the transaction:

```
UCS-A# decommission server 2
UCS-A* # commit-buffer
UCS-A #
```

### What to do next

After decommissioning the rack-mount server, you must wait for few minutes to initiate the recommissioning of the server.

For more information, see [Recommissioning a Rack-Mount Server, on page 82](#)

## Recommissioning a Rack-Mount Server

### Before you begin

Incase of recommissioning a rack-mount server after decommission, you should wait for few minutes to initiate the recommission of the server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>recommission server</b> <i>server-num</i>	Recommissions the specified rack-mount server.
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example recommissions rack-mount server 2 and commits the transaction:

```
UCS-A# recommission server 2
UCS-A* # commit-buffer
UCS-A #
```

# Renumbering a Rack-Mount Server

## Before you begin

If you are swapping IDs between servers, you must first decommission both servers, then wait for the server decommission FSM to complete before proceeding with the renumbering steps.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>show server inventory</b>	Displays information about your servers.
<b>Step 2</b>	Verify that the server inventory does not include the following:	<ul style="list-style-type: none"> <li>• The rack-mount server you want to renumber</li> <li>• A rack-mount server with the number you want to use</li> </ul> <p>If either of these rack-mount servers are listed in the server inventory, decommission those servers. You must wait until the decommission FSM is complete and the rack-mount servers are not listed in the server inventory before continuing. This might take several minutes.</p> <p>To see which servers have been decommissioned, issue the <b>show server decommissioned</b> command.</p>
<b>Step 3</b>	UCS-A# <b>recommission server</b> <i>vendor-name model-name serial-numnew-id</i>	Recommissions and renumbers the specified rack-mount server.
<b>Step 4</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example decommissions a rack-mount server with ID 2, changes the ID to 3, recommissions that server, and commits the transaction:

```
UCS-A# show server inventory
```

```
Server  Equipped PID Equipped VID Equipped Serial (SN) Slot Status      Ackd Memory (MB)
Ackd Cores
-----
1/1     UCSB-B200-M4 V01           FCH1532718P           Equipped              131072
16
1/2     UCSB-B200-M4 V01           FCH153271DF           Equipped              131072
16
1/3     UCSB-B200-M4 V01           FCH153271DL           Equipped              114688
16
```

```

1/4 UCSB-B200-M4 V01 Empty
1/5 Empty
1/6 Empty
1/7 N20-B6730-1 V01 JAF1432CFDH Equipped 65536
16
1/8 Empty
1 R200-1120402W V01 QCI1414A02J N/A 49152
12
2 R210-2121605W V01 QCI1442AHFX N/A 24576 8
4 UCSC-BSE-SFF-C200 V01 QCI1514A0J7 N/A 8192 8

```

```

UCS-A# decommission server 2
UCS-A*# commit-buffer
UCS-A# show server decommissioned

```

```

Vendor Model Serial (SN) Server
-----
Cisco Systems Inc R210-2121605W QCI1442AHFX 2

```

```

UCS-A# recommit chassis "Cisco Systems Inc" "R210-2121605W" QCI1442AHFX 3
UCS-A* # commit-buffer
UCS-A # show server inventory

```

```

Server Equipped PID Equipped VID Equipped Serial (SN) Slot Status Ackd Memory (MB)
Ackd Cores
-----
1/1 UCSB-B200-M4 V01 FCH1532718P Equipped 131072
16
1/2 UCSB-B200-M4 V01 FCH153271DF Equipped 131072
16
1/3 UCSB-B200-M4 V01 FCH153271DL Equipped 114688
16
1/4 UCSB-B200-M4 V01 Empty
1/5 Empty
1/6 Empty
1/7 N20-B6730-1 V01 JAF1432CFDH Equipped 65536
16
1/8 Empty
1 R200-1120402W V01 QCI1414A02J N/A 49152
12
3 R210-2121605W V01 QCI1442AHFX N/A 24576 8
4 UCSC-BSE-SFF-C200 V01 QCI1514A0J7 N/A 8192 8

```

## Removing a Rack-Mount Server

### Before you begin

Physically disconnect the CIMC LOM cables that connect the rack-mount server to the fabric extender before performing the following procedure. For high availability setups, remove both cables.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>remove server</b> <i>server-num</i>	Removes the specified rack-mount server.



	Command or Action	Purpose
<b>Step 2</b>	UCS-A# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example removes rack-mount server 4 and commits the transaction:

```
UCS-A# remove server 4
UCS-A* # commit-buffer
UCS-A #
```

### What to do next

If you physically reconnect the rack-mount server, you must re-acknowledge it for the Cisco UCS Manager to rediscover the server.

For more information, see [Acknowledging a Rack-Mount Server, on page 81](#).

## Turning On the Locator LED for a Rack-Mount Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>enable locator-led</b>	Turns on the rack-mount server locator LED.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example turns on the locator LED for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # enable locator-led
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Turning Off the Locator LED for a Rack-Mount Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>disable locator-led</b>	Turns off the rack-mount server locator LED.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example turns off the locator LED for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # disable locator-led
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Resetting the CMOS for a Rack-Mount Server

Sometimes, troubleshooting a server might require you to reset the CMOS. Resetting the CMOS is not part of the normal maintenance of a server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>reset-cmos</b>	Resets the CMOS for the rack-mount server.
<b>Step 3</b>	UCS-A /server # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example resets the CMOS for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # reset-cmos
UCS-A /server* # commit-buffer
UCS-A /server #
```

## Resetting the CIMC for a Rack-Mount Server

Sometimes, with the firmware, troubleshooting a server might require you to reset the CIMC. Resetting the CIMC is not part of the normal maintenance of a server. After you reset the CIMC, the CIMC reboots the management controller of the blade server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified rack-mount server.
<b>Step 2</b>	UCS-A /server # <b>scope CIMC</b>	Enters server CIMC mode
<b>Step 3</b>	UCS-A /server/CIMC # <b>reset</b>	Resets the CIMC for the rack-mount server.
<b>Step 4</b>	UCS-A /server/CIMC # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example resets the CIMC for rack-mount server 2 and commits the transaction:

```
UCS-A# scope server 2
UCS-A /server # scope CIMC
UCS-A /server/cimc # reset
UCS-A /server/cimc* # commit-buffer
UCS-A /server/cimc #
```

## Clearing TPM for a Rack-Mount Server

You can clear TPM only on Cisco UCS M4 blade and rack-mount servers that include support for TPM.



**Caution** Clearing TPM is a potentially hazardous operation. The OS may stop booting. You may also see loss of data.

### Before you begin

TPM must be enabled.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the rack-mount server.
<b>Step 2</b>	UCS-A# /server # <b>scope tpm</b> <i>tpm-ID</i>	Enters org TPM mode for the specified TPM.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A# /server/tpm # <b>set adminaction clear-config</b>	Specifies that the TPM is to be cleared.
<b>Step 4</b>	UCS-A# /server/tpm # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to clear TPM for a rack-mount server:

```
UCS-A# scope server 3
UCS-A# /server # scope tpm 1
UCS-A# /server/tpm # set adminaction clear-config
UCS-A# /server/tpm* # commit-buffer
```

## Resetting the BIOS Password for a Rack-Mount Server

This option allows you to reset the BIOS password without using the F2 BIOS configuration prompt. Resetting the BIOS password is not part of the normal maintenance of a server. After the BIOS password reset, the server is rebooted immediately and the new BIOS password gets updated.

### Procedure

- 
- Step 1** UCS-A# **scope server** *server-num*  
Enters chassis server mode for the specified chassis.
- Step 2** UCS-A /chassis/server # **reset-bios-password**  
Resets the BIOS password for the rack-mount server.
- Step 3** UCS-A /chassis/server # **commit-buffer**  
Commits the transaction to the system configuration.
-

## Showing the Status for a Rack-Mount Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>show server status</b>	Shows the status for all servers in the Cisco UCS domain.

### Example

The following example shows the status for all servers in the Cisco UCS domain. The servers numbered 1 and 2 do not have a slot listed in the table because they are rack-mount servers.

Server Slot	Status	Availability	Overall Status	Discovery
1/1	Equipped	Unavailable	Ok	Complete
1/2	Equipped	Unavailable	Ok	Complete
1/3	Equipped	Unavailable	Ok	Complete
1/4	Empty	Unavailable	Ok	Complete
1/5	Equipped	Unavailable	Ok	Complete
1/6	Equipped	Unavailable	Ok	Complete
1/7	Empty	Unavailable	Ok	Complete
1/8	Empty	Unavailable	Ok	Complete
1	Equipped	Unavailable	Ok	Complete
2	Equipped	Unavailable	Ok	Complete

## Issuing an NMI from a Rack-Mount Server

Perform the following procedure if the system remains unresponsive and you need Cisco UCS Manager to issue a Non-Maskable Interrupt (NMI) to the BIOS or operating system from the CIMC. This action creates a core dump or stack trace, depending on the operating system installed on the server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> [ <i>chassis-num/server-num</i>   <i>dynamic-uuid</i> ]	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>diagnostic-interrupt</b>	
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

### Example

The following example sends an NMI from server 4 in chassis 2 and commits the transaction:

```
UCS-A# scope server 2/4
UCS-A /chassis/server # diagnostic-interrupt
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Viewing the Power Transition Log

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the rack-mount server.
<b>Step 2</b>	UCS-A# /chassis/server # <b>show power-transition-log</b>	Displays the computeRebootLog instances for the specified server.

### Example

The following example shows how to view the power transition log for server 3.

```
UCS-A# scope server 3
UCS-A# /chassis/server # show power-transition-log

Last 5 server reboots (Newest first):

Pwr Change Source                Last pwr transition timestamp
-----
UCSM TURNUP                       2016-10-28T09:35:04.498
HOST PWR TRANSITION               2016-10-27T17:06:56.157
UCSM TURNUP                       2016-10-27T17:06:24.734
UCSM ASSOCIATE                    2016-10-27T17:06:24.068
UCSM SERVER DISCOVER              2016-10-27T16:56:56.153
```

## Viewing Rack Enclosure Slot Statistics

You can see the stats for server slot in the rack enclosure housing the C125 M5 Servers.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope rack-enclosure</b> <i>rack-enclosure-num</i>	Enters the rack-enclosure.
<b>Step 2</b>	UCS-A# /rack-enclosure # <b>show slot</b>	Displays the slot stats.
<b>Step 3</b>	UCS-A# /rack-enclosure # <b>scope slot</b> <i>slot_ID</i>	Enters the slot.
<b>Step 4</b>	UCS-A# /rack-enclosure/slot # <b>show detail</b>	Displays the following stats: <ul style="list-style-type: none"> <li>• Id</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• Slot Type</li> <li>• Presence State</li> <li>• Server ID</li> <li>• Server DN</li> <li>• Current Task</li> </ul>

### Example

The following example shows how to view slot stats in for an enclosure and individual slot stats:

```
UCS-A# scope rack-enclosure 1
UCS-A /rack-enclosure # show slot
UCS-A /rack-enclosure # show slot

Slot:
  Id           Presence State
  -----
          1 Equipped
          2 Empty
          3 Equipped
          4 Empty
UCS-A /rack-enclosure # scope slot 1
UCS-A /rack-enclosure/slot # show detail

Slot:
  Id: 1
  Slot Type: Compute
  Presence State: Equipped
  Server ID: 4
  Server DN: sys/rack-unit-4
  Current Task:
UCS-A /rack-enclosure/slot #
```







## CHAPTER 8

# S3X60 Server Node Hardware Management

- [Cisco UCS S3260 Server Node Management, on page 93](#)
- [Booting a Server from the Service Profile, on page 94](#)
- [Acknowledging a Server, on page 94](#)
- [Power Cycling a Server, on page 95](#)
- [Shutting Down a Server, on page 95](#)
- [Performing a Hard Reset on a Server, on page 96](#)
- [Resetting a Cisco UCS S3260 Server Node to Factory Default Settings, on page 97](#)
- [Removing a Server from a Chassis, on page 99](#)
- [Decommissioning a Server, on page 100](#)
- [Recommissioning a Server, on page 100](#)
- [Turning On the Locator LED for a Server, on page 101](#)
- [Turning Off the Locator LED for a Server, on page 102](#)
- [Resetting All Memory Errors, on page 102](#)
- [Resetting IPMI to Factory Default Settings, on page 103](#)
- [Resetting the CIMC for a Server, on page 103](#)
- [Resetting the CMOS for a Server, on page 104](#)
- [Resetting the BIOS Password for a Cisco UCS S3260 Server Node, on page 105](#)
- [Resetting KVM, on page 105](#)
- [Issuing an NMI from a Server, on page 106](#)
- [Recovering a Corrupt BIOS, on page 106](#)
- [Health LED Alarms, on page 107](#)

## Cisco UCS S3260 Server Node Management

You can manage and monitor all Cisco UCS S3260 server nodes in a Cisco UCS domain through Cisco UCS Manager. You can perform some server management tasks, such as changes to the power state, from the server and service profile.

The remaining management tasks can only be performed on the server.

If a server slot in a chassis is empty, Cisco UCS Manager provides information, errors, and faults for that slot. You can also re-acknowledge the slot to resolve server mismatch errors and rediscover the server in the slot.

# Booting a Server from the Service Profile

## Before you begin

Associate a service profile with a server or server pool.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power up</b>	Boots the server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example boots the server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServProf34
UCS-A /org/service-profile # power up
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

# Acknowledging a Server

Perform the following procedure to rediscover the server and all endpoints in the server. For example, you can use this procedure if a server is stuck in an unexpected state, such as the discovery state.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>acknowledge server</b> <i>chassis-num</i> <i>/ server-num</i>	Acknowledges the specified server.
<b>Step 2</b>	UCS-A*# <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example acknowledges server 1 in chassis 3 and commits the transaction:

```
UCS-A# acknowledge server 3/1
UCS-A* # commit-buffer
UCS-A #
```

## Power Cycling a Server

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>cycle</b> { <b>cycle-immediate</b>   <b>cycle-wait</b> }	Power cycles the server.  Use the <b>cycle-immediate</b> keyword to immediately begin power cycling the server; use the <b>cycle-wait</b> keyword to schedule the power cycle to begin after all pending management operations have completed.
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example immediately power cycles server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # cycle cycle-immediate
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Shutting Down a Server

When you use this procedure to shut down a server with an installed operating system, Cisco UCS Manager triggers the OS into a graceful shutdown sequence.

**Before you begin**

Associate a service profile with a server or server pool.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>power down</b>	Shuts down the server associated with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shuts down the server associated with the service profile named ServProf34 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServProf34
UCS-A /org/service-profile # power down
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Performing a Hard Reset on a Server

When you reset a server, Cisco UCS Manager sends a pulse on the reset line. You can choose to gracefully shut down the operating system. If the operating system does not support a graceful shutdown, the server is power cycled. The option to have Cisco UCS Manager complete all management operations before it resets the server does not guarantee the completion of these operations before the server is reset.



**Note** If you are trying to boot a server from a power-down state, you should not use **Reset**.

If you continue the power-up with this process, the desired power state of the servers become out of sync with the actual power state and the servers might unexpectedly shut down at a later time. To safely reboot the selected servers from a power-down state, click **Cancel**, then select the **Boot Server** action.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset</b> { <b>hard-reset-immediate</b>   <b>hard-reset-wait</b> }	Performs a hard reset of the server.

	Command or Action	Purpose
		Use the: <ul style="list-style-type: none"> <li>• <b>hard-reset-immediate</b> keyword to immediately begin hard resetting the server.</li> <li>• <b>hard-reset-wait</b> keyword to schedule the hard reset to begin after all pending management operations have completed.</li> </ul>
<b>Step 3</b>	UCS-A /server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example performs an immediate hard reset of server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset hard-reset-immediate
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting a Cisco UCS S3260 Server Node to Factory Default Settings

You can now reset a Cisco UCS S3260 Server Node to its factory settings. By default, the factory reset operation does not affect storage drives. This is to prevent any loss of data. However, you can choose to reset these devices to a known state as well.

The following guidelines apply to Cisco UCS S3260 Server Nodes when using scrub policies:

- For Cisco UCS S3260 Server Nodes, you cannot delete storage by using the scrub policy.
- Cisco UCS S3260 Server Nodes do not support FlexFlash drives.
- For Cisco UCS S3260 Server Nodes, you can only reset the BIOS by using the scrub policy.




---

**Important** Resetting storage devices will result in loss of data.

---

Perform the following procedure to reset the server to factory default settings.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num</i> / <i>server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset factory-default</b> [ <b>delete-flexflash-storage</b>   <b>delete-storage</b> [ <b>create-initial-storage-volumes</b> ] ]	Resets server settings to factory default using the following command options: <ul style="list-style-type: none"> <li>• <b>factory-default</b>—Resets the server to factory defaults without deleting storage</li> </ul> <p><b>Note</b> This operation resets the BIOS.</p> <ul style="list-style-type: none"> <li>• <b>delete-flexflash-storage</b>—Resets the server to factory defaults and deletes flexflash storage</li> </ul> <p><b>Note</b> This operation is not supported on Cisco UCS S3260 Server Nodes.</p> <ul style="list-style-type: none"> <li>• <b>delete-storage</b>—Resets the server to factory defaults and deletes all storage</li> <li>• <b>create-initial-storage-volumes</b>—Resets the server to factory defaults, deletes all storage, sets all disks to their initial state</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

**Example**

The following example resets the server settings to factory default without deleting storage, and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset factory-default
UCS-A /chassis/server* # commit-buffer
```

The following example resets the server settings to factory default, deletes flexflash storage, and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset factory-default delete-flexflash-storage

UCS-A /chassis/server* # commit-buffer
```

The following example resets the server settings to factory default, deletes all storage, and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset factory-default delete-storage
UCS-A /chassis/server* # commit-buffer
```

The following example resets the server settings to factory default, deletes all storage, sets all disks to their initial state, and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset factory-default delete-storage create-initial-storage-volumes
UCS-A /chassis/server* # commit-buffer
```

## Removing a Server from a Chassis

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>remove server</b> <i>chassis-num / server-num</i>	Removes the specified server.
<b>Step 2</b>	UCS-A*# <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 3</b>	Go to the physical location of the chassis and remove the server hardware from the slot.	For instructions on how to remove the server hardware, see the <i>Cisco UCS Hardware Installation Guide</i> for your chassis.

### Example

The following example removes server 1 in chassis 3 and commits the transaction:

```
UCS-A# remove server 3/1
UCS-A* # commit-buffer
UCS-A #
```

### What to do next

If you physically re-install the blade server, you must re-acknowledge the slot for the Cisco UCS Manager to rediscover the server.

For more information, see [Acknowledging a Server, on page 94](#).

# Decommissioning a Server

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>decommission server</b> <i>chassis-num</i> / <i>server-num</i>	Decommissions the specified server.
<b>Step 2</b>	UCS-A*# <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example decommissions server 1 in chassis 3 and commits the transaction:

```
UCS-A# decommission server 3/1
UCS-A* # commit-buffer
UCS-A #
```

## What to do next

After decommissioning the server, you must wait for few minutes to initiate the recommissioning of the server.

For more information, see [Recommissioning a Server, on page 100](#)

# Recommissioning a Server

## Before you begin

Incase of recommissioning the server after decommission, you should wait for few minutes to initiate the recommitment of the server.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>recommission server</b> <i>chassis-num</i> / <i>server-num</i>	Recommissions the specified server.
<b>Step 2</b>	UCS-A*# <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example recommissions server 1 in chassis 3 and commits the transaction:



```
UCS-A# recommission server 3/1
UCS-A* # commit-buffer
UCS-A #
```

## Turning On the Locator LED for a Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>enable locator-led</b> [ <b>multi-master</b>   <b>multi-slave</b> ]	Turns on the server locator LED. The following command options are not applicable to Cisco UCS S3260 Server Nodes: <ul style="list-style-type: none"> <li>• <b>multi-master</b>—Turns on the LED for the master node only.</li> <li>• <b>multi-slave</b>—Turns on the LED for the slave node only.</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example turns on the locator LED on server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # enable locator-led
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

The following example turns on the locator LED for the master node only on server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope chassis 3/1
UCS-A /chassis/server # enable locator-led multi-master
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Turning Off the Locator LED for a Server

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>disable locator-led</b> [ <b>multi-master</b>   <b>multi-slave</b> ]	Turns off the server locator LED. The following command options are not applicable to Cisco UCS S3260 Server Nodes: <ul style="list-style-type: none"> <li>• <b>multi-master</b>—Turns off the LED for the master node only.</li> <li>• <b>multi-slave</b>—Turns off the LED for the slave node only.</li> </ul>
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example turns off the locator LED on server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope chassis 3/1
UCS-A /chassis/server # disable locator-led
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

The following example turns off the locator LED for the master node on server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope chassis 3/1
UCS-A /chassis/server # disable locator-led multi-master
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting All Memory Errors

Use this procedure to reset all correctable and uncorrectable memory errors encountered by .

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /chassis/server # <b>reset-all-memory-errors</b>	Performs a reset of the memory cards.
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example performs an immediate hard reset of server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset-all-memory-errors
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting IPMI to Factory Default Settings

Perform the following procedure if you need to reset IPMI to factory default settings.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset-ipmi</b>	Resets IPMI settings to factory default.
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

### Example

The following example resets the IPMI settings to factory default and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset-ipmi
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting the CIMC for a Server

Sometimes, with the firmware, troubleshooting a server might require you to reset the CIMC. Resetting the CIMC is not part of the normal maintenance of a server. After you reset the CIMC, the CIMC reboots the management controller of the blade server.

If the CIMC is reset, the power monitoring functions of Cisco UCS become briefly unavailable until the CIMC reboots. Typically, the reset only takes 20 seconds; however, it is possible that the peak power cap can exceed during that time. To avoid exceeding the configured power cap in a low power-capped environment, consider staggering the rebooting or activation of CIMCs.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters chassis server CIMC mode
<b>Step 3</b>	UCS-A /chassis/server/cimc # <b>reset</b>	Resets the CIMC for the server.
<b>Step 4</b>	UCS-A /chassis/server/cimc* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example resets the CIMC for server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # reset
UCS-A /chassis/server/cimc* # commit-buffer
UCS-A /chassis/server/cimc #
```

## Resetting the CMOS for a Server

Sometimes, troubleshooting a server might require you to reset the CMOS. Resetting the CMOS is not part of the normal maintenance of a server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset-cmos</b>	Resets the CMOS for the server.
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example resets the CMOS for server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset-cmos
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Resetting the BIOS Password for a Cisco UCS S3260 Server Node

This option allows you to reset the BIOS password without using the F2 BIOS configuration prompt. Resetting the BIOS password is not part of the normal maintenance of a server. After the BIOS password reset, the server is rebooted immediately and the new BIOS password gets updated.

### Procedure

- 
- Step 1** UCS-A# **scope server** *chassis-num / server-num*  
Enters chassis server mode for the specified chassis.
- Step 2** UCS-A /chassis/server # **reset-bios-password**  
Resets the BIOS password for the Cisco UCS S3260 server.
- Step 3** UCS-A /chassis/server # **commit-buffer**  
Commits the transaction to the system configuration.
- 

## Resetting KVM

Perform the following procedure if you need to reset and clear all KVM sessions.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>reset-kvm</b>	Resets and clears all KVM sessions.
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

### Example

The following example resets and clears all KVM sessions and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # reset-kvm
```

```
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Issuing an NMI from a Server

Perform the following procedure if the system remains unresponsive and you need Cisco UCS Manager to issue a Non-Maskable Interrupt (NMI) to the BIOS or operating system from the CIMC. This action creates a core dump or stack trace, depending on the operating system installed on the server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>diagnostic-interrupt</b>	
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

### Example

The following example sends an NMI from server 1 in chassis 3 and commits the transaction:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # diagnostic-interrupt
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Recovering a Corrupt BIOS

On rare occasions, an issue with a server may require you to recover the corrupted BIOS. This procedure is not part of the normal maintenance of a server. After you recover the BIOS, the server boots with the running version of the firmware for that server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-num / server-num</i>	Enters chassis server mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis/server # <b>recover-bios</b> <i>version</i>	Loads and activates the specified BIOS version.
<b>Step 3</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shows how to recover the BIOS:

```
UCS-A# scope server 3/1
UCS-A /chassis/server # recover-bios S5500.0044.0.3.1.010620101125
UCS-A /chassis/server* # commit-buffer
UCS-A /chassis/server #
```

## Health LED Alarms

The server health LED is located on the front of each server. Cisco UCS Manager allows you to view the sensor faults that cause the blade health LED to change color from green to amber or blinking amber.

The health LED alarms display the following information:

Name	Description
Severity column	The severity of the alarm. This can be one of the following: <ul style="list-style-type: none"> <li>• Critical - The server health LED blinks amber. This is indicated with a red dot.</li> <li>• Minor - The server health LED is amber. This is indicated with an orange dot.</li> </ul>
Description column	A brief description of the alarm.
Sensor ID column	The ID of the sensor that triggered the alarm.
Sensor Name column	The name of the sensor that triggered the alarm.

## Viewing Health LED Status

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>show health-led expand</b>	Displays the health LED and sensor alarms for the selected server.

**Example**

The following example shows how to display the health LED status and sensor alarms for chassis 1 server 3:

```
UCS-A# scope server 1/3
UCS-A /chassis/server # show health-led expand
Health LED:
  Severity: Normal
  Reason:
  Color: Green
  Oper State: On

UCS-A /chassis/server #
```





## CHAPTER 9

# Server Boot Configuration

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- [Boot Policy, on page 109](#)
- [UEFI Boot Mode, on page 110](#)
- [UEFI Secure Boot, on page 111](#)
- [CIMC Secure Boot, on page 112](#)
- [Creating a Boot Policy, on page 114](#)
- [SAN Boot, on page 116](#)
- [iSCSI Boot, on page 119](#)
- [LAN Boot, on page 154](#)
- [Local Devices Boot, on page 155](#)
- [Configuring the Boot Policy for a Local LUN, on page 163](#)
- [Deleting a Boot Policy, on page 165](#)
- [UEFI Boot Parameters, on page 165](#)

## Boot Policy

The Cisco UCS Manager enables you to create a boot policy for blade servers and rack servers.

The Cisco UCS Manager boot policy overrides the boot order in the BIOS setup menu and determines the following:

- Selection of the boot device
- Location from which the server boots
- Order in which boot devices are invoked

For example, you can have associated servers boot from a local device, such as a local disk or CD-ROM (VMedia), or you can select a SAN boot or a LAN (PXE) boot.

You can either create a named boot policy to associate with one or more service profiles, or create a boot policy for a specific service profile. A boot policy must be included in a service profile, and that service profile must be associated with a server for it to take effect. If you do not include a boot policy in a service profile, Cisco UCS Manager applies the default boot policy.



**Note** Changes to a boot policy might be propagated to all servers created with an updating service profile template that includes that boot policy. Re-association of the service profile with the server to rewrite the boot order information in the BIOS is automatically triggered.

You can also specify the following for the boot policy:

- Local LUN name. The name specified is the logical name in the storage profile, not the deployed name. Specify only a primary name. Specifying a secondary name results in a configuration error.
- Specific JBOD disk number for booting from JBOD disks.
- Any LUN for backward compatibility; however, we do not recommend this. Other devices must not have bootable images to ensure a successful boot.

## UEFI Boot Mode

Unified Extensible Firmware Interface (UEFI) is a specification that defines a software interface between an operating system and platform firmware. Cisco UCS Manager uses UEFI to replace the BIOS firmware interfaces. This allows the BIOS to run in UEFI mode while still providing legacy support.

You can choose either legacy or UEFI boot mode when you create a boot policy. Legacy boot mode is supported for all Cisco UCS servers. UEFI boot mode is supported only on M3 and higher servers, and allows you to enable UEFI secure boot mode.

UEFI PXE boot is supported with all Cisco VIC adapters on Cisco UCS rack servers integrated with Cisco UCS Manager Release 2.2(4) and later releases. Beginning with Cisco UCS Manager Release 2.2(1), UEFI PXE boot is supported on all Cisco blade servers.

The following limitations apply to the UEFI boot mode:

- UEFI boot mode is not supported with the following combinations:
  - Gen-3 Emulex and QLogic adapters on Cisco UCS blade and rack servers integrated with Cisco UCS Manager.
  - iSCSI boot for all adapters on Cisco UCS rack servers integrated with Cisco UCS Manager.
- If you want to use UEFI boot mode with two iSCSI LUNs, you must manually specify a common iSCSI initiator name in the service profile that is applied to both underlying iSCSI eNICs rather than allowing Cisco UCS Manager to select the name from an IQN suffix pool. If you do not supply a common name, Cisco UCS Manager will not be able to detect the second iSCSI LUN.
- You cannot mix UEFI and legacy boot mode on the same server.
- The server will boot correctly in UEFI mode only if the boot devices configured in the boot policy have UEFI-aware operating systems installed. If a compatible OS is not present, the boot device is not displayed on the **Actual Boot Order** tab in the **Boot Order Details** area.
- In some corner cases, the UEFI boot may not succeed because the UEFI boot manager entry was not saved correctly in the BIOS NVRAM. You can use the UEFI shell to enter the UEFI boot manager entry manually. This situation could occur in the following situations:

- If a blade server with UEFI boot mode enabled is disassociated from the service profile, and the blade is manually powered on using the **Equipment** tab or the front panel.
- If a blade server with UEFI boot mode enabled is disassociated from the service profile, and a direct VIC firmware upgrade is attempted.
- If a blade or rack server with UEFI boot mode enabled is booted off SAN LUN, and the service profile is migrated.

You can create UEFI boot parameters in Cisco UCS Manager. [UEFI Boot Parameters, on page 165](#) provides more information.

## UEFI Secure Boot

Cisco UCS Manager supports UEFI secure boot on Cisco UCS M5 and higher Blade servers, Cisco UCS C-Series M5 and higher Rack servers, and Cisco UCS C125 M5 Servers. Linux secure boot is supported on SLES 15, SLES 13 SP4, Red Hat Linux 7.6 operating systems starting with Release 4.0(4a). When UEFI secure boot is enabled, all executables, such as boot loaders and adapter drivers, are authenticated by the BIOS before they can be loaded. To be authenticated, the images must be signed by either the Cisco Certificate Authority (CA) or a Microsoft CA.

The following limitations apply to UEFI secure boot:

- UEFI boot mode must be enabled in the boot policy.
- UEFI boot mode is available only for drives.
- The Cisco UCS Manager software and the BIOS firmware must be at Release 2.2 or greater.



---

**Note** UEFI boot mode is supported on Cisco UCS C-Series and S-Series rack servers beginning with Release 2.2(3a).

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- User-generated encryption keys are not supported.
- UEFI secure boot can only be controlled by Cisco UCS Manager.
- If you want to downgrade to an earlier version of Cisco UCS Manager, and you have a server in secure boot mode, you must disassociate, then re-associate the server before downgrading. Otherwise, server discovery is not successful.
- In Cisco UCS Manager Release 4.0, UEFI secure boot is supported on the following Operating Systems:
  - In Cisco UCS Manager Release 4.0(1), UEFI secure boot is supported only on Windows 2016 and Windows 2012 R2.
  - In Cisco UCS Manager Release 4.0(2), UEFI secure boot is supported only on Windows 2016 and Windows 2019.
  - In Cisco UCS Manager Release 4.0(4), UEFI secure boot is supported on the following:

**Table 6: Linux Operating Systems**

Linux OS	eNIC/nNIC	fNIC
RHEL 7.5	3.2.210.18.738.12	1.6.0.50
RHEL 7.6	3.2.210.18.738.12	2.0.0.37
CentOS 7.5	3.2.210.18.738.12	1.6.0.50
CentOS 7.6	3.2.210.18.738.12	1.6.0.50
SLES 12.4	3.2.210.18.738.12	2.0.0.32
SLES 15	3.2.210.18.738.12	2.0.0.39-71.0
ESXi	Inbox works	Inbox works

**Note**

- For ESXi, inbox drivers are signed and work as such. Async drivers are not signed and do not work.
- Oracle OS does not support IPv6.
- XEN OS does not support IPv6.

**Table 7: Windows Operating Systems**

Windows OS	neNIC	nfNIC
Windows 2016	5.3.25.4	3.2.0.3
Windows 2019	5.3.25.4	3.2.0.3

## CIMC Secure Boot

With CIMC secure boot, only Cisco signed firmware images can be installed and run on the servers. When the CIMC is updated, the image is certified before the firmware is flashed. If certification fails, the firmware is not flashed. This prevents unauthorized access to the CIMC firmware.

### Guidelines and Limitations for CIMC Secure Boot

- CIMC secure boot is supported on Cisco UCS M5, and M6, M7 rack servers.



**Note** CIMC secure boot is enabled by default on the Cisco UCS C220 /M5/M6/M7, C240 /M5/M6, C480 M5/C480 M5 ML, C225 M6, and C245 M6 rack servers, and is automatically enabled on the Cisco UCS C480 M5 rack server after upgrading to CIMC firmware release 2.2(3) or higher.

- After CIMC secure boot is enabled, you cannot disable it.
- After CIMC secure boot is enabled on a server, you cannot downgrade to a CIMC firmware image prior to 2.1(3).

## Determining the CIMC Secure Boot Status

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters server CIMC mode.
<b>Step 3</b>	UCS-A /server/cimc # <b>show secure-boot</b>	Displays the CIMC secure boot status for the specified server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Unsupported</b>—CIMC secure boot is not supported on the server.</li> <li>• <b>Disabled</b>—CIMC secure boot is supported, but is disabled on the server.</li> <li>• <b>Enabling</b>—CIMC secure boot has been enabled, and the operation is in process.</li> <li>• <b>Enabled</b>—CIMC secure boot is enabled on the server.</li> </ul>

### Example

The following example shows how to display the CIMC secure boot status:

```
UCS-A# scope server 1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # show secure-boot
Secure Boot: Disabled
UCS-A /chassis/server/cimc #
```

# Creating a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, Cisco recommends that you create a global boot policy that can be included in multiple service profiles or service profile templates.

## Before you begin

If you are creating a boot policy that boots the server from a SAN LUN and you require reliable SAN boot operations, you must first remove all local disks from servers associated with a service profile that includes the boot policy.



**Note** The following example shows how to create a boot policy named boot-policy-LAN, specify that servers using this policy will not be automatically rebooted when the boot order is changed, set the UEFI boot mode, enable UEFI boot security, and commit the transaction:

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create boot-policy</b> <i>policy-name</i> [ <b>purpose</b> { <b>operational</b>   <b>utility</b> }]	Creates a boot policy with the specified policy name, and enters organization boot policy mode.  When you create the boot policy, specify the <b>operational</b> option. This ensures that the server boots from the operating system installed on the server. The <b>utility</b> options is reserved and should only be used if instructed to do so by a Cisco representative.
<b>Step 3</b>	(Optional) UCS-A /org/boot-policy # <b>set descr</b> <i>description</i>	Provides a description for the boot policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/boot-policy # <b>set reboot-on-update</b> { <b>no</b>   <b>yes</b> }	Specifies whether the servers using this boot policy are automatically rebooted after you make changes to the boot order.

	Command or Action	Purpose
<b>Step 5</b>	UCS-A /org/boot-policy # <b>set enforce-vnic-name {no   yes}</b>	<p>If you choose <b>yes</b>, Cisco UCS Manager displays a configuration error and reports whether one or more of the vNICs, vHBAs, or iSCSI vNICs listed in the <b>Boot Order</b> table match the server configuration in the service profile.</p> <p>If you choose <b>no</b>, Cisco UCS Manager uses the vNICs, vHBAs, or iSCSI vNICs (as appropriate for the boot option) from the service profile.</p>
<b>Step 6</b>	UCS-A /org/boot-policy # <b>set boot-mode {legacy   uefi}</b>	<p>Specifies whether the servers using this boot policy are using UEFI or legacy boot mode.</p> <p><b>Note</b> Cisco UCS C125 M5 Servers support only UEFI boot mode.</p>
<b>Step 7</b>	UCS-A /org/boot-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 8</b>	UCS-A /org/boot-policy # <b>create boot-security</b>	Enters boot security mode for the specified boot policy.
<b>Step 9</b>	UCS-A /org/boot-policy/boot-security # <b>set secure-boot {no   yes}</b>	Specifies whether secure boot is enabled for the boot policy.
<b>Step 10</b>	UCS-A /org/boot-policy/boot-security # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create a boot policy named boot-policy-LAN, specify that servers using this policy will not be automatically rebooted when the boot order is changed, set the UEFI boot mode, enable UEFI boot security, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # create boot-policy boot-policy-LAN purpose operational
UCS-A /org/boot-policy* # set descr "Boot policy that boots from the LAN."
UCS-A /org/boot-policy* # set reboot-on-update no
UCS-A /org/boot-policy* # set boot-mode uefi
UCS-A /org/boot-policy* # commit-buffer
UCS-A /org/boot-policy # create boot-security
UCS-A /org/boot-policy/boot-security* # set secure-boot yes
UCS-A /org/boot-policy/boot-security* # commit-buffer
UCS-A /org/boot-policy/boot-security #
```

### What to do next

Configure one or more of the following boot options for the boot policy and set their boot order:

- **LAN Boot** —Boots from a centralized provisioning server. It is frequently used to install operating systems on a server from that server. If you choose the LAN Boot option, continue to [Configuring a LAN Boot Policy for a Boot Policy, on page 154](#).

- **SAN Boot** —Boots from an operating system image on the SAN. You can specify a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.

We recommend that you use a SAN boot policy, because it offers the most service profile mobility within the system. If you boot from the SAN, when you move a service profile from one server to another, the new server boots from exactly the same operating system image. Therefore, the new server appears to be exactly the same server to the network.

If you choose the SAN Boot option, continue to [Configuring a SAN Boot for a Boot Policy, on page 117](#).

- **Virtual Media Boot** —Mimics the insertion of a physical CD into a server. It is typically used to manually install operating systems on a server.

If you choose the Virtual Media boot option, continue to [Configuring a Virtual Media Boot for a Boot Policy, on page 159](#).

- **NVMe Boot** —BIOS enumerates the NVMe devices present and boots to the first NVMe device having UEFI capable OS installed on it.

If you choose the NVMe boot option, continue to [Configuring a NVMe Boot for a Boot Policy, on page 161](#).

- **Local Devices boot**—To boot from local devices, such as local disks on the server, virtual media, or remote virtual disks, continue with [Configuring a Local Disk Boot for a Boot Policy, on page 157](#).




---

**Tip** If you configure a local disk and a SAN LUN for the boot order storage type and the operating system or logical volume manager (LVM) is configured incorrectly, the server might boot from the local disk rather than the SAN LUN.

For example, on a server with Red Hat Linux installed, where the LVM is configured with default LV names and the boot order is configured with a SAN LUN and a local disk, Linux reports that there are two LVs with the same name and boots from the LV with the lowest SCSI ID, which could be the local disk.

---

Include the boot policy in a service profile and template.

## SAN Boot

You can configure a boot policy to boot one or more servers from an operating system image on the SAN. The boot policy can include a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.

Cisco recommends using a SAN boot, because it offers the most service profile mobility within the system. If you boot from the SAN when you move a service profile from one server to another, the new server boots from the same operating system image. Therefore, the new server appears as the same server to the network.

To use a SAN boot, ensure that the following is configured:

- The Cisco UCS domain must be able to communicate with the SAN storage device that hosts the operating system image.



- A boot target LUN (Logical Unit Number) on the device where the operating system image is located.



**Note** SAN boot is not supported on Gen-3 Emulex adapters on Cisco UCS blade and rack servers.

## Configuring a SAN Boot for a Boot Policy



**Tip** If you configure a local disk and a SAN LUN for the boot order storage type and the operating system or logical volume manager (LVM) is configured incorrectly, the server might boot from the local disk rather than the SAN LUN.

For example, on a server with Red Hat Linux installed, where the LVM is configured with default LV names and the boot order is configured with a SAN LUN and a local disk, Linux reports that there are two LVs with the same name and boots from the LV with the lowest SCSI ID, which could be the local disk.

This procedure continues directly from [Creating a Boot Policy, on page 114](#).

### Before you begin

Create a boot policy to contain the SAN boot configuration.



**Note** If you are creating a boot policy that boots the server from a SAN LUN and you require reliable SAN boot operations, Cisco recommends that you first remove all local disks and other SAN LUNs from the boot policy in the server service profile.

This does not apply to the Cisco UCS Mini Series.

Beginning with Release 2.2, all SAN boot-related CLI commands have been moved to the SAN scope. Any existing scripts from previous releases that use SAN boot under the storage scope instead of **org/boot-policy/san** or **org/service-profile/boot-definition/san** should be updated.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create san</b>	Creates a SAN boot for the boot policy and enters organization boot policy storage mode.
<b>Step 4</b>	UCS-A /org/boot-policy/san # <b>set order</b> <i>order_number</i>	Sets the boot order for the SAN boot. Enter an integer between 1 and 16.

	Command or Action	Purpose
<b>Step 5</b>	UCS-A /org/boot-policy/san # <b>create san-image {primary   secondary}</b>	Creates a SAN image location, and if the san-image option is specified, enters organization boot policy storage SAN image mode.  When using the enhanced boot order on Cisco UCS the boot order that you define is used. For standard boot mode using the terms "primary" or "secondary" do not imply a boot order. The effective order of boot devices within the same device class is determined by the PCIe bus scan order.
<b>Step 6</b>	UCS-A /org/boot-policy/ssn/san-image # <b>set vhma vhma-name</b>	Specifies the vHBA to be used for the SAN boot.
<b>Step 7</b>	UCS-A /org/boot-policy/san/san-image # <b>create path {primary   secondary}</b>	Creates a primary or secondary SAN boot path and enters organization boot policy SAN path mode.  When using the enhanced boot order on Cisco UCS the boot order that you define is used. For standard boot mode using the terms "primary" or "secondary" do not imply a boot order. The effective order of boot devices within the same device class is determined by the PCIe bus scan order.
<b>Step 8</b>	UCS-A /org/boot-policy/san/san-image/path # <b>set {lun lun-id   wwn wwn-num}</b>	Specifies the LUN or WWN to be used for the SAN path to the boot image.
<b>Step 9</b>	UCS-A /org/boot-policy/san/san-image/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to enter the boot policy named lab1-boot-policy, create a SAN boot for the policy, set the boot order to 1, create a primary SAN image, use a vHBA named vHBA2, create primary path using LUN 0, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab1-boot-policy
UCS-A /org/boot-policy # create san
UCS-A /org/boot-policy/san* # set order 1
UCS-A /org/boot-policy/san* # create san-image primary
UCS-A /org/boot-policy/san/san-image* # set vhma vHBA2
UCS-A /org/boot-policy/san/san-image* # create path primary
UCS-A /org/boot-policy/san/san-image/path* # set lun 0
UCS-A /org/boot-policy/san/san-image/path* # commit-buffer
UCS-A /org/boot-policy/san/san-image/path #
```

The following example shows how to create a SAN boot for the service profile SP\_lab1, set the boot order to 1, create a primary SAN image, use a vHBA named vHBA2, create primary path using LUN 0, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile SP_lab1
UCS-A /org/service-profile # create boot-definition
UCS-A /org/service-profile/boot-definition* # create san
UCS-A /org/service-profile/boot-definition/san* # create san-image primary
UCS-A /org/service-profile/boot-definition/san/san-image* # set vhma vHBA2
UCS-A /org/service-profile/boot-definition/san/san-image* # create path primary
UCS-A /org/service-profile/boot-definition/san/san-image/path* # set lun 0
UCS-A /org/service-profile/boot-definition/san/san-image/path* # commit-buffer
UCS-A /org/service-profile/boot-definition/san/san-image/path #
```

### What to do next

Include the boot policy in a service profile and template.

## iSCSI Boot

iSCSI boot enables a server to boot its operating system from an iSCSI target machine located remotely over a network.

iSCSI boot is supported on the following Cisco UCS hardware:

- Cisco UCS blade servers that have the Cisco UCS M51KR-B Broadcom BCM57711 network adapter and use the default MAC address provided by Broadcom.
- Cisco UCS M81KR Virtual Interface Card
- Cisco UCS VIC-1240 Virtual Interface Card
- Cisco UCS VIC-1280 Virtual Interface Card
- Cisco UCS VIC-1340 Virtual Interface Card
- Cisco UCS VIC 1455
- Cisco UCS rack servers that have the Cisco UCS M61KR-B Broadcom BCM57712 network adapter.
- Cisco UCS P81E Virtual Interface Card
- Cisco UCS VIC 1225 Virtual Interface Card on Cisco UCS rack servers

There are prerequisites that must be met before you configure iSCSI boot. For a list of these prerequisites, see [iSCSI Boot Guidelines and Prerequisites, on page 120](#).

For a high-level procedure for implementing iSCSI boot, see [Configuring iSCSI Boot, on page 123](#).

## iSCSI Boot Process

Cisco UCS Manager uses the iSCSI vNIC and iSCSI boot information created for the service profile in the association process to program the adapter, located on the server. After the adapter is programmed, the server reboots with the latest service profile values. After the power on self-test (POST), the adapter attempts to initialize using these service profile values. If the adapter can use the values and log in to its specified target,

the adapter initializes and posts an iSCSI Boot Firmware Table (iBFT) to the host memory and a valid bootable LUN to the system BIOS. The iBFT that is posted to the host memory contains the initiator and target configuration that is programmed on the primary iSCSI vNIC.




---

**Note** Previously, the host could see only one of the boot paths configured, depending on which path completed the LUN discovery first, and would boot from that path. Now, when there are two iSCSI boot vNICs configured, the host sees both of the boot paths. So for multipath configurations, a single IQN must be configured on both the boot vNICs. If there are different IQNs configured on the boot vNICs on a host, the host boots with the IQN that is configured on the boot vNIC with the lower PCI order.

---

The next step, which is the installation of the operating system (OS), requires an OS that is iBFT capable. During installation of the OS, the OS installer scans the host memory for the iBFT table and uses the information in the iBFT to discover the boot device and create an iSCSI path to the target LUN. Some OSs requires a NIC driver to complete this path. If this step is successful, the OS installer finds the iSCSI target LUN on which to install the OS.




---

**Note** The iBFT works at the OS installation software level and might not work with HBA mode (also known as TCP offload). Whether iBFT works with HBA mode depends on the OS capabilities during installation. Also, for a server that includes a Cisco UCS M51KR-B Broadcom BCM57711 adapter, the iBFT normally works at a maximum transmission unit (MTU) size of 1500, regardless of the MTU jumbo configuration. If the OS supports HBA mode, you might need to set HBA mode, dual-fabric support, and jumbo MTU size after the iSCSI installation process.

---

## iSCSI Boot Guidelines and Prerequisites

These guidelines and prerequisites must be met before configuring iSCSI boot:

- After the iSCSI boot policies are created, a user with ls-compute privileges can include them in a service profile or service profile template. However, a user with only ls-compute privileges cannot create iSCSI boot policies.
- To set up iSCSI boot from a Windows 2008 server where the second vNIC (failover vNIC) must boot from an iSCSI LUN, consult Microsoft Knowledge Base Article 976042. Microsoft has a known issue where Windows might fail to boot from an iSCSI drive or cause a bugcheck error if the networking hardware is changed. To work around this issue, follow the resolution recommended by Microsoft.
- The storage array must be licensed for iSCSI boot and the array side LUN masking must be properly configured.
- Two IP addresses must be determined, one for each iSCSI initiator. If possible, the IP addresses should be on the same subnet as the storage array. The IP addresses are assigned statically or dynamically using the Dynamic Host Configuration Protocol (DHCP).
- You cannot configure boot parameters in the Global boot policy. Instead, after configuring boot parameters, include the boot policy in the appropriate service profile.
- The operating system (OS) must be iSCSI Boot Firmware Table (iBFT) compatible.

- For RHEL 7.x, the kernel parameter "rd.iscsi.ibft=1" is required before the installation. If the parameter is not entered, the iSCSI boot may fail.
- For SLES 12.x, the following guidelines must be followed:
  - Hit "e" on the install disk before loading the kernel, edit the linuxefi ( if using EFI) or kernel (if using legacy), and add the kernel parameter "rd.iscsi.ibft=1 rd.iscsi.firmware=1 rd.neednet=1". If the parameter is not entered, the iSCSI boot may fail.
  - On an existing system that uses iSCSI, ensure that the /etc/iscsi/iscsid.conf has node.startup=automatic (not manual). Add this parameter to the /etc/default/grub/ and then run grub2-mkconfig -o /boot/grub2/grub.cfg to rebuild grub config.
- For Cisco UCS M51KR-B Broadcom BCM57711 network adapters:
  - Servers that use iSCSI boot must contain the Cisco UCS M51KR-B Broadcom BCM57711 network adapter. For information on installing or replacing an adapter card, see the *Cisco UCS B250 Extended Memory Blade Server Installation and Service Note*. The service note is accessible from the *Cisco UCS B-Series Servers Documentation Roadmap* at <http://www.cisco.com/go/unifiedcomputing/b-series-doc>.
  - Set the MAC addresses on the iSCSI device.
  - If you are using the DHCP Vendor ID (Option 43), configure the MAC address of an iSCSI device in /etc/dhcpd.conf.
  - HBA mode (also known as TCP offload) and the boot to target setting are supported. However, only Windows OS supports HBA mode during installation.
  - Before installing the OS, disable the boot to target setting in the iSCSI adapter policy, then after installing the OS, re-enable the boot to target setting.



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**Note** Each time you change an adapter policy setting, the adapter reboots to apply the new setting.

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- When installing the OS on the iSCSI target, the iSCSI target must be ordered *before* the device where the OS image resides. For example, if you are installing the OS on the iSCSI target from a CD, the boot order should be the iSCSI target and then the CD.
  - After the server is iSCSI booted, do not modify the Initiator Name, Target name, LUN, iSCSI device IP, or Netmask/gateway using the Broadcom tool.
  - Do not interrupt the POST (power on self-test) process or the Cisco UCS M51KR-B Broadcom BCM57711 network adapter will fail to initialize.
- For Cisco UCS M81KR Virtual Interface Card and Cisco UCS VIC-1240 Virtual Interface Card:  
For Cisco UCS VIC-1240 Virtual Interface Card:
    - Do not set MAC addresses on the iSCSI device.
    - HBA mode and the boot to target setting are *not* supported.

- When installing the OS on the iSCSI target, the iSCSI target must be ordered *after* the device where the OS image resides. For example, if you are installing the OS on the iSCSI target from a CD, the boot order should be the CD and then the iSCSI target.
- If you are using the DHCP Vendor ID (Option 43), the MAC address of the overlay vNIC must be configured in `/etc/dhcpd.conf`.
- After the server is iSCSI booted, do not modify the IP details of the overlay vNIC.
- The VMware ESX/ESXi operating system does not support storing a core dump file to an iSCSI boot target LUN. Dump files must be written to a local disk.

## Initiator IQN Configuration

Cisco UCS uses the following rules to determine the initiator IQN for an adaptor iSCSI vNIC at the time a service profile is associated with a physical server:

- An initiator IQN at the service profile level *and* at the iSCSI vNIC level cannot be used together in a service profile.
- If an initiator IQN is specified at the service profile level, all of the adaptor iSCSI vNICs are configured to use the same initiator IQN, except in the case of DHCP Option 43, where the initiator IQN is set to empty on the adaptor iSCSI vNIC.
- When an initiator IQN is set at the iSCSI vNIC level, the initiator IQN at the service profile level is removed, if one is present.
- If there are two iSCSI vNIC in a service profile and only one of them has the initiator IQN set, the second one is configured with the default IQN pool. You can change this configuration later. The only exception is if DHCP Option 43 is configured. In this case, the initiator IQN on the second iSCSI vNIC is removed during service profile association.




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**Note** If you change an iSCSI vNIC to use the DHCP Option 43 by setting the vendor ID, it does not remove the initiator IQN configured at the service profile level. The initiator IQN at the service profile level can still be used by another iSCSI vNIC which does not use the DHCP Option 43.

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## Enabling MPIO on Windows

You can enable (MPIO) to optimize connectivity with storage arrays.




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**Note** If you change the networking hardware, Windows might fail to boot from an iSCSI drive. For more information, see [Microsoft support Article ID: 976042](#).

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### Before you begin

The server on which you enable the Microsoft Multipath I/O (MPIO) must have a Cisco VIC driver.

If there are multiple paths configured to the boot LUN, only one path should be enabled when the LUN is installed.

### Procedure

- 
- Step 1** In the service profile associated with the server, configure the primary iSCSI vNIC.  
For more information, see [Creating an iSCSI vNIC in a Service Profile, on page 134](#).
- Step 2** Using the primary iSCSI vNIC, install the Windows operating system on the iSCSI target LUN.
- Step 3** After Windows installation completes, enable MPIO on the host.
- Step 4** In the service profile associated with the server, add the secondary iSCSI vNIC to the boot policy.  
For more information, see [Creating an iSCSI Boot Policy, on page 130](#).
- 

## Configuring iSCSI Boot

When you configure an adapter or blade in Cisco UCS to iSCSI boot from a LUN target, complete all of the following steps.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	(Optional) Configure the iSCSI boot adapter policy.	For more information, see <a href="#">Creating an iSCSI Adapter Policy, on page 124</a> .
<b>Step 2</b>	(Optional) Configure the authentication profiles for the initiator and target.	For more information, see <a href="#">Creating an Authentication Profile, on page 126</a> .
<b>Step 3</b>	(Optional) To configure the iSCSI initiator to use an IP address from a pool of IP addresses, add a block of IP addresses to the iSCSI initiator pool.	For more information, see <a href="#">Adding a Block of IP Addresses to the Initiator Pool, on page 128</a> .
<b>Step 4</b>	Create a boot policy that can be used in any service profile. Alternatively, you can create a local boot policy only for the specific service profile. However, Cisco recommends that you create a boot policy that can be shared with multiple service profiles.	For more information about creating a boot policy that can be used in any service profile, see <a href="#">Creating an iSCSI Adapter Policy, on page 124</a> .
<b>Step 5</b>	If you created a boot policy that can be used in any service profile, assign it to the service profile. Otherwise, proceed to the next step.	For more information, see <a href="#">Creating a Service Profile Template, on page 181</a> .
<b>Step 6</b>	Configure an Ethernet vNIC in a service profile.	The Ethernet vNIC is used as the overlay vNIC for the iSCSI device. For more information, see <a href="#">Configuring a vNIC for a Service Profile, on page 191</a> .

	Command or Action	Purpose
<b>Step 7</b>	Create an iSCSI vNIC in a service profile.	For more information, see <a href="#">Creating an iSCSI vNIC in a Service Profile</a> , on page 134.
<b>Step 8</b>	Set the iSCSI initiator to boot using a static IP Address, an IP address from an IP pool, or DHCP.	See either <a href="#">Creating an iSCSI Initiator that Boots Using a Static IP Address</a> , on page 136, <a href="#">Creating an iSCSI Initiator that Boots Using an IP Address from an IP Pool</a> , on page 139, or <a href="#">Creating an iSCSI Initiator that Boots Using DHCP</a> , on page 141.
<b>Step 9</b>	Create an iSCSI static or auto target.	For more information, see either <a href="#">Creating an iSCSI Static Target</a> , on page 148 or <a href="#">Creating an iSCSI Auto Target</a> , on page 151.
<b>Step 10</b>	Associate the service profile with a server.	For more information, see <a href="#">Associating a Service Profile with a Blade Server or Server Pool</a> , on page 197.
<b>Step 11</b>	Verify the iSCSI boot operation.	For more information, see <a href="#">Verifying iSCSI Boot</a> .
<b>Step 12</b>	Install the OS on the server.	For more information, see one of the following guides: <ul style="list-style-type: none"> <li>• <i>Cisco UCS B-Series Blade Servers VMware Installation Guide</i></li> <li>• <i>Cisco UCS B-Series Blade Servers Linux Installation Guide</i></li> <li>• <i>Cisco UCS B-Series Blade Servers Windows Installation Guide</i></li> </ul>
<b>Step 13</b>	Boot the server.	

## Creating an iSCSI Adapter Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create iscsi-policy</b> <i>policy-name</i>	Creates the iSCSI adapter policy.
<b>Step 3</b>	(Optional) UCS-A /org/iscsi-policy # <b>set descr</b> <i>description</i>	Provides a description for the iSCSI adapter policy.



	Command or Action	Purpose
<b>Step 4</b>	Required: UCS-A /org/iscsi-policy # <b>set iscsi-protocol-item connection-timeout</b> <i>timeout-secs</i>	The number of seconds to wait until Cisco UCS assumes that the initial login has failed and the iSCSI adapter is unavailable.  Enter an integer between 0 and 255. If you enter 0, Cisco UCS uses the value set in the adapter firmware (default: 15 seconds).
<b>Step 5</b>	Required: UCS-A /org/iscsi-policy # <b>set iscsi-protocol-item dhcp-timeout</b> <i>timeout-secs</i>	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).
<b>Step 6</b>	Required: UCS-A /org/iscsi-policy # <b>set iscsi-protocol-item lun-busy-retry-count</b> <i>num</i>	The number of times to retry the connection in case of a failure during iSCSI LUN discovery.  Enter an integer between 0 and 60. If you enter 0, Cisco UCS uses the value set in the adapter firmware (default: 15 seconds).
<b>Step 7</b>	Required: UCS-A /org/iscsi-policy # <b>set iscsi-protocol-item tcp-time-stamp</b> {no   yes}	Specifies whether to apply a TCP timestamp. With this setting, transmitted packets are given a time stamp of when the packet was sent so that the packet's round-trip time can be calculated, when needed. This setting applies only to Cisco UCS M51KR-B Broadcom BCM57711 adapters.
<b>Step 8</b>	Required: UCS-A /org/iscsi-policy # <b>set iscsi-protocol-item hbamode</b> {no   yes}	Specifies whether to enable HBA mode.  This option should only be enabled for servers with the Cisco UCS NIC M51KR-B adapter running the Windows operating system.
<b>Step 9</b>	Required: UCS-A /org/iscsi-policy # <b>set iscsi-protocol-item boottotarget</b> {no   yes}	Specifies whether to boot from the iSCSI target.  This option only applies to servers with the Cisco UCS NIC M51KR-B adapter. It should be disabled until you have installed an operating system on the server.
<b>Step 10</b>	Required: UCS-A /org/iscsi-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an iSCSI adapter policy called `iscsiboot`, set the connection timeout, DHCP timeout, and LUN busy retry count, apply a TCP timestamp, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # create iscsi-policy iscsiboot
UCS-A /org/iscsi-policy* # set iscsi-protocol-item connection-timeout 60
UCS-A /org/iscsi-policy* # set iscsi-protocol-item dhcp-timeout 200
UCS-A /org/iscsi-policy* # set iscsi-protocol-item lun-busy-retry-count 5
UCS-A /org/iscsi-policy* # set iscsi-protocol-item tcp-time-stamp yes
UCS-A /org/iscsi-policy* # set iscsi-protocol-item hbamode yes
UCS-A /org/iscsi-policy* # set iscsi-protocol-item boottotarget yes
UCS-A /org/iscsi-policy* # commit-buffer
UCS-A /org/iscsi-policy #
```

### What to do next

Include the adapter policy in a service profile and template.

## Deleting an iSCSI Adapter Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete iscsi-policy</b> <i>policy-name</i>	Deletes the iSCSI adapter policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete an iSCSI adapter policy named `iscsi-adapter-pol` and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # delete iscsi-policy iscsi-adapter-pol
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Creating an Authentication Profile

If you use authentication for iSCSI boot, you need to create an authentication profile for both the initiator and target.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create auth-profile</b> <i>profile-name</i>	Creates an authentication profile with the specified name. The name can be up to 16 alphanumeric characters.
<b>Step 3</b>	UCS-A /org/auth-profile* # <b>set user-id</b> <i>id-name</i>	Creates a log in for authentication.
<b>Step 4</b>	UCS-A /org/auth-profile* # <b>set password</b>	Creates a password for authentication.
<b>Step 5</b>	UCS-A /org/auth-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 6</b>	UCS-A /org/auth-profile* # <b>exit</b>	Exits the current mode.
<b>Step 7</b>	Repeat steps 2 through 6 to create an authentication profile for the target.	

## Example

The following example shows how to create an authentication profile for an initiator and target and commit the transaction:

```
UCS-A# scope org
UCS-A /org # create auth-profile InitAuth
UCS-A /org/auth-profile* # set user-id init
UCS-A /org/auth-profile* # set password
Enter a password:
Confirm the password:
UCS-A /org/auth-profile* # commit-buffer
UCS-A /org/auth-profile # exit
UCS-A /org # create auth-profile TargetAuth
UCS-A /org/auth-profile* # set user-id target
UCS-A /org/auth-profile* # set password
Enter a password:
Confirm the password:
UCS-A /org/auth-profile* # commit-buffer
UCS-A /org/auth-profile # exit
```

## What to do next

Create an Ethernet vNIC to be used as the overlay vNIC for the iSCSI device, and then create an iSCSI vNIC.

## Deleting an Authentication Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete auth-profile</b> <i>auth-profile-name</i>	Deletes the specified authentication profile.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete an authentication profile called iscsi-auth and commit the transaction:

```
UCS-A# scope org
UCS-A /org # delete auth-profile iscsi-auth
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Adding a Block of IP Addresses to the Initiator Pool

You can create a group of IP addresses to be used for iSCSI boot. Cisco UCS Manager reserves the block of IP addresses you specify.

The IP pool must not contain any IP addresses that were assigned as static IP addresses for a server or service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>scope ip-pool iscsi-initiator-pool</b>	Enters the mode to specify an iSCSI initiator pool.
<b>Step 3</b>	(Optional) UCS-A /org/ip-pool # <b>set descr</b> <i>description</i>	Provides a description for the IP pool.

	Command or Action	Purpose
		<p><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.</p>
<b>Step 4</b>	UCS-A /org/ip-pool # <b>set assignmentorder</b> { <b>default</b>   <b>sequential</b> }	<p>This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>default</b>—Cisco UCS Manager selects a random identity from the pool.</li> <li>• <b>sequential</b>—Cisco UCS Manager selects the lowest available identity from the pool.</li> </ul>
<b>Step 5</b>	UCS-A /org/ip-pool# <b>create block</b> <i>from_ip_address to_ip_address</i> <i>default_gateway subnet_mask</i>	Creates a block of IP addresses for the iSCSI initiator.
<b>Step 6</b>	(Optional) UCS-A/org/ip-pool/block# <b>show detail expand</b>	Shows the block of IP addresses that you have created.
<b>Step 7</b>	UCS-A /org/ip-pool/block # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an IP initiator pool for the iSCSI vNIC and commit the transaction:

```
UCS-A # scope org /
UCS-A /org # scope ip-pool iscsi-initiator-pool
UCS-A /org/ip-pool # create block 40.40.40.10 40.40.40.50 40.40.40.1 255.0.0.0
UCS-A /org/ip-pool/block # show detail expand
Block of IP Addresses:
  From: 40.40.40.10
  To: 40.40.40.50
  Default Gateway: 40.40.40.1
  Subnet Mask: 255.0.0.0
UCS-A /org/ip-pool/block # commit buffer
```

### What to do next

Configure one or more service profiles or service profile templates to obtain the iSCSI initiator IP address from the iSCSI initiator IP pool.

## Deleting a Block of IP Addresses from the Initiator Pool

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>scope ip-pool iscsi-initiator-pool</b>	Enters the mode to specify an iSCSI initiator pool.
<b>Step 3</b>	UCS-A /org/ip-pool# <b>delete block</b> <i>from_ip_address to_ip_address</i>	Deletes the specified block of IP addresses from the initiator pool.
<b>Step 4</b>	(Optional) UCS-A/org/ip-pool/block# <b>show detail expand</b>	Shows that the block of IP addresses has been deleted.
<b>Step 5</b>	UCS-A /org/ip-pool# <b>commit buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete a block of IP addresses from the initiator pool and commit the transaction:

```
UCS-A # scope org /
UCS-A /org # scope ip-pool iscsi-initiator-pool
UCS-A /org/ip-pool # delete block 40.40.40.10 40.40.40.50 40.40.40.1 255.0.0.0
UCS-A /org/ip-pool # show detail expand

IP Pool:
  Name: iscsi-initiator-pool
  Size: 0
  Assigned: 0
  Descr:
UCS-A /org/ip-pool # commit buffer
```

## Creating an iSCSI Boot Policy

You can add up to two iSCSI vNICs per boot policy. One vNIC acts as the primary iSCSI boot source, and the other acts as the secondary iSCSI boot source.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>create boot-policy</b> <i>policy-name</i> [ <b>purpose</b> { <b>operational</b>   <b>utility</b> }]	<p>Creates a boot policy with the specified policy name, and enters organization boot policy mode.</p> <p>This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved.</p> <p>When you create the boot policy, specify the <b>operational</b> option. This ensures that the server boots from the operating system installed on the server. The <b>utility</b> options is reserved and should only be used if instructed to do so by a Cisco representative.</p>
<b>Step 3</b>	(Optional) UCS-A /org/boot-policy # <b>set descr</b> <i>description</i>	<p>Provides a description for the boot policy.</p> <p><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks do not appear in the description field of any <b>show</b> command output.</p>
<b>Step 4</b>	(Optional) UCS-A /org/boot-policy # <b>set enforce-vnic-name</b> { <b>no</b>   <b>yes</b> }	<p>If you choose <b>yes</b>, Cisco UCS Manager reports whether the device name specified in the boot policy matches what is specified in the service profile.</p> <p>If you choose <b>no</b>, Cisco UCS Manager uses any vNIC, vHBA, or iSCSI device from the service profile and does not report whether the device name specified in the boot policy matches what is specified in the service profile.</p>
<b>Step 5</b>	UCS-A /org/boot-policy # <b>set reboot-on-update</b> { <b>no</b>   <b>yes</b> }	<p>Specifies whether the servers using this boot policy are automatically rebooted after you make changes to the boot order.</p> <p>In the Cisco UCS Manager GUI, if the <b>Reboot on Boot Order Change</b> check box is checked for a boot policy, and if CD-ROM or Floppy is the last device in the boot order, deleting or adding the device does not directly affect the boot order and the server does not reboot.</p>
<b>Step 6</b>	UCS-A /org/boot-policy # <b>create iscsi</b>	Adds an iSCSI boot to the boot policy.

	Command or Action	Purpose
<b>Step 7</b>	UCS-A /org/boot-policy/iscsi # <b>create path</b> { <b>primary</b>   <b>secondary</b> }	Specifies the primary and secondary paths that Cisco UCS Manager uses to reach the iSCSI target .With iSCSI boot, you set up two paths. Cisco UCS Manager uses the primary path first, and if that fails, then it uses the secondary path.
<b>Step 8</b>	UCS-A /org/boot-policy/iscsi/path # <b>create iscsivnicname</b> <i>iscsi-vnic-name</i>	Creates an iSCSI vNIC.
<b>Step 9</b>	UCS-A /org/boot-policy/iscsi/path # <b>exit</b>	Exits iSCSI path mode.
<b>Step 10</b>	UCS-A /org/boot-policy/iscsi/path # <b>set order</b> <i>order-num</i>	Specifies the order for the iSCSI boot in the boot order.
<b>Step 11</b>	(Optional) Repeat steps 8-10 to create secondary iSCSI vNICs.	
<b>Step 12</b>	UCS-A /org/boot-policy/iscsi # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an iSCSI boot policy named `iscsi-boot-policy-LAN`, provide a description for the boot policy, specify that servers using this policy are not automatically rebooted when the boot order is changed, set the boot order for iSCSI boot to 2, create an iSCSI boot and associate it with a vNIC called `iscsienic1`, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # create boot-policy iscsi-boot-policy-LAN purpose operational
UCS-A /org/boot-policy* # set descr "Boot policy that boots from iSCSI."
UCS-A /org/boot-policy* # set enforce-vnic-name yes
UCS-A /org/boot-policy* # set reboot-on-update no
UCS-A /org/boot-policy* # create iscsi
UCS-A /org/boot-policy/iscsi* # create path primary
UCS-A /org/boot-policy/iscsi/path* # set iscsivnicname iscsienic1
UCS-A /org/boot-policy/iscsi/path* # exit
UCS-A /org/boot-policy/iscsi* # set order 2
UCS-A /org/boot-policy/iscsi* # commit-buffer
UCS-A /org/boot-policy #
```

### What to do next

Include the boot policy in a service profile and template.

After a server is associated with a service profile that includes this boot policy, you can verify the actual boot order in the **Boot Order Details** area on the **General** tab for the server.



## Deleting iSCSI Devices from a Boot Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>boot-pol-name</i>	Enters boot policy organization mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>delete iscsi</b>	Deletes the iSCSI boot from the boot policy.
<b>Step 4</b>	UCS-A /org/boot-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete an iSCSI boot from the boot policy named boot-policy-iscsi and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope boot-policy boot-policy-iscsi
UCS-A /org/boot-policy # delete iscsi
UCS-A /org/boot-policy* # commit-buffer
UCS-A /org/boot-policy #
```

## Setting an Initiator IQN at the Service Profile Level

In a service profile, you can create an initiator with a specific IQN or one that is derived from a pool of IQNs.

### Before you begin

You cannot delete an IQN using the CLI.

To understand the initiator IQN configuration guidelines, see [Initiator IQN Configuration, on page 122](#).

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/service-profile# <b>set iscsi-identity</b> { <b>initiator</b> <b>name</b> <i>initiator-name</i> <b>initiator-pool-name</b> <i>pool-name</i> }	Creates an initiator with the specified name. The name can be up to 16 alphanumeric characters.
<b>Step 4</b>	UCS-A /org/service-profile* # <b>commit buffer</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	UCS-A /org/auth-profile* # <b>exit</b>	Exits the current mode.

### Example

The following example shows how to create a specific name for an iSCSI initiator and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # set iscsi-identity initiator-name manual:IQN
UCS-A /org/service-profile* # commit-buffer
```

## Creating an iSCSI vNIC in a Service Profile

You can create an iSCSI vNIC in a service profile.

### Before you begin

You must have an Ethernet vNIC in a service profile to be used as the overlay vNIC for the iSCSI device.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create vnic-iscsi</b> <i>iscsi-vnic-name</i> .	Specifies the iSCSI vNIC name.
<b>Step 4</b>	(Optional) UCS-A /org/service-profile/vnic-iscsi* # <b>set</b> <b>iscsi-adaptor-policy</b> <i>iscsi-adaptor-name</i>	Specifies the iSCSI adaptor policy that you have created for this iSCSI vNIC.
<b>Step 5</b>	(Optional) UCS-A /org/service-profile/vnic-iscsi* # <b>set</b> <b>auth-name</b> <i>authentication-profile-name</i>	Sets the authentication profile to be used by the iSCSI vNIC. The authentication profile must already exist for it to be set. For more information, see <a href="#">Creating an Authentication Profile, on page 126</a> .

	Command or Action	Purpose
<b>Step 6</b>	UCS-A /org/service-profile/vnic-iscsi* # <b>set identity {dynamic-mac {dynamic-mac-address   derived}   mac-pool mac-pool-name }</b>	Specifies the MAC address for the iSCSI vNIC.  <b>Note</b> The MAC address is only set for Cisco UCS NIC M51KR-B adapters.
<b>Step 7</b>	UCS-A /org/service-profile/vnic-iscsi* # <b>set iscsi-identity {initiator-name initiator-name   initiator-pool-name iqn-pool-name }</b>	Specifies the name of the iSCSI initiator or the name of an IQN pool from which the iSCSI initiator name will be provided. The iSCSI initiator name can be up to 223 characters.
<b>Step 8</b>	UCS-A /org/service-profile/vnic-iscsi* # <b>set overlay-vnic-name overlay-vnic-name</b>	Specifies the Ethernet vNIC that is used by the iSCSI device as the overlay vNIC. For more information, see <a href="#">Configuring a vNIC for a Service Profile, on page 191</a> .
<b>Step 9</b>	UCS-A /org/service-profile/vnic-iscsi* # <b>create eth-if</b>	Creates an Ethernet interface for a VLAN assigned to the iSCSI vNIC.
<b>Step 10</b>	UCS-A /org/service-profile/vnic-iscsi/eth-if* # <b>set vlanname vlan-name.</b>	Specifies the VLAN name. The default VLAN is default. For the Cisco UCS M81KR Virtual Interface Card and the Cisco UCS VIC-1240 Virtual Interface Card, the VLAN that you specify must be the same as the native VLAN on the overlay vNIC. For the Cisco UCS M51KR-B Broadcom BCM57711 adapter, the VLAN that you specify can be any VLAN assigned to the overlay vNIC.
<b>Step 11</b>	UCS-A /org/service-profile/vnic-iscsi # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an iSCSI vNIC called scsivnic1, add it to an existing service profile called accounting, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # create vnic-iscsi iSCSI1
UCS-A /org/service-profile/vnic-iscsi* # set iscsi-adaptor-policy iscsiboot
UCS-A /org/service-profile/vnic-iscsi* # set auth-name initauth
UCS-A /org/service-profile/vnic-iscsi* # set identity dynamic-mac derived
UCS-A /org/service-profile/vnic-iscsi* # set iscsi-identity initiator-name iSCSI1
UCS-A /org/service-profile/vnic-iscsi* # set overlay-vnic-name eth1
UCS-A /org/service-profile/vnic-iscsi* # create eth-if
UCS-A /org/service-profile/vnic-iscsi/eth-if* # set vlanname default
UCS-A /org/service-profile/vnic-iscsi/eth-if* # commit buffer
```

**What to do next**

Configure an iSCSI initiator to boot using a static IP address, an IP address from a configured IP pool, or DHCP.

**Deleting an iSCSI vNIC from a Service Profile****Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>delete vnic-iscsi</b> <i>iscsi-vnic-name</i>	Deletes the specified iSCSI vNIC from the specified service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shows how to delete an iSCSI vNIC called scsivnic1 and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # delete vnic-iscsi scsivnic1
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

**Creating an iSCSI Initiator that Boots Using a Static IP Address**

In a service profile, you can create an iSCSI initiator and configure it to boot using a static IP address.

**Before you begin**

You have completed the following:

- Created iSCSI overlay vNICs in a service profile.
- Created an iSCSI vNIC in a service profile.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the configuration mode for the specified iSCSI vNIC.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>create ip-if</b>	Creates an IP interface.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if* # <b>enter static-ip-params</b>	Specifies that you are entering static IP boot parameters.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if/static-ip-params* # <b>set addr</b> <i>ip-address</i>	Specifies the static IP address.
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if/static-ip-params* # <b>set default-gw</b> <i>ip-address</i>	Specifies the default gateway IP address.
<b>Step 8</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if/static-ip-params* # <b>set primary-dns</b> <i>ip-address</i>	Specifies the primary DNS IP address.
<b>Step 9</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if/static-ip-params* # <b>set secondary-dns</b> <i>ip-address</i>	Specifies the secondary DNS IP address.
<b>Step 10</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if/static-ip-params* # <b>set subnet</b> <i>subnet-ip-address</i>	Specifies the subnet mask.
<b>Step 11</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/eth-if/ip-if/static-ip-params* # <b>commit buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shows how to configure the initiator to boot using a static IP address and commit the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # create ip-if
```

```

UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # enter static-ip-params
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # set addr
10.104.105.193
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # set default-gw
10.104.105.1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # set primary-dns
11.11.11.100
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # set secondary-dns
11.11.11.100
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # set subnet
255.255.255.0
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # commit-buffer

```

### What to do next

Create an iSCSI target.

## Deleting the Static IP Address Boot Parameters from an iSCSI Initiator

In a service profile, you can delete the static IP address boot parameters from an iSCSI initiator.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the configuration mode for the specified iSCSI vNIC.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>scope ip-if</b>	Enters the configuration mode for an IP interface.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # <b>delete static-ip-params</b>	Deletes the static IP boot parameters from an initiator.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/static-ip-params* # <b>commit buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete the static IP address boot parameters from the initiator and commit the transaction:

```

UCS-A # scope org
UCS-A /org # scope service-profile accounting

```

```
UCS-A /org/service-profile # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # scope ip-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if # delete static-ip-params
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # commit-buffer
```

## Creating an iSCSI Initiator that Boots Using an IP Address from an IP Pool

In a service profile, you can create an iSCSI initiator and configure it to boot using an IP address from an IP pool that you have created.

### Before you begin

You have completed the following:

- Created an overlay vNIC in a service profile
- Created an iSCSI vNIC in a service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the configuration mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the configuration mode for the specified iSCSI vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi* # <b>scope ip-if</b>	Enters the configuration mode for the iSCSI Ethernet interface.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # <b>enter pooled-ip-params</b>	Specifies that the iSCSI initiator boot using one of the IP addresses from the previously created iSCSI initiator IP pool.
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/pooled-ip-params* # <b>commit buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an iSCSI initiator and configure it to boot using an IP address from an IP pool:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # scope ip-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # enter pooled-ip-params
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/pooled-ip-params* # commit buffer
```

### What to do next

Create an iSCSI target.

## Deleting the IP Pool Boot Parameter from an iSCSI Initiator

In a service profile, you can create an iSCSI initiator and configure it to boot using an IP address from an IP pool that you have created.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the configuration mode for configuring the iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot/ # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the configuration mode for the specified iSCSI vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>enter ip-if</b>	Enters the configuration mode for an IP interface.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # <b>delete pooled-ip-params</b>	Specifies that the iSCSI initiator does not use an IP address from an IP pool to boot.
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/pooled-ip-params* # <b>commit buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete the boot using an IP address from an IP pool parameter and commit the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope iscsi-boot
```



```
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # enter ip-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # delete pooled-ip-params
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/pooled-ip-params* # commit buffer
```

## Creating an iSCSI Initiator that Boots Using DHCP

In a service profile, you can create an iSCSI initiator and configure it to boot using DHCP.

### Before you begin

You have completed the following:

- Created iSCSI overlay vNICs in a service profile.
- Created an iSCSI vNIC in a service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the configuration mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the configuration mode for the specified iSCSI vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>create ip-if</b>	Creates an IP interface.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # <b>create dhcp-ip-params</b>	Specifies that you are setting the initiator to boot using DHCP.
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/dhcp-ip-params* # <b>commit buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to configure the initiator to boot using DHCP and commit the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope iscsi-boot
```

```
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # create ip-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # create dhcp-ip-params
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/dhcp-ip-params* # commit-buffer
```

### What to do next

Create an iSCSI target.

## Deleting the DHCP Boot Parameter from an iSCSI Initiator

In a service profile, you can remove the DHCP boot parameter from an iSCSI initiator.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the configuration mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the configuration mode for the specified iSCSI vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>enter ip-if</b>	Enters the configuration mode for an IP interface.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # <b>delete dhcp-ip-params</b>	Specifies that the initiator does not use DHCP to boot.
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/dhcp-ip-params* # <b>commit buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete the boot using DHCP parameter and commit the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope iscsi-boot
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # enter ip-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if* # delete dhcp-ip-params
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ip-if/dhcp-ip-params* # commit-buffer
```

## IQN Pools

An IQN pool is a collection of iSCSI Qualified Names (IQNs) for use as initiator identifiers by iSCSI vNICs in a Cisco UCS domain.

IQN pool members are of the form *prefix:suffix:number*, where you can specify the prefix, suffix, and a block (range) of numbers.

An IQN pool can contain more than one IQN block, with different number ranges and different suffixes, but sharing the same prefix.

## Creating an IQN Pool



**Note** In most cases, the maximum IQN size (prefix + suffix + additional characters) is 223 characters. When using the Cisco UCS NIC M51KR-B adapter, you must limit the IQN size to 128 characters.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create iqn-pool</b> <i>pool-name</i>	Creates an IQN pool with the specified pool name and enters organization IQN pool mode.  This name can be between 1 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
<b>Step 3</b>	UCS-A /org/iqn-pool # <b>set iqn-prefix</b> <i>prefix</i>	Specifies the prefix for the IQN block members. Unless limited by the adapter card, the prefix can contain up to 150 characters.
<b>Step 4</b>	(Optional) UCS-A /org/iqn-pool # <b>set descr</b> <i>description</i>	Provides a description for the IQN pool. Enter up to 256 characters.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.

	Command or Action	Purpose
<b>Step 5</b>	UCS-A /org/iqn-pool # <b>set assignmentorder</b> { <b>default</b>   <b>sequential</b> }	This can be one of the following: <ul style="list-style-type: none"> <li>• <b>default</b>—Cisco UCS Manager selects a random identity from the pool.</li> <li>• <b>sequential</b>—Cisco UCS Manager selects the lowest available identity from the pool.</li> </ul>
<b>Step 6</b>	UCS-A /org/iqn-pool # <b>create block</b> <i>suffix from to</i>	Creates a block (range) of IQNs, and enters organization IQN pool block mode. You must specify the base suffix, the starting suffix number, and the ending suffix number. The resulting IQN pool members are of the form <i>prefix:suffix:number</i> . The suffix can be up to 64 characters. <p><b>Note</b> An IQN pool can contain more than one IQN block. To create multiple blocks, enter multiple <b>create block</b> commands from organization IQN pool mode.</p>
<b>Step 7</b>	UCS-A /org/iqn-pool/block # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an IQN pool named pool4, provide a description for the pool, specify a prefix and a block of suffixes to be used for the pool, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # create iqn-pool pool4
UCS-A /org/iqn-pool* # set iqn-prefix iqn.alpha.com
UCS-A /org/iqn-pool* # set descr "This is IQN pool 4"
UCS-A /org/iqn-pool* # create block beta 3 5
UCS-A /org/iqn-pool/block* # commit-buffer
UCS-A /org/iqn-pool/block #
```

### What to do next

Include the IQN suffix pool in a service profile and template.

## Adding Blocks to an IP Pool

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope ip-pool</b> <i>pool-name</i>	Enters organization IP pool mode for the specified pool.
<b>Step 3</b>	UCS-A /org/ip-pool # <b>create block</b> <i>first-ip-addr last-ip-addr gateway-ip-addr subnet-mask</i>	Creates a block (range) of IP addresses, and enters organization IP pool block mode. You must specify the first and last IP addresses in the address range, the gateway IP address, and subnet mask.  <b>Note</b> An IP pool can contain more than one IP block. To create multiple blocks, enter multiple <b>create block</b> commands from organization IP pool mode.
<b>Step 4</b>	UCS-A /org/ip-pool/block # <b>commit-buffer</b>	Commits the transaction.
<b>Step 5</b>	UCS-A /org/ip-pool/block # <b>exit</b>	Exits IPv4 block configuration mode.
<b>Step 6</b>	UCS-A /org/ip-pool # <b>create ipv6-block</b> <i>first-ip6-addr last-ip6-addr gateway-ip6-addr prefix</i>	Creates a block (range) of IPv6 addresses, and enters organization IP pool IPv6 block mode. You must specify the first and last IPv6 addresses in the address range, the gateway IPv6 address, and network prefix.  <b>Note</b> An IP pool can contain more than one IPv6 block. To create multiple IPv6 blocks, enter multiple <b>create ipv6-block</b> commands from organization IP pool mode.
<b>Step 7</b>	UCS-A /org/ip-pool/ ipv6-block # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

This example shows how to add blocks of IPv4 and IPv6 addresses to an IP pool named pool4 and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ip-pool pool4
UCS-A /org/ip-pool # create block 192.168.100.1 192.168.100.200 192.168.100.10 255.255.255.0
```

```
UCS-A /org/ip-pool/block* # commit-buffer
UCS-A /org/ip-pool/block #exit
UCS-A /org/ip-pool* # create ipv6-block 2001:888::10 2001:888::100 2001:888::1 64
UCS-A /org/ip-pool/ipv6-block* commit-buffer
```

## Deleting a Block from an IP Pool

If you delete an address block from a pool, Cisco UCS Manager does not reallocate any addresses in that block that were assigned to vNICs or vHBAs. All assigned addresses from a deleted block remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.



**Note** IPv6 address blocks are not applicable to vNICs or vHBAs.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope ip-pool</b> <i>pool-name</i>	Enters organization IP pool mode for the specified pool.
<b>Step 3</b>	UCS-A /org/ip-pool # <b>delete</b> { <i>ip-block</i>   <i>ipv6-block</i> } { <i>first-ip-addr</i>   <i>first-ipv6-addr</i> } { <i>last-ip-addr</i>   <i>last-ipv6-addr</i> }	Deletes the specified block (range) of IPv4 or IPv6 addresses.
<b>Step 4</b>	UCS-A /org/ip-pool # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

This example shows how to delete an IP address block from an IP pool named pool4 and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ip-pool pool4
UCS-A /org/ip-pool # delete block 192.168.100.1 192.168.100.200
UCS-A /org/ip-pool* # commit-buffer
UCS-A /org/ip-pool #
```

This example shows how to delete an IPv6 address block from an IP pool named pool4 and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ip-pool pool4
UCS-A /org/ip-pool # delete ipv6-block 2001::1 2001::10
UCS-A /org/ip-pool* # commit-buffer
UCS-A /org/ip-pool #
```

## Deleting an IQN Pool

If you delete a pool, Cisco UCS Manager does not reallocate any addresses from that pool that were assigned to vNICs or vHBAs. All assigned addresses from a deleted pool remain with the vNIC or vHBA to which they are assigned until one of the following occurs:

- The associated service profiles are deleted.
- The vNIC or vHBA to which the address is assigned is deleted.
- The vNIC or vHBA is assigned to a different pool.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete iqn-pool</b> <i>pool-name</i>	Deletes the specified IQN pool.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete the IQN pool named pool4 and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # delete iqn-pool pool4
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Viewing IQN Pool Usage

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope iqn-pool</b> <i>pool-name</i>	Enters organization IQN pool mode for the specified pool.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/iqn-pool # <b>show pooled</b>	Displays the assignments of the IQN block members.

### Example

The following example shows how to display the assignments of suffixes in the IQN pool named pool4:

```
UCS-A# scope org /
UCS-A /org # scope iqn-pool pool4
UCS-A /org/iqn-pool # show pooled
Pooled:
  Name           Assigned Assigned To Dn
  -----
  beta:3         No
  beta:4         No
  beta:5         No
```

```
UCS-A /org/iqn-pool #
```

## Creating an iSCSI Static Target

You can create a static target.

### Before you begin

You have already created an iSCSI vNIC.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile to which you want to add an iSCSI target.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the iSCSI vNIC mode for the specified vNIC name.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>create static-target-if</b> { <b>1</b>   <b>2</b> }	Creates a static target for the iSCSI vNIC and assigns a priority level to it.  Valid priority levels are 1 or 2.



	Command or Action	Purpose
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if # <b>set name</b> <i>name</i>	<p>A regular expression that defines the iSCSI Qualified Name (IQN) or Extended Unique Identifier (EUI) name of the iSCSI target.</p> <p>You can enter any alphanumeric characters as well as the following special characters:</p> <ul style="list-style-type: none"> <li>• . (period)</li> <li>• : (colon)</li> <li>• - (dash)</li> </ul> <p><b>Important</b> This name must be properly formatted using standard IQN or EUI guidelines.</p> <p>The following examples show properly formatted iSCSI target names:</p> <ul style="list-style-type: none"> <li>• iqn.2001-04.com.example</li> <li>• iqn.2001-04.com.example:storage.disk1.sys1.s8675309</li> <li>• iqn.2001-04.com.example:storage.tape1.sys1.xyz</li> <li>• iqn.2001-04.com.example:storage.disk2.sys1.xyz</li> <li>• eui.02004567A425678D</li> </ul>
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if # <b>set port</b> <i>port-num</i>	<p>The port associated with the iSCSI target.</p> <p>Enter an integer between 1 and 65535. The default is 3260.</p>
<b>Step 8</b>	(Optional) UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if # <b>set auth-name</b> <i>auth-profile</i>	<p>If you need the target to authenticate itself and have set up an authentication profile, you need to specify the name of authentication profile.</p> <p>The name of the associated iSCSI authentication profile.</p>
<b>Step 9</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if # <b>set ipaddress</b> <i>ipv4-address</i>	The IPv4 address assigned to the iSCSI target.
<b>Step 10</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if # <b>create lun</b>	Creates the LUN that corresponds to the location of the interface.
<b>Step 11</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if/lun* # <b>set id</b> <i>id-number</i>	Specifies the target LUN id. Valid values are from 0 to 65535.

	Command or Action	Purpose
<b>Step 12</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if/lun* # exit	Exits the current configuration mode.
<b>Step 13</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if # exit	Exits the current configuration mode.
<b>Step 14</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 15</b>	(Optional) Repeat steps 5 through 14 to create a second static target.	

### Example

The following example shows how to create two iSCSI static target interfaces and commit the transaction:

```
UCS-A # scope org test
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope iscsi-boot
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # create static-target-if 1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set name statictarget1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set port 3260
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set auth-name
authprofile1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set ip-address
192.168.10.10
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # create lun
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if/lun* # set id 1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if/lun* # exit
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # exit
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # commit-buffer
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # create static-target-if 2
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set ipaddress
192.168.10.11
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set name statictarget2
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set port 3260
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # set auth-name
authprofile1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # create lun
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if/lun* # set id 1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if/lun* # exit
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/static-target-if* # exit
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # commit-buffer
```

### What to do next

To configure a second iSCSI device, repeat the steps for creating an iSCSI vNIC, initiator, and target.

## Deleting an iSCSI Static Target

You can delete an iSCSI static target. However, you must have at least one iSCSI static target remaining after you delete one. Therefore, you must have two iSCSI static targets in order to delete one of them.



**Note** If you have two iSCSI targets and you delete the first priority target, the second priority target becomes the first priority target, although the Cisco UCS Manager still shows it as the second priority target.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile to which you want to add an iSCSI target.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the iSCSI vNIC mode for the specified vNIC name.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>delete static-target-if</b>	Deletes the static target for the iSCSI vNIC.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete an iSCSI static target and commit the transaction:

```
UCS-A # scope org test
UCS-A /org # scope service-profile sample
UCS-A /org # scope iscsi-boot
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi trial
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # delete static-target-if 1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # commit-buffer
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi #
```

## Creating an iSCSI Auto Target

You can create an iSCSI auto target with or without the vendor IDs.

### Before you begin

These prerequisites must be met before creating iSCSI auto target:

- You have already created an iSCSI vNIC in a service profile.
- You have considered the prerequisites for the VIC that you are using. For more information, see [iSCSI Boot Guidelines and Prerequisites, on page 120](#)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile that you want to add an iSCSI target interface to.
<b>Step 3</b>	UCS-A /org # <b>scope iscsi-boot</b> <b>Example:</b>	Enters the mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters iSCSI vNIC service profile organization mode for the specified vNIC name.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/ # <b>create auto-target-if</b>	Creates an auto target for the iSCSI vNIC. If you plan to use an auto target without the vendor ID, you must configure an initiator name. For more information, see <a href="#">Creating an iSCSI vNIC in a Service Profile, on page 134</a> .
<b>Step 6</b>	(Optional) UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/auto-target-if* # <b>set dhcp-vendor-id</b> <i>vendor-id</i>	Sets a vendor ID for the auto target. The vendor ID can be up to 32 alphanumeric characters.
<b>Step 7</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/auto-target-if* # <b>exit</b>	Exists the current configuration mode.
<b>Step 8</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create an iSCSI auto target *without* a vendor ID and commit the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope iscsi-boot
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
```

```
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # create auto-target-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/auto-target-if* # exit
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # commit-buffer
```

The following example shows how to create an iSCSI auto target *with* a vendor ID and commit the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope iscsi-boot
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi iSCSI1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # create auto-target-if
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/auto-target-if* # set dhcp-vendor-id
iSCSI_Vendor
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi/auto-target-if* # exit
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # commit-buffer
```

### What to do next

To configure a second iSCSI device, repeat the steps for creating an iSCSI vNIC, initiator, and target.

## Deleting an iSCSI Static Target

You can delete an iSCSI static target. However, you must have at least one iSCSI static target remaining after you delete one. Therefore, you must have two iSCSI static targets in order to delete one of them.



**Note** If you have two iSCSI targets and you delete the first priority target, the second priority target becomes the first priority target, although the Cisco UCS Manager still shows it as the second priority target.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile to which you want to add an iSCSI target.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope iscsi-boot</b>	Enters the mode for configuring iSCSI boot parameters.
<b>Step 4</b>	UCS-A /org/service-profile/iscsi-boot # <b>scope vnic-iscsi</b> <i>iscsi-vnic-name</i>	Enters the iSCSI vNIC mode for the specified vNIC name.
<b>Step 5</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>delete static-target-if</b>	Deletes the static target for the iSCSI vNIC.
<b>Step 6</b>	UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to delete an iSCSI static target and commit the transaction:

```
UCS-A # scope org test
UCS-A /org # scope service-profile sample
UCS-A /org # scope iscsi-boot
UCS-A /org/service-profile/iscsi-boot # scope vnic-iscsi trial
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # delete static-target-if 1
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi # commit-buffer
UCS-A /org/service-profile/iscsi-boot/vnic-iscsi #
```

## Verifying iSCSI Boot

Use the KVM console to view the boot up messages as the adapter is booting. For information on how to access the KVM console, see the *Starting the KVM Console* chapter.

This step can only be performed using the Cisco UCS Manager GUI. For more information, see the *Starting the KVM Console* chapter in the *UCS Manager GUI Configuration Guide*.

- For the Cisco UCS M51KR-B Broadcom BCM57711, the following message appears:

```
Logging in the 1st iSCSI Target... Succeeded.
```

- For the Cisco UCS M81KR Virtual Interface Card, the following message appears:

```
Option ROM installed successfully.
```

## LAN Boot

You can configure a boot policy to boot one or more servers from a centralized provisioning server on the LAN. A LAN (or PXE) boot is frequently used to install operating systems on a server from that LAN server.

You can add more than one type of boot device to a LAN boot policy. For example, you could add a local disk or virtual media boot as a secondary boot device.

## Configuring a LAN Boot Policy for a Boot Policy

### Before you begin

Create a boot policy to contain the LAN boot configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create lan</b>	Creates a LAN boot for the boot policy and enters organization boot policy LAN mode.
<b>Step 4</b>	UCS-A /org/boot-policy/lan # <b>set order</b> {1   2   3   4}	Specifies the boot order for the LAN boot.
<b>Step 5</b>	UCS-A /org/boot-policy/lan # <b>create path</b> { <b>primary</b>   <b>secondary</b> }	Creates a primary or secondary LAN boot path and enters organization boot policy LAN path mode.
<b>Step 6</b>	UCS-A /org/boot-policy/lan/path # <b>set vnic</b> <i>vnic-name</i>	Specifies the vNIC to use for the LAN path to the boot image.
<b>Step 7</b>	UCS-A /org/boot-policy/lan/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example enters the boot policy named lab2-boot-policy, creates a LAN boot for the policy, sets the boot order to 2, creates primary and secondary paths using the vNICs named vNIC1 and vNIC2, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab2-boot-policy
UCS-A /org/boot-policy* # create lan
UCS-A /org/boot-policy/lan* # set order 2
UCS-A /org/boot-policy/lan* # create path primary
UCS-A /org/boot-policy/lan/path* # set vnic vNIC1
UCS-A /org/boot-policy/lan/path* # exit
UCS-A /org/boot-policy/lan* # create path secondary
UCS-A /org/boot-policy/lan/path* # set vnic vNIC2
UCS-A /org/boot-policy/lan/path* # commit-buffer
UCS-A /org/boot-policy/lan/path #
```

### What to do next

Include the boot policy in a service profile and template.

## Local Devices Boot

Cisco UCS Manager allows you to boot from different local devices.



**Note** For Cisco UCS M4 and higher blade and rack servers using enhanced boot order, you can select both top-level and second-level boot devices.

### Local Disk Boot

If a server has a local drive, you can configure a boot policy to boot the server from the top-level local disk device or from any of the following second-level devices:

- Local LUN—Enables boot from local disk or local LUN.
- Local JBOD—Enables boot from a bootable JBOD.
- SD card—Enables boot from SD card.
- Internal USB—Enables boot for internal USB.
- External USB—Enables boot from external USB.
- Embedded Local LUN—Enables boot from the embedded local LUN on the Cisco UCS 240 M4/M5 server.
- Embedded Local Disk—Enables boot from the embedded local disk on the Cisco UCS C240 M4SX and the M4L servers.



---

**Note** Second-level devices are only available for Cisco UCS M4 and higher blade and rack servers using enhanced boot order.

---

### Virtual Media Boot

You can configure a boot policy to boot one or more servers from a virtual media device that is accessible from the server. A virtual media device mimics the insertion of a physical CD/DVD disk (read-only) or floppy disk (read-write) into a server. This type of server boot is typically used to manually install operating systems on a server.



---

**Note** Second-level devices are only available for Cisco UCS M4 and higher blade and rack servers using enhanced boot order.

---

### Remote Virtual Drive Boot

You can configure a boot policy to boot one or more servers from a remote virtual drive that is accessible from the server.

### NVMe Boot

Beginning with release 3.2(1) Cisco UCS Manager provides the option of adding an NVMe device to the Boot policy for M5 blade and rack servers. BIOS enumerates the NVMe devices present and boots to the first NVMe device having UEFI capable OS installed on it.



## Configuring a Local Disk Boot for a Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, Cisco recommends that you create a global boot policy that can be included in multiple service profiles or service profile templates.

You can add more than one type of boot device to a boot policy. For example, you could add a virtual media boot as a secondary boot device.



**Note** Beginning with Release 2.2, if you want to add any top-level local storage device to the boot order, you must use **create local-any** after the **create local** command. If you have any policies from previous releases that contain a local storage device, they will be modified to use local-any during upgrade.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create storage</b>	Creates a storage boot for the boot policy and enters organization boot policy storage mode.
<b>Step 4</b>	UCS-A /org/boot-policy/storage # <b>create local</b>	Creates a local storage location and enters the boot policy local storage mode.
<b>Step 5</b>	UCS-A /org/boot-policy/storage/local/ # <b>create</b> { <b>embedded-local-jbod</b>   <b>embedded-local-lun</b>   <b>local-any</b>   <b>local-jbod</b>   <b>local-lun</b>   <b>nvme</b>   <b>sd-card</b>   <b>usb-extern</b>   <b>usb-intern</b> }	<p>Specifies the type of local storage. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>embedded-local-jbod</b>—A local JBOD disk drive.</li> <li>• <b>embedded-local-lun</b>—A local LUN drive.</li> </ul> <p><b>Note</b> In a setup with the Cisco boot optimized M.2 RAID controller (UCS-M2-HWRAID), select any to add the disk. Do not select Primary or Secondary.</p> <ul style="list-style-type: none"> <li>• <b>local-any</b>—Any type of local storage device. This option can be used in either legacy or UEFI boot mode.</li> </ul>

	Command or Action	Purpose
		<p><b>Note</b> Cisco UCS M1 and M2 blade and rack servers using standard boot order can only use local-any.</p> <ul style="list-style-type: none"> <li>• local-lun—A local hard disk drive.</li> <li>• sd-card—An SD card.</li> <li>• usb-extern—An external USB card.</li> <li>• usb-intern—An internal USB card.</li> </ul> <p>For Cisco UCS M4 and higher blade and rack servers using enhanced boot order, you can select both top-level and second-level boot devices.</p>
<b>Step 6</b>	<pre>UCS-A /org/boot-policy/storage/local/local-storage-device # set order order_number</pre>	<p>Sets the boot order for the specified local storage device. Enter an integer between 1 and 16.</p> <p>When using the enhanced boot order on Cisco UCS the boot order that you define is used. For standard boot mode using the terms "primary" or "secondary" do not imply a boot order. The effective order of boot devices within the same device class is determined by the PCIe bus scan order.</p>
<b>Step 7</b>	<pre>UCS-A /org/boot-policy/storage/local/local-storage-device # commit-buffer</pre>	<p>Commits the transaction to the system configuration.</p>

### Example

The following example shows how to create a boot policy named lab1-boot-policy, create a local hard disk drive boot for the policy, set the boot order to 3, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab1-boot-policy
UCS-A /org/boot-policy* # create storage
UCS-A /org/boot-policy/storage* # create local
UCS-A /org/boot-policy/storage/local* # create local-lun
UCS-A /org/boot-policy/storage/local/sd-card* # set order 3
UCS-A /org/boot-policy/storage/local/sd-card* # commit-buffer
UCS-A /org/boot-policy/storage/local/sd-card #
```

The following example shows how to create a local SD card boot for the service profile SP\_lab1, set the boot order to 3, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile SP_lab1
UCS-A /org/service-profile # create boot-definition
```

```
UCS-A /org/service-profile/boot-definition* # create storage
UCS-A /org/service-profile/boot-definition/storage* # create local
UCS-A /org/service-profile/boot-definition/storage/local* # create sd-card
UCS-A /org/service-profile/boot-definition/storage/local* # set order 3
UCS-A /org/service-profile/boot-definition/storage/local* # commit-buffer
UCS-A /org/service-profile/boot-definition/storage/local #
```

The following example shows how to create any top-level local device boot for the service profile `SP_lab1`, set the boot order to 3, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile SP_lab1
UCS-A /org/service-profile # create boot-definition
UCS-A /org/service-profile/boot-definition* # create storage
UCS-A /org/service-profile/boot-definition/storage* # create local
UCS-A /org/service-profile/boot-definition/storage/local* # create local-any
UCS-A /org/service-profile/boot-definition/storage/local/local-any* # set order 3
UCS-A /org/service-profile/boot-definition/storage/local/local-any* # commit-buffer
UCS-A /org/service-profile/boot-definition/storage/local/local-any #
```

### What to do next

Include the boot policy in a service profile and template.

## Configuring a Virtual Media Boot for a Boot Policy



**Note** Virtual Media requires the USB to be enabled. If you modify the BIOS settings that affect the USB functionality, you also affect the Virtual Media. Therefore, Cisco recommends that you leave the following USB BIOS defaults for best performance:

- Make Device Non Bootable—set to **disabled**
- USB Idle Power Optimizing Setting—set to **high-performance**

### Before you begin

Create a boot policy to contain the virtual media boot configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create virtual-media</b> { <b>read-only</b>   <b>read-only-local</b>   <b>read-only-remote</b>   <b>read-write</b>	Creates the specified virtual media boot for the boot policy and enters organization boot policy virtual media mode. This can be one of the following:

	Command or Action	Purpose
	<b>read-write-drive   read-write-local   read-write-remote</b> }	<ul style="list-style-type: none"> <li>• read-only—Local or remote CD/DVD. This option can be used in either legacy or UEFI boot mode.</li> <li>• read-only-local—Local CD/DVD.</li> <li>• read-only-remote—Remote CD/DVD.</li> </ul> <p>In a setup with M5 blade servers, if an ISO is mapped to the KVM console, use only <b>Remote CD/DVD</b> in Boot Order.</p> <ul style="list-style-type: none"> <li>• read-write—Local or remote floppy disk drive. This option can be used in either legacy or UEFI boot mode.</li> <li>• read-write-drive—Remote USB drive.</li> <li>• read-write-local—Local floppy disk drive.</li> <li>• read-write-remote—Remote floppy disk drive.</li> </ul> <p><b>Note</b> For Cisco UCS M4 and higher blade and rack servers using enhanced boot order, you can select both top-level and second-level boot devices.</p>
<b>Step 4</b>	UCS-A /org/boot-policy/virtual-media # <b>set order</b> <i>order_number</i>	Sets the boot order for the virtual-media boot. Enter an integer between 1 and 16.
<b>Step 5</b>	UCS-A /org/boot-policy/virtual-media # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to enter the boot policy named lab3-boot-policy, create a CD/DVD virtual media boot, set the boot order to 3, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab3-boot-policy
UCS-A /org/boot-policy* # create virtual-media read-only-local
UCS-A /org/boot-policy/virtual-media* # set order 3
UCS-A /org/boot-policy/virtual-media* # commit-buffer
```

### What to do next

Include the boot policy in a service profile and template.

## Configuring a NVMe Boot for a Boot Policy



**Note** NVMe boot policy is available only with Uefi boot mode, either with or without boot security.

### Before you begin

Create a boot policy to contain the NVMe boot configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>scope storage</b>	Enters organization boot policy storage mode for the boot policy.
<b>Step 4</b>	UCS-A /org/boot-policy/storage # <b>scope local</b>	Enters local storage boot policy mode for the specified boot policy.
<b>Step 5</b>	UCS-A /org/boot-policy/storage/local # <b>create nvme</b>	Creates the NVMe boot for the boot policy.
<b>Step 6</b>	UCS-A /org/boot-policy/storage/local* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to enter the boot policy named lab3-boot-policy, create a NVMe boot, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope boot-policy lab3-boot-policy
UCS-A /org/boot-policy/ # scope storage
UCS-A /org/boot-policy/storage # scope local
UCS-A /org/boot-policy/storage/local # create nvme
UCS-A /org/boot-policy/storage/local* # commit-buffer
```

### What to do next

Include the boot policy in a service profile and template.

## Creating a CIMC vMedia Boot Policy

You can also create a local boot policy that is restricted to a service profile or service profile template. However, Cisco recommends that you create a global boot policy that can be included in multiple service profiles or service profile templates.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>create boot-policy</b> <i>policy-name</i>	Creates a boot policy with the specified policy name, and enters organization boot policy mode.
<b>Step 3</b>	UCS-A /org/boot-policy* # <b>create virtual-media</b> ?	Displays a list of local and remote devices to your can access and boot.
<b>Step 4</b>	UCS-A /org/boot-policy* # <b>create virtual-media</b> { <b>access</b>   <b>vMediaMappingName</b> }	Displays a list of local and remote devices to your can access and boot.
<b>Step 5</b>	UCS-A /org/boot-policy* # <b>create virtual-media read-write-remote-drive vMediaMap0</b> }	Creates vMedia Boot Device configuration for specified vMedia.
<b>Step 6</b>	UCS-A /org/boot-policy/virtual-media* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 7</b>	UCS-A /org/boot-policy/virtual-media* # <b>show detail expand</b>	Displays the following boot order. <b>Boot virtual media:</b> <b>Order:</b> 1 <b>Access:</b> Read Write Remote vMedia Drive <b>Name:</b> vmediaMap0

### Example

The following example creates a CIMC vMedia boot policy.

```
UCS-A# scope org /
UCS-A /org* # create boot-policy boot-policy vm-vmediamap-boot
UCS-A /org/boot-policy* # create virtual-media
```

## Viewing a CIMC vMedia Mount

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis_id/blade_id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A# /chassis/server # <b>scope cimc</b>	Enters CIMC mode.
<b>Step 3</b>	UCS-A /chassis/server/cimc # <b>show vmedia-mapping-list detail expand</b>	Displays the vMedia mapping details.

### Example

The following example shows how to view a CIMC vMedia mount.

```
UCS-A# scope server 1/2
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # show vmedia-mapping-list detail expand

vMedia Mapping List:
vMedia Mapping:
Disk Id: 1
Mapping Name: cdd
Device Type: Cdd
Remote IP: 172.31.1.167
Image Path: cifs
Image File Name: ubuntu-14.11-desktop-i386.iso
Mount Protocol: Cifs
Mount Status: Mounted
Error: None
Password:
User ID: Administrator

UCS-A /chassis/server/cimc #
```

## Configuring the Boot Policy for a Local LUN

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>create storage</b>	Creates a storage boot for the boot policy and enters organization boot policy storage mode.

	Command or Action	Purpose
<b>Step 4</b>	UCS-A /org/boot-policy/storage # <b>create local</b>	Creates a local storage location and enters the boot policy local storage mode.
<b>Step 5</b>	UCS-A /org/boot-policy/storage/local/ # <b>create local-lun</b>	Specifies a local hard disk drive as the local storage.
<b>Step 6</b>	UCS-A /org/boot-policy/storage/local/local-lun # <b>create local-lun-image-path</b> { <b>primary</b>   <b>secondary</b> }	Specifies the boot order for the LUN that you specify.  <b>Important</b> Cisco UCS Manager Release 2.2(4) does not support <b>secondary</b> boot order.
<b>Step 7</b>	UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path # <b>set lunname</b> <i>lun_name</i>	Specifies the name of the LUN that you want to boot from.
<b>Step 8</b>	UCS-A /org/boot-policy/storage/local/local-storage-device # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create a boot policy named lab1-boot-policy, create a local hard disk drive boot for the policy, specify a boot order and a LUN to boot from, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy lab1-boot-policy
UCS-A /org/boot-policy* # create storage
UCS-A /org/boot-policy/storage* # create local
UCS-A /org/boot-policy/storage/local* # create local-lun
UCS-A /org/boot-policy/storage/local/local-lun # create local-lun-image-path primary
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path # set lunname luna
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path # commit-buffer
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path #
```

### What to do next

Include the boot policy in a service profile and template.



# Deleting a Boot Policy

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete boot-policy</b> <i>policy-name</i>	Deletes the specified boot policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example deletes the boot policy named boot-policy-LAN and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete boot-policy boot-policy-LAN
UCS-A /org* # commit-buffer
UCS-A /org #
```

# UEFI Boot Parameters

UEFI boot mode for servers is dependent on information that is stored on the platform hardware. The boot entry, which contains information about the UEFI OS boot loader, is stored in the BIOS flash of the server. In Cisco UCS Manager releases earlier than Release 2.2(4), when a service profile is migrated from one server to another server, the boot loader information is not available on the destination server. Hence, the BIOS cannot load the boot loader information for the server to boot in UEFI boot mode.

Cisco UCSM Release 2.2(4) introduces UEFI boot parameters to provide the BIOS with information about the location of the UEFI OS boot loader on the destination server from where the BIOS loads it. Now, the server can use the boot loader information and boot in UEFI boot mode.

## Guidelines and Limitations for UEFI Boot Parameters

- You can configure UEFI boot parameters only if the boot mode is UEFI.
- When you upgrade Cisco UCS Manager to Release 2.2(4), UEFI boot failure during service profile migration is not handled automatically. You must explicitly create the UEFI boot parameters in the target device to successfully boot to the UEFI-capable OS.
- UEFI boot parameters are supported on all M4 and higher servers that support second-level boot order.
- You can specify UEFI boot parameters for the following device types:
  - SAN LUN

- ISCSI LUN
  - Local LUN
- UEFI boot parameters are specific to each operating system. You can specify UEFI boot parameters for the following operating systems:
    - VMware ESX
    - SuSE Linux
    - Microsoft Windows
    - Red Hat Enterprise Linux 7

## Configuring UEFI Boot Parameters for a Local LUN

### Before you begin

Ensure that the boot mode for the local LUN is set to UEFI.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>scope storage</b>	Enters organization boot policy storage mode for the boot policy.
<b>Step 4</b>	UCS-A /org/boot-policy/storage # <b>scope local</b>	Enters the boot policy local storage mode.
<b>Step 5</b>	UCS-A /org/boot-policy/storage/local/ # <b>scope</b> { <b>local-any</b>   <b>local-lun</b>   <b>sd-card</b>   <b>usb-extern</b>   <b>usb-intern</b> }	<p>Specifies the type of local storage. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>local-any</b>—Any type of local storage device. This option can be used in either legacy or UEFI boot mode.</li> </ul> <p><b>Note</b> Cisco UCS M1 and M2 blade and rack servers using standard boot order can only use <b>local-any</b>.</p> <ul style="list-style-type: none"> <li>• <b>local-lun</b>—A local hard disk drive.</li> <li>• <b>sd-card</b>—An SD card.</li> <li>• <b>usb-extern</b>—An external USB card.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>usb-intern—An internal USB card.</li> </ul> <p><b>Important</b> The only type of local storage for which you can configure UEFI boot parameters is <b>local-lun</b>.</p>
<b>Step 6</b>	UCS-A /org/boot-policy/storage/local/local-lun # <b>scope local-lun-image-path</b> { <b>primary</b>   <b>secondary</b> }	Enters the image path for the local LUN.
<b>Step 7</b>	UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path # <b>create uefi-boot-param</b>	Creates UEFI boot parameters and enters UEFI boot parameter mode.
<b>Step 8</b>	UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # <b>set bootloader-name</b> <i>name</i>	Sets the name of the boot loader.
<b>Step 9</b>	UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # <b>set bootloader-path</b> <i>path</i>	Sets the path of the boot loader.
<b>Step 10</b>	UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # <b>set boot-description</b> " <i>description</i> "	Sets a description for the boot loader.
<b>Step 11</b>	UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create UEFI boot parameters for a local LUN, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy bp1
UCS-A /org/boot-policy* # scope storage
UCS-A /org/boot-policy/storage* # scope local
UCS-A /org/boot-policy/storage/local* # scope local-lun
UCS-A /org/boot-policy/storage/local/local-lun # scope local-lun-image-path primary
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path # create uefi-boot-param
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # set
  bootloader-name grub.efi
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # set
  bootloader-path EFI\redhat
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* # set
  boot-description "Red Hat Enterprise Linux"
UCS-A /org/boot-policy/storage/local/local-lun/local-lun-image-path/uefi-boot-param* #
commit-buffer
```

## Configuring UEFI Boot Parameters for an iSCSI LUN

### Before you begin

Ensure that the boot mode for the iSCSI LUN is set to UEFI.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>scope iscsi</b>	Enters organization boot policy iSCSI mode for the boot policy.
<b>Step 4</b>	UCS-A /org/boot-policy/iscsi # <b>scope path</b> { <b>primary</b>   <b>secondary</b> }	Enters the image path for the iSCSI LUN.
<b>Step 5</b>	UCS-A /org/boot-policy/iscsi/path # <b>create uefi-boot-param</b>	Creates UEFI boot parameters and enters UEFI boot parameter mode.
<b>Step 6</b>	UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # <b>set bootloader-name</b> <i>name</i>	Sets the name of the boot loader.
<b>Step 7</b>	UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # <b>set bootloader-path</b> <i>path</i>	Sets the path of the boot loader.
<b>Step 8</b>	UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # <b>set boot-description</b> " <i>description</i> "	Sets a description for the boot loader.
<b>Step 9</b>	UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create UEFI boot parameters for an iSCSI LUN, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy bp2
UCS-A /org/boot-policy* # scope iscsi
UCS-A /org/boot-policy/iscsi # scope path primary
UCS-A /org/boot-policy/iscsi/path # create uefi-boot-param
UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # set bootloader-name grub.efi
UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # set bootloader-path EFI\redhat
UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # set boot-description "Red Hat Enterprise"
```

```
Linux"
UCS-A /org/boot-policy/iscsi/path/uefi-boot-param* # commit-buffer
```

## Configuring UEFI Boot Parameters for a SAN LUN

### Before you begin

Ensure that the boot mode for the SAN LUN is set to UEFI.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope boot-policy</b> <i>policy-name</i>	Enters organization boot policy mode for the specified boot policy.
<b>Step 3</b>	UCS-A /org/boot-policy # <b>scope san</b>	Enters organization boot policy SAN mode for the boot policy.
<b>Step 4</b>	UCS-A /org/boot-policy/san # <b>scope san-image</b> { <b>primary</b>   <b>secondary</b> }	Enters the SAN image.
<b>Step 5</b>	UCS-A /org/boot-policy/san/san-image # <b>scope path</b> { <b>primary</b>   <b>secondary</b> }	Enters the image path for the SAN LUN.
<b>Step 6</b>	UCS-A /org/boot-policy/san/san-image/path # <b>create uefi-boot-param</b>	Creates UEFI boot parameters and enters UEFI boot parameter mode.
<b>Step 7</b>	UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # <b>set bootloader-name</b> <i>name</i>	Sets the name of the boot loader.
<b>Step 8</b>	UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # <b>set bootloader-path</b> <i>path</i>	Sets the path of the boot loader.
<b>Step 9</b>	UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # <b>set boot-description</b> " <i>description</i> "	Sets a description for the boot loader.
<b>Step 10</b>	UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example shows how to create UEFI boot parameters for a SAN LUN, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope boot-policy bp3
UCS-A /org/boot-policy* # scope san
UCS-A /org/boot-policy/san # scope san-image primary
UCS-A /org/boot-policy/san/san-image # scope path primary
UCS-A /org/boot-policy/san/san-image/path # create uefi-boot-param
UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # set bootloader-name grub.efi
UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # set bootloader-path EFI\redhat
UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # set boot-description "Red Hat
Enterprise Linux"
UCS-A /org/boot-policy/san/san-image/path/uefi-boot-param* # commit-buffer
```



## CHAPTER 10

# Service Profile Configuration

- [Service Profiles in UCS Manager, on page 171](#)
- [Service Profiles that Override Server Identity, on page 172](#)
- [Service Profiles that Inherit Server Identity, on page 172](#)
- [Guidelines and Recommendations for Service Profiles, on page 173](#)
- [Inband Service Profiles, on page 174](#)
- [Service Profile Templates, on page 181](#)
- [Service Profile Tasks, on page 185](#)
- [Service Profile Association, on page 197](#)
- [Service Profile Boot Definition , on page 200](#)
- [Fibre Channel Zoning for a Service Profile, on page 206](#)
- [Service Profile Template Management, on page 208](#)

## Service Profiles in UCS Manager

A service profile defines a single server and its storage and networking characteristics. You can create a service profile for Cisco UCS Manager and UCS Mini. When a service profile is deployed to a server, UCS Manager automatically configures the server, adapters, fabric extenders, and fabric interconnects to match the configuration specified in the service profile.

A service profile includes four types of information:

- **Server definition:** Defines the resources (e.g. a specific server or a blade inserted to a specific chassis) that are required to apply to the profile.
- **Identity information:** Includes the UUID, MAC address for each virtual NIC (vNIC), and WWN specifications for each HBA.
- **Firmware revision specifications:** Used when a certain tested firmware revision is required to be installed or for some other reason a specific firmware is used.
- **Connectivity definition:** Configures network adapters, fabric extenders, and parent interconnects, however this information is abstract as it does not include the details of how each network component is configured.

The UCS system provides two types of service profiles: Service profiles that inherit server identity and service profiles that override server identity.



---

**Note** A server may also show a field for **Server Personality** as part of its properties. On Cisco UCS M6 and M7 servers, this field is displayed if a server personality is configured for HX servers. This field is not visible if no server personality is configured. The server personality is informational only and cannot be reset in the UCS Manager GUI. However, the UCS Manager CLI provides a command line option to revert the server back to a "no personality" state.

---

## Service Profiles that Override Server Identity

This type of service profile provides the maximum amount of flexibility and control. This profile allows you to override the identity values that are on the server at the time of association and use the resource pools and policies set up in Cisco UCS Manager to automate some administration tasks.

You can disassociate this service profile from one server, then associate it with another server. This re-association can be done either manually or through an automated server pool policy. The burned-in settings, such as UUID and MAC address on the new server are overwritten with the configuration in the service profile. As a result, the change in the server is transparent to your network. You do not need to reconfigure any component or application on your network to begin using the new server.

This profile allows you to take advantage of and manage system resources through resource pools and policies, such as the following:

- Virtualized identity information, including pools of MAC addresses, WWN addresses, and UUIDs
- Ethernet and Fibre Channel adapter profile policies
- Firmware package policies
- Operating system boot order policies

Unless the service profile contains power management policies, a server pool qualification policy, or another policy that requires a specific hardware configuration, you can use the profile for any type of server in the Cisco UCS domain.

You can associate these service profiles with either a rack-mount server or a blade server. The ability to migrate the service profile depends upon whether you choose to restrict migration of the service profile.



---

**Note** If you choose not to restrict migration, Cisco UCS Manager does not perform any compatibility checks on the new server before migrating the existing service profile. If the hardware of both servers are not similar, the association might fail.

---

## Service Profiles that Inherit Server Identity

This hardware-based service profile is the simplest to use and create. This profile uses the default values in the server and mimics the management of a rack-mounted server. It is tied to a specific server and cannot be moved or migrated to another server.

You do not need to create pools or configuration policies to use this service profile.



This service profile inherits and applies the identity and configuration information that is present at the time of association, such as the following:

- MAC addresses for the two NICs
- For a converged network adapter or a virtual interface card, the WWN addresses for the two HBAs
- BIOS versions
- Server UUID



---

**Important** The server identity and configuration information inherited through this service profile might not have the values burned into the server hardware at the manufacturer if those values were changed before this profile is associated with the server.

---

## Guidelines and Recommendations for Service Profiles

In addition to any guidelines or recommendations that are specific to policies and pools included in service profiles and service profile templates, such as the local disk configuration policy, adhere to the following guidelines and recommendations that impact the ability to associate a service profile with a server:

### **Limit to the Number of vNICs that Can Be Configured on a Rack-Mount Server**

You can configure up to 56 vNICs per supported adapter, such as the Cisco UCS P81E Virtual Interface Card (N2XX-ACPCI01), on any rack-mount server that is integrated with Cisco UCS Manager.

### **No Power Capping Support for Rack-Mount Servers**

Power capping is not supported for rack servers. If you include a power control policy in a service profile that is associated with a rack-mount server, the policy is not implemented.

### **QoS Policy Guidelines for vNICs**

You can only assign a QoS policy to a vNIC if the priority setting for that policy is not set to **fc**, which represents the Fibre Channel system class. You can configure the priority for the QoS policy with any other system class.

### **QoS Policy Guidelines for vHBAs**

You can only assign a QoS policy to a vHBA if the priority setting for that policy is set to **fc**, which represents the Fibre Channel system class.

The Host Control setting for a QoS policy applies to vNICs only. It has no effect on a vHBA.

# Inband Service Profiles

## Configuring an Inband Service Profile

This procedure explains how to create an inband service profile.



**Note** All Cisco UCS M4 servers configured in Cisco UCS Manager GUI with an out-of-band configuration using the server CIMC from the **Equipment** tab, will automatically get an inband network (VLAN) and IPv4/IPv6 configuration as specified in the inband profile. Removing the network or IP pool name from the inband profile configuration will delete the inband configuration from the server, if the server inband configuration was derived from the inband profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope eth-uplink</b>	Enters the Ethernet uplink configuration mode.
<b>Step 2</b>	UCS-A /eth-uplink # <b>scope inband-profile</b>	Enters the inband profile configuration mode.
<b>Step 3</b>	UCS-A /eth-uplink/inband-profile # <b>set net-group-name</b> <i>vlan-group-name</i>	Sets the network group name for the inband profile.
<b>Step 4</b>	UCS-A /eth-uplink/inband-profile* # <b>set default-vlan-name</b> <i>vlan-name</i>	Sets the default VLAN for the inband profile.
<b>Step 5</b>	UCS-A /eth-uplink/inband-profile* # <b>set default-pool-name</b> <i>pool-name</i>	Sets the IP pool for the inband profile.
<b>Step 6</b>	UCS-A /eth-uplink/inband-profile* # <b>set monitor-interval</b> <i>interval</i>	Sets the monitor-interval after which failover to the subordinate fabric interconnect occurs. This can range from 1 to 5 seconds.
<b>Step 7</b>	UCS-A /eth-uplink/inband-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The example below creates the inband service profile `inband-profile`, sets the network group name to `inband-vlan-group`, sets the default VLAN to `Inband_VLAN`, sets the IP pool to `inband_default`, sets the monitor-interval to 5 seconds, and commits the transaction:

```
UCS-A #scope eth-uplink
UCS-A /eth-uplink # scope inband-profile
UCS-A /eth-uplink/inband-profile # set net-group-name inband-vlan-group
UCS-A /eth-uplink/inband-profile* # set default-vlan-name Inband_VLAN
UCS-A /eth-uplink/inband-profile* # set default-pool-name inband_default
UCS-A /eth-uplink/inband-profile* # set monitor-interval 5
```

```
UCS-A /eth-uplink/inband-profile* # commit-buffer
UCS-A /eth-uplink/inband-profile #
```

## Configuring an Inband Management Service Profile

This procedure explains how to configure an inband management service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the organization configuration mode.
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>sp-name</i>	Creates the service profile specified and enters service profile configuration mode.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create mgmt-iface</b> <i>in-band</i>	Creates the management interface specified and enters management interface configuration mode
<b>Step 4</b>	UCS-A /org/service-profile/mgmt-iface # <b>create mgmt-vlan</b>	Creates a management VLAN and enters the management VLAN configuration mode.
<b>Step 5</b>	UCS-A/org/service-profile/mgmt-iface/mgmt-vlan # <b>set network-name</b> <i>network-name</i>	Sets the management VLAN network name.
<b>Step 6</b>	UCS-A /org/service-profile/mgmt-iface/mgmt-vlan # <b>create ext-pooled-ip</b>	Creates an external IP pool and enters the IP pool configuration mode.
<b>Step 7</b>	UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip # <b>set name</b> <i>pool-name</i>	Sets the name of the external IPv4 pool.
<b>Step 8</b>	UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip # <b>exit</b>	Exits IPv4 pool configuration mode.
<b>Step 9</b>	UCS-A /org/service-profile/mgmt-iface/mgmt-vlan # <b>create ext-pooled-ip6</b>	Creates an external IPv6 pool and enters the IPv6 pool configuration mode.
<b>Step 10</b>	UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip6 # <b>set name</b> <i>pool-name</i>	Sets the name of the external IPv6 pool.
<b>Step 11</b>	UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip6 # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The example below creates a service profile name `inband_sp`, configures a management interface named `in-band`, creates a management VLAN, sets the network name to `Inband_VLAN`, creates an

external IPv4 pool and sets the name to `inband_default`, creates an external IP and an external IPv6 management pool, sets the name of both pools to `inband_default`, and commits the transaction:

```
UCS-A# scope org
UCS-A /org # create service-profile inband_sp
UCS-A /org/service-profile* # create mgmt-iface in-band
UCS-A /org/service-profile/mgmt-iface* # create mgmt-vlan
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan* # set network-name Inband_VLAN
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan* # create ext-pooled-ip
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip* # set name inband_default
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip* # exit
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan* # create ext-pooled-ip6
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip6* # set name inband_default
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip6* # commit-buffer
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan/ext-pooled-ip6 # exit
UCS-A /org/service-profile/mgmt-iface/mgmt-vlan # exit
UCS-A /org/service-profile/mgmt-iface # exit
```

### What to do next

Associate the inband management interface service profile to a server.

## Deleting the Inband Configuration from a Service Profile

This procedure explains how to delete the inband configuration from a service profile.



**Note** If an inband profile is configured in Cisco UCS Manager with a default VLAN name and a default pool name, the server CIMC will automatically get an inband configuration from the inband profile within one minute after deleting the configuration from the service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> /	Enters the organization configuration mode.
<b>Step 2</b>	UCS-A/org # <b>scope service-profile blade1</b>	Enters the organization profile configuration mode.
<b>Step 3</b>	UCS-A/org/service-profile # <b>delete mgmt-iface in-band</b>	Deletes the specified service profile.
<b>Step 4</b>	UCS-A/org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example scopes to the service profile `blade1`, deletes the management interface `in-band`, and commits the transaction:

```
UCS-A# scope org
UCS-A /org # scope service-profile blade1
UCS-A /org/service-profile # delete mgmt-iface in-band
```

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

## Configuring Inband Management on the CIMC

This procedure explains how to configure inband management on a server CIMC to pooled IP.



**Note** Setting the inband management IP address to a static IP address is similar to setting the inband management IP address to the pooled IP address. The example below creates a management interface on chassis 1, server 1 named in-band, sets the IPv4 and IPv6 states to static, and commits the transaction. This example also creates a management VLAN, creates an external static IPv4, brings up the IPv4, creates an external static IPv6, brings up the IPv6, and commits the transaction:

```
UCS-A# scope server 1/1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # create mgmt-iface in-band
UCS-A /chassis/server/cimc/mgmt-iface* # set ipv4state static
UCS-A /chassis/server/cimc/mgmt-iface* # set ipv6state static
UCS-A /chassis/server/cimc/mgmt-iface* # commit-buffer
UCS-A /chassis/server/cimc/mgmt-iface # show detail

External Management Interface:
  Mode: In Band
  Ip V4 State: Static
  Ip V6 State: Static
  Is Derived from Inband Profile: No
UCS-A /chassis/server/cimc/mgmt-iface # set
  ipv4state IpV4State
  ipv6state IpV6State
  mode      Mode

UCS-A /chassis/server/cimc/mgmt-iface # create mgmt-vlan
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # create ext-static-ip
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip* # set addr x.x.x.1
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip* # set subnet 255.255.255.0
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip* # set default-gw x.x.x.254
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip* # commit-buffer
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip # up
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan # create ext-static-ip6
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip6* # set addr xxxx:xxxx:xxxx:1::
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip6* # set default-gw
xxxx:xxxx:xxxx:1::0001
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip6* # set prefix 64
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip6* # commit-buffer
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-static-ip6 # up
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan # show detail expand

External Management Virtual LAN:
  Network Name:
  Id: 1

  External Management Static IP:
    IP Address: x.x.x.1
    Default Gateway: 10.193.1.254
    Subnet: 255.255.255.0
    Primary DNS IP: 0.0.0.0
    Secondary DNS IP: 0.0.0.0

  External Management Static IPv6:
    IP Address: xxxx:xxxx:xxxx:1::
    Default Gateway: xxxx:xxxx:xxxx:1::0001
    Prefix: 64
    Primary DNS IP: ::
    Secondary DNS IP: ::
```

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassi-numserver-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters the CIMC configuration mode.
<b>Step 3</b>	UCS-A /chassis/server /chassis/server/cimc # <b>create mgmt-iface</b> <i>in-band</i>	Creates the management interface specified and enters management interface configuration mode.
<b>Step 4</b>	UCS-A /chassis/server/cimc/mgmt-iface* # <b>set ipv4state pooled</b>	Sets IPv4 state to pooled.
<b>Step 5</b>	UCS-A /chassis/server/cimc/mgmt-iface *## <b>set ipv6state pooled</b>	Sets IPv6 state to pooled.
<b>Step 6</b>	UCS-A /chassis/server/cimc/mgmt-iface* # <b>create mgmt-vlan</b>	Creates a management VLAN and enters the management VLAN configuration mode.
<b>Step 7</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # <b>set network-name</b> <i>network-name</i>	Sets the management VLAN network name.
<b>Step 8</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # <b>create ext-pooled-ip</b>	Creates an external IPv4 pool and enters the IPv4 pool configuration mode.
<b>Step 9</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip* # <b>set name</b> <i>pool-name</i>	Sets the name of the external IPv4 pool.
<b>Step 10</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip* # <b>exit</b>	Exits IPv4 pool configuration mode.
<b>Step 11</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # <b>create ext-pooled-ip6</b>	Creates an external IPv6 pool and enters the IPv6 pool configuration mode.
<b>Step 12</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip6* # <b>set name</b> <i>pool-name</i>	Sets the name of the external IPv6 pool.
<b>Step 13</b>	UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip6* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The example below creates a management interface on chassis 1, server 1 named in-band, sets the IPv4 and IPv6 states to pooled, creates a management VLAN, sets the network name to Inband, creates an external IPv4 pool, sets the name to inband\_default. Creates an external IPv6 pool, sets the name to inband\_default, and commits the transaction:

```

UCS-A# scope server 1/1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # create mgmt-iface in-band
UCS-A /chassis/server/cimc/mgmt-iface* # set ipv4state pooled
UCS-A /chassis/server/cimc/mgmt-iface* # set ipv6state pooled
UCS-A /chassis/server/cimc/mgmt-iface* # create mgmt-vlan
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # set network-name Inband
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # create ext-pooled-ip
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip* # set name Inband_default
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip* # exit
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan* # create ext-pooled-ip6
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip6* # set name Inband_default
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip6* # commit-buffer
UCS-A /chassis/server/cimc/mgmt-iface/mgmt-vlan/ext-pooled-ip6 #

```

## Deleting the Inband Configuration from the CIMC

This procedure explains how to delete the inband configuration from a server CIMC.



**Note** If an inband profile is configured in Cisco UCS Manager with a default VLAN name and a default pool name, the server CIMC will automatically get an inband configuration from the inband profile within one minute after deleting the configuration from the service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassi-numserver-num</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope cimc</b>	Enters the CIMC configuration mode.
<b>Step 3</b>	UCS-A /chassis/server /chassis/server/cimc # <b>delete mgmt-ifacein-band</b>	Deletes the specified service profile.
<b>Step 4</b>	UCS-A /chassis/server /chassis/server/cimc # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the management interface named in-band from chassis 1, server 1, and commits the transaction:

```

UCS-A# scope server 1/1
UCS-A /chassis/server # scope cimc
UCS-A /chassis/server/cimc # delete mgmt-iface in-band
UCS-A /chassis/server/cimc* # commit-buffer
UCS-A /chassis/server/cimc #

```



# Service Profile Templates

## Creating a Service Profile Template

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>profile-name</i> { <b>initial-template</b>   <b>updating-template</b> }	Creates the specified service profile template and enters organization service profile mode.  Enter a unique <i>profile-name</i> to identify this service profile template.  This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>set boot-policy</b> <i>policy-name</i>	Associates the specified boot policy with the service profile.
<b>Step 5</b>	(Optional) UCS-A /org/service-profile # <b>set descr</b> <i>description</i>	Provides a description for the service profile.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 6</b>	UCS-A /org/service-profile # <b>set dynamic-vnic-conn-policy</b> <i>policy-name</i>	Associates the specified dynamic vNIC connection policy with the service profile.
<b>Step 7</b>	UCS-A /org/service-profile # <b>set ext-mgmt-ip-state</b> { <b>none</b>   <b>pooled</b> }	Specifies how the management IP address will be assigned to the service profile.  You can set the management IP address policy using the following options:

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• None-- The service profile is not assigned an IP address.</li> <li>• Pooled-- The service profile is assigned an IP address from the management IP pool.</li> </ul> <p><b>Note</b> Setting the management IP address to static for a service profile template will result in an error.</p>
<b>Step 8</b>	UCS-A /org/service-profile # <b>set host-fw-policy</b> <i>policy-name</i>	Associates the specified host firmware policy with the service profile.
<b>Step 9</b>	UCS-A /org/service-profile # <b>set identity</b> { <b>dynamic-uuid</b> { <i>uuid</i>   <b>derived</b> }   <b>dynamic-wwnn</b> { <i>wwnn</i>   <b>derived</b> }   <b>uuid-pool</b> <i>pool-name</i>   <b>wwnn-pool</b> <i>pool-name</i> }	<p>Specifies how the server acquires a UUID or WWNN. You can do one of the following:</p> <ul style="list-style-type: none"> <li>• Create a unique UUID in the form <i>nnnnnnnnn-<i>nnnn</i>-<i>nnnn</i>-<i>nnnnnnnnnnnnnnnn</i></i> .</li> <li>• Derive the UUID from the one burned into the hardware at manufacture.</li> <li>• Use a UUID pool.</li> <li>• Create a unique WWNN in the form <i>hh : hh : hh : hh : hh : hh : hh : hh</i> .</li> <li>• Derive the WWNN from one burned into the hardware at manufacture.</li> <li>• Use a WWNN pool.</li> </ul>
<b>Step 10</b>	UCS-A /org/service-profile # <b>set ipmi-access-profile</b> <i>profile-name</i>	Associates the specified IPMI access profile with the service profile.
<b>Step 11</b>	UCS-A /org/service-profile # <b>set lan-connectivity-policy-name</b> <i>policy-name</i>	<p>Associates the specified LAN connectivity policy with the service profile.</p> <p><b>Note</b> You cannot have a LAN connectivity policy and locally created vNICs in the same service profile. When you add a LAN connectivity policy to a service profile, any existing vNIC configuration is erased.</p>
<b>Step 12</b>	UCS-A /org/service-profile # <b>set local-disk-policy</b> <i>policy-name</i>	Associates the specified local disk policy with the service profile.

	Command or Action	Purpose
<b>Step 13</b>	UCS-A /org/service-profile # <b>set maint-policy</b> <i>policy-name</i>	Associates the specified maintenance policy with the service profile.
<b>Step 14</b>	UCS-A /org/service-profile # <b>set mgmt-fw-policy</b> <i>policy-name</i>	Associates the specified management firmware policy with the service profile.
<b>Step 15</b>	UCS-A /org/service-profile # <b>set power-control-policy</b> <i>policy-name</i>	Associates the specified power control policy with the service profile.
<b>Step 16</b>	UCS-A /org/service-profile # <b>set san-connectivity-policy-name</b> <i>policy-name</i>	Associates the specified SAN connectivity policy with the service profile.  <b>Note</b> You cannot have a SAN connectivity policy and locally created vHBAs in the same service profile. When you add a SAN connectivity policy to a service profile, any existing vHBA configuration is erased.
<b>Step 17</b>	UCS-A /org/service-profile # <b>set scrub-policy</b> <i>policy-name</i>	Associates the specified scrub policy with the service profile.
<b>Step 18</b>	UCS-A /org/service-profile # <b>set sol-policy</b> <i>policy-name</i>	Associates the specified serial over LAN policy with the service profile.
<b>Step 19</b>	UCS-A /org/service-profile # <b>set stats-policy</b> <i>policy-name</i>	Associates the specified statistics policy with the service profile.
<b>Step 20</b>	UCS-A /org/service-profile # <b>set user-label</b> <i>label-name</i>	Specifies the user label associated with the service profile.
<b>Step 21</b>	UCS-A /org/service-profile # <b>set vcon</b> {1   2} <b>selection</b> {all   assigned-only   exclude-dynamic   exclude-unassigned}	Specifies the selection preference for the specified vCon.
<b>Step 22</b>	UCS-A /org/service-profile # <b>set vcon-profile</b> <i>policy-name</i>	Associates the specified vNIC/vHBA placement profile with the service profile.  <b>Note</b> You can either assign a vNIC/vHBA placement profile to the service profile, or set vCon selection preferences for the service profile, but you do not need to do both.
<b>Step 23</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create a service profile template and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # create service-profile ServTemp2 updating-template
UCS-A /org/service-profile* # set bios-policy biospol1
UCS-A /org/service-profile* # set boot-policy bootpol32
UCS-A /org/service-profile* # set descr "This is a service profile example."
UCS-A /org/service-profile* # set dynamic-vnic-conn-policy mydynvnicconnpolicy
UCS-A /org/service-profile* # set ext-mgmt-ip-state pooled
UCS-A /org/service-profile* # set host-fw-policy ipmi-user987
UCS-A /org/service-profile* # set identity dynamic-uuid derived
UCS-A /org/service-profile* # set ipmi-access-profile ipmiProf16
UCS-A /org/service-profile* # set local-disk-policy localdiskpol33
UCS-A /org/service-profile* # set maint-policy maintpol4
UCS-A /org/service-profile* # set mgmt-fw-policy mgmtfwpol175
UCS-A /org/service-profile* # set power-control-policy powcontrpol13
UCS-A /org/service-profile* # set scrub-policy scrubpol55
UCS-A /org/service-profile* # set sol-policy solpol2
UCS-A /org/service-profile* # set stats-policy statspol4
UCS-A /org/service-profile* # set user-label mylabel
UCS-A /org/service-profile* # vcon-policy myvconnpolicy
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to do next

- (Optional) Configure a boot definition for the service profile. Use this option only if you have not associated a boot policy with the service profile.
- Create a service profile instance from the service profile template.

## Creating a Service Profile Instance from a Service Profile Template

### Before you begin

Verify that there is a service profile template from which to create a service profile instance.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>profile-name</i> <b>instance</b>	Creates the specified service profile instance and enters organization service profile mode.  Enter a unique <i>profile-name</i> to identify this service profile template.  This name can be between 2 and 32 alphanumeric characters. You cannot use spaces

	Command or Action	Purpose
		or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set src-templ-name</b> <i>profile-name</i>	Specifies the source service profile template to apply to the service profile instance. All configuration settings from the service profile template will be applied to the service profile instance.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a service profile instance named ServProf34, applies the service profile template named ServTemp2, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create service-profile ServProf34 instance
UCS-A /org/service-profile* # set src-templ-name ServTemp2
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to do next

Associate the service profile to a server, rack server, or server pool.

## Service Profile Tasks

### Renaming a Service Profile

When you rename a service profile, the following occurs:

- Event logs and audit logs that reference the previous name for the service profile are retained under that name.
- A new audit record is created to log the rename operation.
- All records of faults against the service profile under its previous name are transferred to the new service profile name.



**Note** You cannot rename a service profile with pending changes.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>rename-to</b> <i>new-profile-name</i>	<p>Renames the specified service profile.</p> <p>When you enter this command, you are warned that you may lose all uncommitted changes in the CLI session. Type <b>y</b> to confirm that you want to continue.</p> <p>This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.</p>
<b>Step 4</b>	UCS-A /org/service-profile/ # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

This example shows how to change the name of a service profile from ServInst90 to ServZoned90 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # rename-to ServZoned90
Rename is a standalone operation. You may lose any uncommitted changes in this CLI session.
Do you want to continue? (yes/no): y
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Creating a Hardware-Based Service Profile

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>create service-profile</b> <i>profile-name</i> <b>instance</b>	Creates the specified service profile instance and enters organization service profile mode.  Enter a unique <i>profile-name</i> to identify this service profile.  This name can be between 2 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and this name must be unique across all service profiles and service profile templates within the same organization.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>set boot-policy</b> <i>policy-name</i>	Associates the specified boot policy with the service profile.
<b>Step 5</b>	(Optional) UCS-A /org/service-profile # <b>set descr</b> <i>description</i>	Provides a description for the service profile.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 6</b>	UCS-A /org/service-profile # <b>set dynamic-vnic-conn-policy</b> <i>policy-name</i>	Associates the specified dynamic vNIC connection policy with the service profile.
<b>Step 7</b>	UCS-A /org/service-profile # <b>set ext-mgmt-ip-state</b> { <b>none</b>   <b>pooled</b>   <b>static</b> }	Specifies how the management IP address will be assigned to the service profile.  You can set the management IP address policy using the following options: <ul style="list-style-type: none"> <li>• None-- The service profile is not assigned an IP address.</li> <li>• Pooled-- The service profile is assigned an IP address from the management IP pool.</li> <li>• Static-- The service profile is assigned the configured static IP address.</li> </ul>
<b>Step 8</b>	UCS-A /org/service-profile # <b>set host-fw-policy</b> <i>ipmi-user-name</i>	Associates the specified host forwarding policy with the service profile.

	Command or Action	Purpose
<b>Step 9</b>	UCS-A /org/service-profile # <b>set identity</b> { <b>dynamic-uuid</b> { <i>uuid</i>   <b>derived</b> }   <b>dynamic-wwnn</b> { <i>wwnn</i>   <b>derived</b> }   <b>uuid-pool</b> <i>pool-name</i>   <b>wwnn-pool</b> <i>pool-name</i> }	Specifies how the server acquires a UUID or WWNN. You can do one of the following: <ul style="list-style-type: none"> <li>• Create a unique UUID in the form <i>nnnnnnnnn-nnnnn-nnnnnnnnnnnnnnn</i>.</li> <li>• Derive the UUID from the one burned into the hardware at manufacture.</li> <li>• Use a UUID pool.</li> <li>• Create a unique WWNN in the form <i>hh : hh : hh : hh : hh : hh : hh : hh</i>.</li> <li>• Derive the WWNN from one burned into the hardware at manufacture.</li> <li>• Use a WWNN pool.</li> </ul>
<b>Step 10</b>	UCS-A /org/service-profile # <b>set ipmi-access-profile</b> <i>profile-name</i>	Associates the specified IPMI access profile with the service profile.
<b>Step 11</b>	UCS-A /org/service-profile # <b>set local-disk-policy</b> <i>policy-name</i>	Associates the specified local disk policy with the service profile.
<b>Step 12</b>	UCS-A /org/service-profile # <b>set maint-policy</b> <i>policy-name</i>	Associates the specified maintenance policy with the service profile.
<b>Step 13</b>	UCS-A /org/service-profile # <b>set mgmt-fw-policy</b> <i>policy-name</i>	Associates the specified management forwarding policy with the service profile.
<b>Step 14</b>	UCS-A /org/service-profile # <b>set power-control-policy</b> <i>policy-name</i>	Associates the specified power control policy with the service profile.
<b>Step 15</b>	UCS-A /org/service-profile # <b>set scrub-policy</b> <i>policy-name</i>	Associates the specified scrub policy with the service profile.
<b>Step 16</b>	UCS-A /org/service-profile # <b>set sol-policy</b> <i>policy-name</i>	Associates the specified serial over LAN policy with the service profile.
<b>Step 17</b>	UCS-A /org/service-profile # <b>set stats-policy</b> <i>policy-name</i>	Associates the specified statistics policy with the service profile.
<b>Step 18</b>	UCS-A /org/service-profile # <b>set user-label</b> <i>label-name</i>	Specifies the user label associated with the service profile.
<b>Step 19</b>	UCS-A /org/service-profile # <b>set vcon</b> { <b>1</b>   <b>2</b> } <b>selection</b> { <b>all</b>   <b>assigned-only</b>   <b>exclude-dynamic</b>   <b>exclude-unassigned</b> }	Specifies the selection preference for the specified vCon.
<b>Step 20</b>	UCS-A /org/service-profile # <b>set vcon-policy</b> <i>policy-name</i>	Associates the specified vNIC/vHBA placement policy with the service profile.



	Command or Action	Purpose
		<b>Note</b> You can either assign a vNIC/vHBA placement profile to the service profile, or set vCon selection preferences for the service profile, but you do not need to do both.
<b>Step 21</b>	UCS-A /org/service-profile# <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create a service profile instance and commit the transaction:

```
UCS-A# scope org /
UCS-A /org* # create service-profile ServInst90 instance
UCS-A /org/service-profile* # set bios-policy biospol1
UCS-A /org/service-profile* # set boot-policy bootpol32
UCS-A /org/service-profile* # set descr "This is a service profile example."
UCS-A /org/service-profile* # set ext-mgmt-ip-state pooled
UCS-A /org/service-profile* # set host-fw-policy ipmi-user987
UCS-A /org/service-profile* # set identity dynamic-uuid derived
UCS-A /org/service-profile* # set ipmi-access-profile ipmiProf16
UCS-A /org/service-profile* # set local-disk-policy localdiskpol133
UCS-A /org/service-profile* # set maint-policy maintpol4
UCS-A /org/service-profile* # set mgmt-fw-policy mgmtfwpol75
UCS-A /org/service-profile* # set power-control-policy powcontrpol113
UCS-A /org/service-profile* # set scrub-policy scrubpol155
UCS-A /org/service-profile* # set sol-policy solpol2
UCS-A /org/service-profile* # set stats-policy statspol4
UCS-A /org/service-profile* # set user-label mylabel
UCS-A /org/service-profile* # vcon-policy myvconnpolicy
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

### What to do next

- (Optional) Configure a boot definition for the service profile. Use this option only if you have not associated a boot policy with the service profile.
- Associate the service profile with a blade server, server pool, or rack server.

## Creating vNIC Pairs on a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A /org # <b>scope</b> <i>org-name</i> .	Enters the organization mode for the specified organization. To enter the root organization mode enter "org" as the org-name.

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>service profile name</i> .	Enters the name of the service profile where you want to create the vNIC pair.
<b>Step 3</b>	UCS-A /org # scope service-profile <b>create vnic</b> <i>eth0</i> .	Assigns a name to the vNIC for creating the redundancy pair.
<b>Step 4</b>	UCS-A /org/service-profile/vnic* # <b>set template-name</b> <i>vNIC-primary</i> .	Specifies to use the Primary vNIC template that you can link to a Secondary vNIC template to create a vNIC pair at the service profile level.
<b>Step 5</b>	UCS-A /org/service-profile/vnic* # <b>exit</b> .	Exits the Primary vNIC template to use to create the vNIC pair.  <b>Note</b> You can now create the peer vNIC to link to vNIC eth0. Ensure to commit the transaction after linking vNIC eth0 to vNIC eth1 to create the vNIC pair.
<b>Step 6</b>	UCS-A /org/service-profile # <b>create vnic</b> <i>eth1</i> .	Assigns a name to the vNIC for creating the peer vNIC to create the pair that you link to vNIC eth0.
<b>Step 7</b>	UCS-A /org/service-profile/vnic* <b>set template-name</b> <i>vNIC secondary</i> .	Specifies to use the Secondary vNIC template as the peer template to a Primary vNIC template to create a vNIC pair that you can use at the service profile level.
<b>Step 8</b>	UCS-A /org/service-profile/vnic* # <b>exit</b> .	Exits the Secondary vNIC template to use to create the vNIC pair.
<b>Step 9</b>	UCS-A /org/service-profile* # <b>commit-buffer</b> .	Commits the transaction to the system configuration.

### Example

The following example creates a vNIC redundancy pair from a service profile and commits the transaction:

```
UCS-A # scope org
UCS-A /org # scope service-profile test-sp
UCS-A /org/service-profile # create vNIC eth0
UCS-A /org/service-profile/vnic* # set template-name vNIC-primary
UCS-A /org/service-profile/vnic* # exit
UCS-A /org/service-profile* # create vNIC eth1
UCS-A /org/service-profile/vnic* # set template-name vNIC-secondary
UCS-A /org/service-profile/vnic* # exit
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Configuring a vNIC for a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create vnic</b> <i>vnic-name</i> [ <b>eth-if</b> <i>eth-if-name</i> ] [ <b>fabric</b> { <b>a</b>   <b>b</b> }]	Creates a vNIC for the specified service profile and enters organization service profile vNIC mode.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set adapter-policy</b> <i>policy-name</i>	Specifies the adapter policy to use for the vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/vnic # <b>set fabric</b> { <b>a</b>   <b>a-b</b>   <b>b</b>   <b>b-a</b> }	Specifies the fabric to use for the vNIC. If you did not specify the fabric when creating the vNIC template in Step 3, you have the option to specify it with this command.  If you want this vNIC to be able to access the second fabric interconnect if the default one is unavailable, choose <b>a-b</b> (A is the primary) or <b>b-a</b> (B is the primary) .

	Command or Action	Purpose
		<p><b>Note</b> Do not enable fabric failover for the vNIC under the following circumstances:</p> <ul style="list-style-type: none"> <li>• If the Cisco UCS domain is running in Ethernet Switch Mode. vNIC fabric failover is not supported in that mode. If all Ethernet uplinks on one fabric interconnect fail, the vNICs do not fail over to the other.</li> <li>• If you plan to associate this vNIC to a server with an adapter that does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter. If you do so, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.</li> </ul>
<b>Step 6</b>	UCS-A /org/service-profile/vnic # <b>set identity</b> { <b>dynamic-mac</b> { <i>mac-addr</i>   <b>derived</b> }   <b>mac-pool</b> <i>mac-pool-name</i> }	<p>Specifies the identity (MAC address) for the vNIC. You can set the identity using one of the following options:</p> <ul style="list-style-type: none"> <li>• Create a unique MAC address in the form <i>nn : nn : nn : nn : nn : nn</i>.</li> <li>• Derive the MAC address from one burned into the hardware at manufacture.</li> <li>• Assign a MAC address from a MAC pool.</li> </ul>
<b>Step 7</b>	UCS-A /org/service-profile/vnic # <b>set mtu</b> <i>size-num</i>	<p>The maximum transmission unit, or packet size, that this vNIC accepts.</p> <p>Enter an integer between 1500 and 9216.</p> <p><b>Note</b> If the vNIC has an associated QoS policy, the MTU specified here must be equal to or less than the MTU specified in the associated QoS system class. If this MTU value exceeds the MTU value in the QoS system class, packets might get dropped during data transmission.</p>

	Command or Action	Purpose
<b>Step 8</b>	UCS-A /org/service-profile/vnic # <b>set nw-control-policy</b> <i>policy-name</i>	The network control policy the vNIC should use.
<b>Step 9</b>	UCS-A /org/service-profile/vnic # <b>set order</b> { <i>order-num</i>   <b>unspecified</b> }	Specifies the relative order for the vNIC.
<b>Step 10</b>	UCS-A /org/service-profile/vnic # <b>set pin-group</b> <i>group-name</i>	The LAN pin group the vNIC should use.
<b>Step 11</b>	UCS-A /org/service-profile/vnic # <b>set qos-policy</b> <i>policy-name</i>	The quality of service policy the vNIC should use.
<b>Step 12</b>	UCS-A /org/service-profile/vnic # <b>set stats-policy</b> <i>policy-name</i>	The statistics collection policy the vNIC should use.
<b>Step 13</b>	UCS-A /org/service-profile/vnic # <b>set template-name</b> <i>policy-name</i>	Specifies the dynamic vNIC connectivity policy to use for the vNIC.
<b>Step 14</b>	UCS-A /org/service-profile/vnic # <b>set vcon</b> { <b>1</b>   <b>2</b>   <b>3</b>   <b>4</b>   <b>any</b> }	Assigns the vNIC to the specified vCon. Use the <b>any</b> keyword to have Cisco UCS Manager automatically assign the vNIC.
<b>Step 15</b>	UCS-A /org/service-profile/vnic # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a vNIC for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # create vnic vnic3 fabric a
UCS-A /org/service-profile/vnic* # set adapter-policy AdaptPol2
UCS-A /org/service-profile/vnic* # set fabric a-b
UCS-A /org/service-profile/vnic* # set identity mac-pool MacPool3
UCS-A /org/service-profile/vnic* # set mtu 8900
UCS-A /org/service-profile/vnic* # set nw-control-policy ncp5
UCS-A /org/service-profile/vnic* # set order 0
UCS-A /org/service-profile/vnic* # set pin-group EthPinGroup12
UCS-A /org/service-profile/vnic* # set qos-policy QosPol5
UCS-A /org/service-profile/vnic* # set stats-policy StatsPol2
UCS-A /org/service-profile/vnic* # set template-name VnicConnPol3
UCS-A /org/service-profile/vnic* # set set vcon any
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic #
```

## Configuring a vHBA for a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create vhba</b> <i>vhba-name</i> [ <b>fabric</b> { <b>a</b>   <b>b</b> }] [ <b>fc-if</b> <i>fc-if-name</i> ]	Creates a vHBA for the specified service profile and enters organization service profile vHBA mode.
<b>Step 4</b>	UCS-A /org/service-profile/vhba # <b>set adapter-policy</b> <i>policy-name</i>	Specifies the adapter policy to use for the vHBA.
<b>Step 5</b>	UCS-A /org/service-profile/vhba # <b>set admin-vcon</b> { <b>1</b>   <b>2</b>   <b>any</b> }	Assigns the vHBA to one or all virtual network interface connections.
<b>Step 6</b>	UCS-A /org/service-profile/vhba # <b>set identity</b> { <b>dynamic-wwpn</b> { <i>wwpn</i>   <b>derived</b> }   <b>wwpn-pool</b> <i>wwn-pool-name</i> }	<p>Specifies the WWPN for the vHBA.</p> <p>You can set the storage identity using one of the following options:</p> <ul style="list-style-type: none"> <li>• Create a unique WWPN in the form <i>hh:hh:hh:hh:hh:hh:hh:hh</i>. You can specify a WWPN in the range from 20:00:00:00:00:00:00:00 to 20:FF:FF:FF:FF:FF:FF:FF or from 50:00:00:00:00:00:00:00 to 5F:FF:FF:FF:FF:FF:FF:FF.</li> <li>• If you want the WWPN to be compatible with Cisco MDS Fibre Channel switches, use the WWPN template <b>20:00:00:25:B5:XX:XX:XX</b>.</li> <li>• Derive the WWPN from one burned into the hardware at manufacture.</li> <li>• Assign a WWPN from a WWN pool.</li> </ul>
<b>Step 7</b>	UCS-A /org/service-profile/vhba # <b>set max-field-size</b> <i>size-num</i>	Specifies the maximum size of the Fibre Channel frame payload (in bytes) that the vHBA supports.
<b>Step 8</b>	UCS-A /org/service-profile/vhba # <b>set order</b> { <i>order-num</i>   <b>unspecified</b> }	Specifies the PCI scan order for the vHBA.

	Command or Action	Purpose
<b>Step 9</b>	UCS-A /org/service-profile/vhba # <b>set pers-bind</b> {disabled   enabled}	Disables or enables persistent binding to Fibre Channel targets.
<b>Step 10</b>	UCS-A /org/service-profile/vhba # <b>set pin-group</b> <i>group-name</i>	Specifies the SAN pin group to use for the vHBA.
<b>Step 11</b>	UCS-A /org/service-profile/vhba # <b>set qos-policy</b> <i>policy-name</i>	Specifies the QoS policy to use for the vHBA.
<b>Step 12</b>	UCS-A /org/service-profile/vhba # <b>set stats-policy</b> <i>policy-name</i>	Specifies the statistics threshold policy to use for the vHBA.
<b>Step 13</b>	UCS-A /org/service-profile/vhba # <b>set template-name</b> <i>policy-name</i>	Specifies the vHBA template to use for the vHBA.
<b>Step 14</b>	UCS-A /org/service-profile/vhba # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a vHBA for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # create vhba vhba3 fabric b
UCS-A /org/service-profile/vhba* # set adapter-policy AdaptPol2
UCS-A /org/service-profile/vhba* # set admin-vcon any
UCS-A /org/service-profile/vhba* # set identity wwpn-pool SanPool7
UCS-A /org/service-profile/vhba* # set max-field-size 2112
UCS-A /org/service-profile/vhba* # set order 0
UCS-A /org/service-profile/vhba* # set pers-bind enabled
UCS-A /org/service-profile/vhba* # set pin-group FcPinGroup12
UCS-A /org/service-profile/vhba* # set qos-policy QosPol5
UCS-A /org/service-profile/vhba* # set stats-policy StatsPol2
UCS-A /org/service-profile/vhba* # set template-name SanConnPol3
UCS-A /org/service-profile/vhba* # commit-buffer
UCS-A /org/service-profile/vhba #
```

## Configuring a Local Disk for a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/service-profile # <b>create local-disk-config</b>	Creates a local disk configuration for the service profile and enters organization service profile local disk configuration mode.
<b>Step 4</b>	(Optional) UCS-A /org/service-profile/local-disk-config # <b>set descr</b> <i>description</i>	Provides a description for the local disk configuration.
<b>Step 5</b>	UCS-A /org/service-profile/local-disk-config # <b>set mode</b> { <b>any-configuration</b>   <b>no-local-storage</b>   <b>no-raid</b>   <b>raid-0-striped</b>   <b>raid-1-mirrored</b>   <b>raid-5-striped-parity</b>   <b>raid-6-striped-dual-parity</b>   <b>raid-10-mirrored-and-striped</b> }	Specifies the mode for the local disk.
<b>Step 6</b>	UCS-A /org/service-profile/local-disk-config # <b>create partition</b>	Creates a partition for the local disk and enters organization service profile local disk configuration partition mode.
<b>Step 7</b>	(Optional) UCS-A /org/service-profile/local-disk-config/partition # <b>set descr</b> <i>description</i>	Provides a description for the partition.
<b>Step 8</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>set size</b> { <i>size-num</i>   <b>unspecified</b> }	Specifies the partition size in MBytes.
<b>Step 9</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>set type</b> { <b>ext2</b>   <b>ext3</b>   <b>fat32</b>   <b>none</b>   <b>ntfs</b>   <b>swap</b> }	Specifies the partition type.
<b>Step 10</b>	UCS-A /org/service-profile/local-disk-config/partition # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a local disk for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # scope boot-definition
UCS-A /org/service-profile # create local-disk-config
UCS-A /org/service-profile/local-disk-config* # set mode raid-1-mirrored
UCS-A /org/service-profile/local-disk-config* # create partition
UCS-A /org/service-profile/local-disk-config/partition* # set size 1000000
UCS-A /org/service-profile/local-disk-config/partition* # set type ntfs
UCS-A /org/service-profile/local-disk-config/partition* # commit-buffer
UCS-A /org/service-profile/local-disk-config/partition #
```



## Configuring Serial over LAN for a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create sol-config</b>	Creates a serial over LAN configuration for the service profile and enters organization service profile SoL configuration mode.
<b>Step 4</b>	UCS-A /org/service-profile/sol-config # { <b>disable</b>   <b>enable</b> }	Disables or enables the serial over LAN configuration for the service profile.
<b>Step 5</b>	(Optional) UCS-A /org/service-profile/sol-config # <b>set descr</b> <i>description</i>	Provides a description for the serial over LAN configuration.
<b>Step 6</b>	UCS-A /org/service-profile/sol-config # <b>set speed</b> { <b>115200</b>   <b>19200</b>   <b>38400</b>   <b>57600</b>   <b>9600</b> }	Specifies the serial baud rate.
<b>Step 7</b>	UCS-A /org/service-profile/sol-config # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures serial over LAN for the service profile named ServInst90 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # create sol-config
UCS-A /org/service-profile/sol-config* # enable
UCS-A /org/service-profile/sol-config* # set descr "Sets serial over LAN to 9600 baud."
UCS-A /org/service-profile/sol-config* # set speed 9600
UCS-A /org/service-profile/sol-config* # commit-buffer
UCS-A /org/service-profile/sol-config #
```

## Service Profile Association

### Associating a Service Profile with a Blade Server or Server Pool

Follow this procedure if you did not associate the service profile with a blade server or server pool when you created it, or to change the blade server or server pool with which a service profile is associated.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>associate</b> { <b>server</b> <i>chassis-id / slot-id</i>   <b>server-pool</b> <i>pool-name qualifier</i> } [ <b>restrict-migration</b> ]	Associates the service profile with a single server, or to the specified server pool with the specified server pool policy qualifications.  Adding the optional <b>restrict-migration</b> keyword prevents the service profile from being migrated to another server.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example associates the service profile named ServProf34 with the server in slot 4 of chassis 1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile* # associate server 1/4
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Associating a Service Profile with a Rack Server

Follow this procedure if you did not associate the service profile with a rack server when you created it, or to change the rack server with which a service profile is associated.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>associate server</b> <i>serv-id</i> [ <b>restrict-migration</b> ]	Associates the service profile with the specified rack server.

	Command or Action	Purpose
		Adding the optional the restrict-migration command prevents the service profile from being migrated to another server.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example associates the service profile named ServProf34 with the rack server 1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile* # associate server 1
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Disassociating a Service Profile from a Server or Server Pool

This procedure covers disassociating a service profile from a blade server, rack server, or server pool.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>disassociate</b>	Disassociates the service profile from the server or server pool.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example disassociates the service profile named ServProf34 from the server to which it was associated and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServProf34
UCS-A /org/service-profile # disassociate
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Clearing the Server Personality Field

In Cisco UCS C220 M6, C225 M6, C240 M6, C245 M6, and B200 M6 servers, a server personality field is displayed when a server personality is configured for HyperFlex (HX) servers. This procedure covers clearing the Server Personality set by the installer and revert the server to "no personality state".

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Accesses the specified server.
<b>Step 2</b>	UCS-A/server # <b>scope personality</b> <i>personality_id</i>	Accesses personality. By default, this setting is 1 for the HX server.
<b>Step 3</b>	UCS-A/server/personality # <b>show</b>	Shows the current configured personality.
<b>Step 4</b>	UCS-A/server/personality # <b>clear personality</b>	Clears the current personality.
<b>Step 5</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 6</b>	UCS-A/server/personality # <b>show</b>  <b>Example:</b>  UCS-A# scope server 15 eng-fi142-B /server # scope personality 1 eng-fi142-B /server/personality # show  Server Personality: Id Name AdditionalInfo ----- 1 Hyperflex Server {&quot;pre-validation&quot;: true} UCS-A/server/personality # clear personality UCS-A/server/personality*# commit buffer UCS-A/server/personality # show UCS-A/server/personality #	The <b>show</b> command verifies whether the field is empty.  After the personality has been cleared and committed, the <b>show</b> command will not return a result from the personality.

## Service Profile Boot Definition

### Configuring a Boot Definition for a Service Profile

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create boot-definition</b>	Creates a boot definition for the service profile and enters organization service profile boot definition mode.
<b>Step 4</b>	(Optional) UCS-A /org/service-profile/boot-definition # <b>set descr</b> <i>description</i>	Provides a description for the boot definition.
<b>Step 5</b>	(Optional) UCS-A /org/service-profile/boot-definition # <b>set reboot-on-update</b> {no   yes}	Specifies whether to automatically reboot all servers that use this boot definition after changes are made to the boot order. By default, the reboot on update option is disabled.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a boot definition for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # create boot-definition
UCS-A /org/service-profile/boot-definition* # set descr "This boot definition reboots on
update."
UCS-A /org/service-profile/boot-definition* # set reboot-on-update yes
UCS-A /org/service-profile/boot-definition* # commit-buffer
UCS-A /org/service-profile/boot-definition #
```

### What to do next

Configure one or more of the following boot options for the boot definition and set their boot order:

- **LAN Boot** —Boots from a centralized provisioning server. It is frequently used to install operating systems on a server from that server.

If you choose the LAN Boot option, continue to [Configuring a LAN Boot for a Service Profile Boot Definition](#) , on page 202.

- **Storage Boot** — Boots from an operating system image on the SAN. You can specify a primary and a secondary SAN boot. If the primary boot fails, the server attempts to boot from the secondary.

We recommend that you use a SAN boot, because it offers the most service profile mobility within the system. If you boot from the SAN, when you move a service profile from one server to another, the new server boots from exactly the same operating system image. Therefore, the new server appears to be exactly the same server to the network.

If you choose the Storage Boot option, continue to [Configuring a Storage Boot for a Service Profile Boot Definition](#) , on page 203.

- **Virtual Media Boot**—Mimics the insertion of a physical CD into a server. It is typically used to manually install operating systems on a server.

If you choose the Virtual Media boot option, continue to [Configuring a Virtual Media Boot for a Service Profile Boot Definition](#), on page 204.

## Configuring a LAN Boot for a Service Profile Boot Definition

### Before you begin

Configure a boot definition for a service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope boot-definition</b>	Enters organization service profile boot definition mode.
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition # <b>create lan</b>	Creates a LAN boot for the service profile boot definition and enters service profile boot definition LAN mode.
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition/lan # <b>set order</b> {1   2   3   4}	Specifies the boot order for the LAN boot.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition/lan # <b>create path</b> {primary   secondary}	Creates a primary or secondary LAN boot path and enters service profile boot definition LAN path mode.
<b>Step 7</b>	UCS-A /org/service-profile/boot-definition/lan/path # <b>set vnic</b> <i>vnic-name</i>	Specifies the vNIC to use for the LAN image path.
<b>Step 8</b>	UCS-A /org/service-profile/boot-definition/lan/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example enters the service profile named ServInst90, creates a LAN boot for the service profile boot definition, sets the boot order to 2, creates a primary path, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
```

```

UCS-A /org/service-profile* # scope boot-definition
UCS-A /org/service-profile/boot-definition* # create lan
UCS-A /org/service-profile/boot-definition/lan* # set order 2
UCS-A /org/service-profile/boot-definition/lan* # create path primary
UCS-A /org/service-profile/boot-definition/lan/path* # set vnic vnic3
UCS-A /org/service-profile/boot-definition/lan/path* # commit-buffer
UCS-A /org/service-profile/boot-definition/lan/path #

```

## Configuring a Storage Boot for a Service Profile Boot Definition

### Before you begin

Configure a boot definition for a service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>1</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope boot-definition</b>	Enters organization service profile boot definition mode.
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition # <b>create storage</b>	Creates a storage boot for the service profile boot definition and enters service profile boot definition storage mode.
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition/storage # <b>set order</b> {1   2   3   4}	Specifies the boot order for the storage boot.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition/storage # <b>create</b> {local   san-image {primary   secondary}}	Creates a local storage boot or a SAN image boot. If a SAN image boot is created, it enters service profile boot definition storage SAN image mode.
<b>Step 7</b>	UCS-A /org/service-profile/boot-definition/storage/san-image # <b>create path</b> {primary   secondary}	Creates a primary or secondary SAN image path and enters service profile boot definition storage SAN image path mode.  When using the enhanced boot order on Cisco UCS the boot order that you define is used. For standard boot mode using the terms "primary" or "secondary" do not imply a boot order. The effective order of boot devices within the same device class is determined by the PCIe bus scan order.

	Command or Action	Purpose
<b>Step 8</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>set lun</b> <i>lun-num</i>	Specifies the LUN used for the SAN image path.
<b>Step 9</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>set vhma</b> <i>vhba-name</i>	Specifies the vHBA used for the SAN image path.
<b>Step 10</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>set wwn</b> <i>wwn-num</i>	Specifies the WWN used for the SAN image path.
<b>Step 11</b>	UCS-A /org/service-profile/boot-definition/storage/san-image/path # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example enters the service profile named ServInst90, creates a storage boot for the service profile boot definition, sets the boot order to 2, creates a primary path, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # scope boot-definition
UCS-A /org/service-profile/boot-definition* # create storage
UCS-A /org/service-profile/boot-definition/storage* # create san-image primary
UCS-A /org/service-profile/boot-definition/storage* # set order 2
UCS-A /org/service-profile/boot-definition/storage/san-image* # create path primary
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # set lun 27512
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # set vhma vhma3
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # set wwn
20:00:00:00:20:00:00:23
UCS-A /org/service-profile/boot-definition/storage/san-image/path* # commit-buffer
UCS-A /org/service-profile/boot-definition/storage/san-image/path #
```

## Configuring a Virtual Media Boot for a Service Profile Boot Definition

### Before you begin

Configure a boot definition for a service profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.



	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope boot-definition</b>	Enters organization service profile boot definition mode.
<b>Step 4</b>	UCS-A /org/service-profile/boot-definition # <b>create virtual-media {read-only   read-write}</b>	Creates a read-only or read-write virtual media boot for the service profile boot definition and enters service profile boot definition virtual media mode.
<b>Step 5</b>	UCS-A /org/service-profile/boot-definition/virtual-media # <b>set order {1   2   3   4}</b>	Specifies the boot order for the virtual media boot.
<b>Step 6</b>	UCS-A /org/service-profile/boot-definition/virtual-media # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example enters the service profile named ServInst90, creates a virtual media boot with read-only privileges for the service profile boot definition, sets the boot order to 3, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile* # scope boot-definition
UCS-A /org/service-profile/boot-definition* # create virtual-media read-only
UCS-A /org/service-profile/boot-definition/virtual-media* # set order 3
UCS-A /org/service-profile/boot-definition/virtual-media* # commit-buffer
UCS-A /org/service-profile/boot-definition/virtual-media #
```

## Deleting a Boot Definition for a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>delete boot-definition</b>	Deletes the boot definition for the service profile.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example deletes the boot definition for a service profile and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # delete boot-definition
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Fibre Channel Zoning for a Service Profile

### Configuring a vHBA Initiator Group with an Existing Storage Connection Policy

This procedure assumes that you want to use an existing global Fibre Channel storage connection policy. If you want to create a storage connection policy definition just for this service profile, see [Configuring a vHBA Initiator Group with a local Storage Connection Policy Definition, on page 207](#).

For information about how to create a global Fibre Channel storage connection policy that is available to all service profiles, see [Creating a Fibre Channel Storage Connection Policy](#).

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create initiator-group</b> <i>group-name</i>	Creates the specified initiator group for Fibre Channel zoning and enters service profile initiator group mode.
<b>Step 4</b>	UCS-A /org/service-profile/initiator-group # <b>create initiator</b> <i>vhba-name</i>	Creates the specified vHBA initiator in the initiator group.  If desired, repeat this step to add a second vHBA initiator to the group.
<b>Step 5</b>	UCS-A /org/service-profile/initiator-group # <b>set storage-connection-policy</b> <i>policy-name</i>	Associates the specified storage connection policy with the service profile.
<b>Step 6</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a vHBA initiator group named `initGroupZone1` with two vHBA initiators for a service profile named `ServInst90`, includes an existing Fibre Channel storage connection policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # create initiator-group initGroupZone1
UCS-A /org/service-profile/initiator-group* # create initiator vhb1
UCS-A /org/service-profile/initiator-group* # create initiator vhb2
UCS-A /org/service-profile/initiator-group* # set storage-connection-policy scpolicyZone1
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Configuring a vHBA Initiator Group with a local Storage Connection Policy Definition

This procedure assumes that you want to create a local Fibre Channel storage connection policy for a service profile. If you want to use an existing storage connection policy, see [Configuring a vHBA Initiator Group with an Existing Storage Connection Policy, on page 206](#).

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>create initiator-group</b> <i>group-name</i>	Creates the specified initiator group for Fibre Channel zoning and enters service profile initiator group mode.
<b>Step 4</b>	UCS-A /org/service-profile/initiator-group # <b>create initiator</b> <i>vhba-name</i>	Creates the specified vHBA initiator in the vHBA initiator group.  If desired, repeat this step to add a second vHBA initiator to the group.
<b>Step 5</b>	UCS-A /org/service-profile/initiator-group # <b>create storage-connection-def</b> <i>policy-name</i>	Creates the specified storage connection policy definition and enters storage connection definition mode.
<b>Step 6</b>	UCS-A /org/service-profile/initiator-group/storage-connection-def # <b>create storage-target</b> <i>wwpn</i>	Creates a storage target endpoint with the specified WWPN, and enters storage target mode.

	Command or Action	Purpose
<b>Step 7</b>	UCS-A /org/service-profile/initiator-group/storage-connection-def/storage-target # <b>set target-path</b> {a   b}	Specifies which fabric interconnect is used for communications with the target endpoint.
<b>Step 8</b>	UCS-A /org/service-profile/initiator-group/storage-connection-def/storage-target # <b>set target-vsan</b> vsan	Specifies which VSAN is used for communications with the target endpoint.
<b>Step 9</b>	UCS-A /org/service-profile/initiator-group # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a vHBA initiator group named `initGroupZone1` with two vHBA initiators for a service profile named `ServInst90`, configures a local storage connection policy definition named `scPolicyZone1`, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile ServInst90
UCS-A /org/service-profile # create initiator-group initGroupZone1
UCS-A /org/service-profile/initiator-group* # create initiator vhb1
UCS-A /org/service-profile/initiator-group* # create initiator vhb2
UCS-A /org/service-profile/initiator-group* # create storage-connection-def scPolicyZone1
UCS-A /org/service-profile/initiator-group/storage-connection-def* # create storage-target

20:10:20:30:40:50:60:70
UCS-A /org/service-profile/initiator-group/storage-connection-def/storage-target* # set
target-path a
UCS-A /org/service-profile/initiator-group/storage-connection-def/storage-target* # set
target-vsan default
UCS-A /org/service-profile/initiator-group* # commit-buffer
UCS-A /org/service-profile/initiator-group #
```

## Service Profile Template Management

### Setting the Asset Tag Value

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter <code>/</code> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>sp-name</i>	Enters the service profile configuration mode for the specified service profile.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/service-profile # <b>set asset-tag value at-name</b>	Specifies the asset tag name for the server.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit buffer</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	Reboot the server for the new asset tag to take effect in the BIOS.	

### Example

The following example shows how to configure asset tag for a server:

```
UCS-A# scope org /
UCS-A /org* # scope service-profile sp1
UCS-A /org/service-profile* # set asset-tag value EXAMPLE
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Viewing the Server Asset Tag

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A /org# <b>scope server server-name</b>	Enters the service name.
<b>Step 2</b>	UCS-A /chassis/server# <b>show detail</b>	Displays the server asset tag.

### Example

The following example shows how to display the asset tag of a server:

```
UCS-A# scope server 1/5
UCS-A/chassis/server # show detail
Server:
  Slot: 5
  Name:
  User Label:
  Overall Status: Config
  Oper Qualifier: N/A
  Service Profile: asset-tag
  Asset Tag: EXAMPLE
  Association: Associated
```

## Resetting the UUID Assigned to a Service Profile from a Pool in a Service Profile Template

If you change the UUID suffix pool assigned to an updating service profile template, Cisco UCS Manager does not change the UUID assigned to a service profile created with that template. If you want Cisco UCS Manager to assign a UUID from the newly assigned pool to the service profile, and therefore to the associated server, you must reset the UUID. You can only reset the UUID assigned to a service profile and its associated server under the following circumstances:

- The service profile was created from an updating service profile template and includes a UUID assigned from a UUID suffix pool.
- The UUID suffix pool name is specified in the service profile. For example, the pool name is not empty.
- The UUID value is not 0, and is therefore not derived from the server hardware.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the command mode for the organization for which you want to reset the UUID. If the system does not include multi-tenancy, type / as the <i>org-name</i> to enter the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters the service profile that requires the UUID for the associated server to be reset to a different UUID suffix pool.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set identity dynamic-uuid derived</b>	Specifies that the service profile will obtain a UUID dynamically from a pool.
<b>Step 4</b>	UCS-A /org/service-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

This example resets the UUID of a service profile to a different UUID suffix pool:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # set identity dynamic-uuid derived
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile #
```

## Resetting the MAC Address Assigned to a vNIC from a Pool in a Service Profile Template

If you change the MAC pool assigned to an updating service profile template, Cisco UCS Manager does not change the MAC address assigned to a service profile created with that template. If you want Cisco UCS Manager to assign a MAC address from the newly assigned pool to the service profile, and therefore to the

associated server, you must reset the MAC address. You can only reset the MAC address assigned to a service profile and its associated server under the following circumstances:

- The service profile was created from an updating service profile template and includes a MAC address assigned from a MAC pool.
- The MAC pool name is specified in the service profile. For example, the pool name is not empty.
- The MAC address value is not 0, and is therefore not derived from the server hardware.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the command mode for the organization that contains the service profile for which you want to reset the MAC address. If the system does not include multi-tenancy, type <i>/</i> as the <i>org-name</i> to enter the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters the command mode for the service profile that requires the MAC address of the associated server to be reset to a different MAC address.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic</b> <i>vnic-name</i>	Enters the command mode for the vNIC for which you want to reset the MAC address.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set identity dynamic-mac derived</b>	Specifies that the vNIC will obtain a MAC address dynamically from a pool.
<b>Step 5</b>	UCS-A /org/service-profile/vnic # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

This example resets the MAC address of a vNIC in a service profile:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # scope vnic dynamic-prot-001
UCS-A /org/service-profile/vnic # set identity dynamic-mac derived
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic #
```

## Resetting the WWPN Assigned to a vHBA from a Pool in a Service Profile Template

If you change the WWPN pool assigned to an updating service profile template, Cisco UCS Manager does not change the WWPN assigned to a service profile created with that template. If you want Cisco UCS Manager to assign a WWPN from the newly assigned pool to the service profile, and therefore to the associated server,

you must reset the WWPN. You can only reset the WWPN assigned to a service profile and its associated server under the following circumstances:

- The service profile was created from an updating service profile template and includes a WWPN assigned from a WWPN pool.
- The WWPN pool name is specified in the service profile. For example, the pool name is not empty.
- The WWPN value is not 0, and is therefore not derived from the server hardware.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the command mode for the organization that contains the service profile for which you want to reset the WWPN. If the system does not include multi-tenancy, type <i>/</i> as the <i>org-name</i> to enter the root organization.
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters the service profile of the vHBA for which you want to reset the WWPN.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vhba</b> <i>vhba-name</i>	Enters the command mode for vHBA for which you want to reset the WWPN.
<b>Step 4</b>	UCS-A /org/service-profile/vhba # <b>set identity dynamic-wwpn derived</b>	Specifies that the vHBA will obtain a WWPN dynamically from a pool.
<b>Step 5</b>	UCS-A /org/service-profile/vhba # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

This example resets the WWPN of a vHBA in a service profile:

```
UCS-A# scope org /
UCS-A /org # scope service-profile ServInst90
UCS-A /org/service-profile # scope vhba vhba3
UCS-A /org/service-profile/vhba # set identity dynamic-wwpn derived
UCS-A /org/service-profile/vhba* # commit-buffer
UCS-A /org/service-profile/vhba #
```





# CHAPTER 11

## Server-Related Policy Configuration

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- [BIOS Settings, on page 213](#)
- [CIMC Security Policies, on page 320](#)
- [SPDM Security, on page 327](#)
- [Creating and Configuring a SPDM Security Certificate Policy using CLI, on page 328](#)
- [Loading an Outside SPDM Security Certificate Policy, on page 330](#)
- [Viewing the Certificate Inventory, on page 330](#)
- [Deleting a SPDM Policy, on page 332](#)
- [Graphics Card Policies, on page 332](#)
- [Configuring Local Disk Configuration Policies, on page 335](#)
- [Persistent Memory Modules, on page 350](#)
- [Scrub Policies, on page 350](#)
- [Configuring DIMM Error Management, on page 355](#)
- [Serial over LAN Policy, on page 357](#)
- [Server Autoconfiguration Policy, on page 359](#)
- [Server Discovery Policy, on page 361](#)
- [Server Inheritance Policies, on page 365](#)
- [Server Pool Policy, on page 367](#)
- [Server Pool Policy Qualification, on page 369](#)
- [Configuring vNIC/vHBA Placement Policies, on page 383](#)
- [CIMC Mounted vMedia, on page 396](#)

## BIOS Settings

### Server BIOS Settings

Cisco UCS provides two methods for making global modifications to the BIOS settings on servers in an Cisco UCS domain. You can create one or more BIOS policies that include a specific grouping of BIOS settings that match the needs of a server or set of servers, or you can use the default BIOS settings for a specific server platform.

Both the BIOS policy and the default BIOS settings for a server platform enable you to fine tune the BIOS settings for a server managed by Cisco UCS Manager.

Depending upon the needs of the data center, you can configure BIOS policies for some service profiles and use the BIOS defaults in other service profiles in the same Cisco UCS domain, or you can use only one of them. You can also use Cisco UCS Manager to view the actual BIOS settings on a server and determine whether they are meeting current needs.



**Note** Cisco UCS Manager pushes BIOS configuration changes through a BIOS policy or default BIOS settings to the Cisco Integrated Management Controller (CIMC) buffer. These changes remain in the buffer and do not take effect until the server is rebooted.

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

## Main BIOS Settings

The following table lists the main server BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Properties</b>	
<b>Reboot on BIOS Settings Change</b> set reboot-on-update	When the server is rebooted after you change one or more BIOS settings.  <b>yes</b> —If you enable this setting, the server is rebooted according to the maintenance policy in the server's service profile. For example, if the maintenance policy requires user acknowledgment, the server is not rebooted and the BIOS changes are not applied until a user acknowledges the pending activity.  <b>no</b> —If you do not enable this setting, the BIOS changes are not applied until the next time the server is rebooted, whether as a result of another server configuration change or a manual reboot.
<b>BIOS Setting</b>	
<b>Quiet Boot</b> set quiet-boot-config quiet-boot	What the BIOS displays during Power On Self-Test (POST). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS displays all messages and Option ROM information during boot.</li> <li>• <b>enabled</b>—The BIOS displays the logo screen, but does not display any messages or Option ROM information during boot.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>POST error pause</b> <b>set post-error-pause-config</b> <b>post-error-pause</b>	What happens when the server encounters a critical error during POST. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS continues to attempt to boot the server.</li> <li>• <b>enabled</b>—The BIOS pauses the attempt to boot the server and opens the Error Manager when a critical error occurs during POST.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Resume on AC power loss</b> <b>set resume-ac-on-power-loss-config</b> <b>resume-action</b>	How the server behaves when power is restored after an unexpected power loss. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>stay-off</b>—The server remains off until manually powered on.</li> <li>• <b>last-state</b>—The server is powered on and the system attempts to restore its last state.</li> <li>• <b>reset</b>—The server is powered on and automatically reset.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Front panel lockout</b> <b>set front-panel-lockout-config</b> <b>front-panel-lockout</b>	Whether the power and reset buttons on the front panel are ignored by the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The power and reset buttons on the front panel are active and can be used to affect the server.</li> <li>• <b>enabled</b>—The power and reset buttons are locked out. The server can only be reset or powered on or off from the CIMC GUI.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>CDN Control</b></p> <p><b>set consistent-device-name-control</b> <b>cdn-name</b></p>	<p>Consistent Device Naming allows Ethernet interfaces to be named in a consistent manner. This makes Ethernet interface names more uniform, easy to identify, and persistent when adapter or other configuration changes are made.</p> <p>Whether consistent device naming is enabled or not. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Consistent device naming is disabled for the BIOS policy.</li> <li>• <b>enabled</b>—Consistent device naming is enabled for the BIOS policy. This enables Ethernet interfaces to be named consistently. This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>PCIe Slots CDN Control</b></p> <p><b>set consistent-device-name-control</b> <b>pcie-slot-cdn-name</b></p>	<p>PCIe Slots Consistent Device Naming (CDN) control allows PCIe slots to be named in a consistent manner. This makes PCIe slot names more uniform, easy to identify, and persistent when the configuration changes are made. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Consistent device naming is disabled. This is the default option.</li> <li>• <b>enabled</b>—Consistent device naming is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## Processor BIOS Settings

The following table lists the processor BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>PRMRR Size</b> <b>set PrmrrSize</b>	<p>Processor Reserved Memory Range Registers (PRMRR) is the size of the protected region in the systems DRAM. The maximum size of the PRMRR field in the BIOS configuration will match the amount of the SGX Enclave Capacity value for the Intel CPU being utilized.. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>invalid config</b>—This is the default value.</li> <li>• <b>128M, 256M, 512M, 1G, 2G, 4G, 8G, 16G, 32G, 64G, 128G, 256G, 512G</b> —The size of the protected regions.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Intel Turbo Boost Tech</b> <b>set intel-turbo-boost-config turbo-boost</b>	<p>Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>enabled</b>—The processor uses Turbo Boost Technology if required.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Enhanced Intel SpeedStep Tech</b> <b>set enhanced-intel-speedstep-config speed-step</b>	<p>Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>enabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure your operating system supports this feature.</p>

Name	Description
<b>Intel HyperThreading Tech</b> <b>set hyper-threading-config</b> <b>hyper-threading</b>	<p>Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>enabled</b>—The processor allows for the parallel execution of multiple threads.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure the operating system supports this feature.</p>
<b>Intel Speed Select</b> <b>set-IntelSpeedSelect</b>	<p>Allows improved CPU performance by using Intel Speed Select technology to tune the CPU to run at one of three operating profiles, based on number of logical processor cores, frequency, and TDP thread setting, to improve performance over the basic Platform Default setting. These profiles correspond to High, Medium, and Low Core settings and can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>base</b>—The processor uses Base.</li> <li>• <b>config1</b>—The processor uses Config 1.</li> <li>• <b>config2</b>—The processor uses Config 2.</li> <li>• <b>config3</b>—The processor uses Config 3.</li> <li>• <b>config4</b>—The processor uses Config 4.</li> </ul> <p><b>Note</b>           The values <b>config1</b> and <b>config2</b> are not supported on Cisco UCS M6 and M7 servers.</p> <ul style="list-style-type: none"> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>Core Multi Processing</b>  <b>set core-multi-processing-config multi-processing</b></p>	<p>Sets the state of logical processor cores per CPU in a package. If you disable this setting, Intel Hyper Threading technology is also disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>All</b>—Enables multiprocessing on all logical processor cores.</li> <li>• <b>1 through <i>n</i></b>—Specifies the number of logical processor cores per CPU that can run on the server. To disable multiprocessing and have only one logical processor core per CPU running on the server, choose 1.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure your operating system supports this feature.</p>
<p><b>Execute Disable Bit</b>  <b>set execute-disable bit</b></p>	<p>Classifies memory areas on the server to specify where the application code can execute. As a result of this classification, the processor disables code execution if a malicious worm attempts to insert code in the buffer. This setting helps to prevent damage, worm propagation, and certain classes of malicious buffer overflow attacks. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not classify memory areas.</li> <li>• <b>enabled</b>—The processor classifies memory areas.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure your operating system supports this feature.</p>
<p><b>Intel Virtualization Technology</b>  <b>set intel-vt-config vt</b></p>	<p>Whether the processor uses Intel Virtualization Technology, which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not permit virtualization.</li> <li>• <b>enabled</b>—The processor allows multiple operating systems in independent partitions.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> If you change this option, you must power cycle the server before the setting takes effect.</p>

Name	Description
<p><b>Hardware Prefetcher</b></p> <p><b>set processor-prefetch-config hardware-prefetch</b></p>	<p>Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The hardware prefetcher is not used.</li> <li>• <b>enabled</b>—The processor uses the hardware prefetcher when cache issues are detected.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b>      <b>CPUPerformance</b> must be set to <b>Custom</b> in order to specify this value. For any value other than <b>Custom</b>, this option is overridden by the setting in the selected CPU performance profile.</p>
<p><b>Adjacent Cache Line Prefetcher</b></p> <p><b>set processor-prefetch-config adjacent-cache-line-prefetch</b></p>	<p>Whether the processor fetches cache lines in even/odd pairs instead of fetching just the required line. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor only fetches the required line.</li> <li>• <b>enabled</b>—The processor fetches both the required line and its paired line.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b>      must be set to <b>Custom</b> in order to specify this value. For any value other than <b>Custom</b>, this option is overridden by the setting in the selected CPU performance profile.</p>
<p><b>DCU Streamer Prefetch</b></p> <p><b>set processor-prefetch-config dcu-streamer-prefetch</b></p>	<p>Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not try to anticipate cache read requirements and only fetches explicitly requested lines.</li> <li>• <b>enabled</b>—The DCU prefetcher analyzes the cache read pattern and prefetches the next line in the cache if it determines that it may be needed.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<b>DCU IP Prefetcher</b> <b>set processor-prefetch-config</b> <b>dcu-ip-prefetch</b>	<p>Whether the processor uses the DCU IP Prefetch mechanism to analyze historical cache access patterns and preload the most relevant lines in the L1 cache. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not preload any cache data.</li> <li>• <b>enabled</b>—The DCU IP prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>KTI Prefetch</b>	<p>KTI 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"> <li>• <b>disabled</b>—The processor does not preload any cache data.</li> <li>• <b>enabled</b>—The KTI prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>LLC Prefetch</b>	<p>Whether the processor uses the LLC Prefetch mechanism to fetch the data into the LLC. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not preload any cache data.</li> <li>• <b>enabled</b>—The LLC prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>XPT Prefetch</b>	<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"> <li>• <b>disabled</b>—The CPU does not use the XPT Prefetch option.</li> <li>• <b>enabled</b>—The CPU enables the XPT prefetcher option.</li> <li>• <b>auto</b>—The CPU auto enables the XPT prefetcher option.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>Direct Cache Access</b> set direct-cache-access-config access</p>	<p>Allows processors to increase I/O performance by placing data from I/O devices directly into the processor cache. This setting helps to reduce cache misses. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines how to place data from I/O devices into the processor cache.</li> <li>• <b>disabled</b>—Data from I/O devices is not placed directly into the processor cache.</li> <li>• <b>enabled</b>—Data from I/O devices is placed directly into the processor cache.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>Processor C State</b> set processor-c-state-config c-state</p>	<p>Whether the system can enter a power savings mode during idle periods. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The system remains in a high-performance state even when idle.</li> <li>• <b>enabled</b>—The system can reduce power to system components such as the DIMMs and CPUs.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>We recommend that you contact your operating system vendor to make sure your operating system supports this feature.</p>
<p><b>Processor C1E</b> set processor-c1e-config c1e</p>	<p>Allows the processor to transition to its minimum frequency upon entering C1. This setting does not take effect until after you have rebooted the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The CPU continues to run at its maximum frequency in the C1 state.</li> <li>• <b>enabled</b>—The CPU transitions to its minimum frequency. This option saves the maximum amount of power in the C1 state.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>Processor C3 Report</b>  <b>set processor-c3-report-config</b>  <b>processor-c3-report</b></p>	<p>Whether the processor sends the C3 report to the operating system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>—The processor sends the C3 report to the OS.</li> <li>• <b>disabled</b>—The processor does not send the C3 report.</li> <li>• <b>acpi-c2</b>—The processor sends the C3 report using the advanced configuration and power interface (ACPI) C2 format.</li> <li>• <b>acpi-c3</b>—The processor sends the C3 report using the ACPI C3 format.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>On the Cisco UCS B440 Server, the BIOS Setup menu uses enabled and disabled for these options. If you specify acpi-c2 or acpi-c3, the server sets the BIOS value for that option to enabled.</p>
<p><b>Processor C6 Report</b>  <b>set processor-c6-report-config</b>  <b>processor-c6-report</b></p>	<p>Whether the processor sends the C6 report to the operating system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not send the C6 report.</li> <li>• <b>enabled</b>—The processor sends the C6 report.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>Processor C7 Report</b>  <b>set processor-c7-report-config</b>  <b>processor-c7-report</b></p>	<p>Whether the processor sends the C7 report to the operating system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>c7</b>—The processor sends the report using the C7 format.</li> <li>• <b>c7s</b>—The processor sends the report using the C7s format.</li> <li>• <b>disabled</b>—The processor does not send the C7 report.</li> <li>• <b>enabled</b>—The processor sends the C7 report.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Processor CMCI</b>	Enables CMCI generation. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor disables CMCI.</li> <li>• <b>enabled</b>—The processor enables CMCI.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>CPU Performance</b> <b>set cpu-performance-config</b> <b>cpu-performance</b>	Sets the CPU performance profile for the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Custom</b>—All performance profile options can be configured from the BIOS setup on the server. In addition, the Hardware Prefetcher and Adjacent Cache-Line Prefetch options can be configured as well.</li> <li>• <b>high-throughput</b>—Data reuse and the DCU IP prefetcher are enabled, and all other prefetchers are disabled.</li> <li>• <b>hpc</b>—All prefetchers are enabled and data reuse is disabled. This setting is also known as high-performance computing.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Max Variable MTRR Setting</b> <b>set max-variable-mtrr-setting-config</b> <b>processor-mtrr</b>	Allows you to select the number of mean time to repair (MTRR) variables. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto-max</b>—BIOS uses the default value for the processor.</li> <li>• <b>8</b>—BIOS uses the number specified for the variable MTRR.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>Local X2 APIC</b>  <b>set local-x2-apic-config localx2-apic</b></p>	<p>Allows you to set the type of Application Policy Infrastructure Controller (APIC) architecture. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Processor disables Local X2 APIC.</li> <li>• <b>enabled</b>—Processor enables Local X2 APIC.</li> <li>• <b>xapic</b>—Uses the standard xAPIC architecture.</li> <li>• <b>x2apic</b>—Uses the enhanced x2APIC architecture to support 32 bit addressability of processors.</li> <li>• <b>auto</b>—Automatically uses the xAPIC architecture that is detected.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>Power Technology</b>  <b>set processor-energy-config</b>  <b>cpu-power-management</b></p>	<p>Enables you to configure the CPU power management settings for the following options:</p> <ul style="list-style-type: none"> <li>• Enhanced Intel Speedstep Technology</li> <li>• Intel Turbo Boost Technology</li> <li>• Processor Power State C6</li> </ul> <p>Power Technology can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The server does not perform any CPU power management and any settings for the BIOS parameters mentioned above are ignored.</li> <li>• <b>Energy_Efficient</b>—The server determines the best settings for the BIOS parameters mentioned above and ignores the individual settings for these parameters.</li> <li>• <b>performance</b>—The server automatically optimizes the performance for the BIOS parameters mentioned above.</li> <li>• <b>custom</b>—The server uses the individual settings for the BIOS parameters mentioned above. You must select this option if you want to change any of these BIOS parameters.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>Energy Performance</b>  <b>set processor-energy-config</b>  <b>energy-performance</b></p>	<p>Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>performance</b> — The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power.</li> <li>• <b>balanced-performance</b> — The server provides all server components with enough power to keep a balance between performance and power.</li> <li>• <b>balanced-energy</b> — The server provides all server components with enough power to keep a balance between performance and power.</li> <li>• <b>energy-efficient</b> — The server provides all server components with less power to keep reduce power consumption.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b>      <b>CPUPowerManagement</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<p><b>Frequency Floor Override</b>  <b>set frequency-floor-override-config</b>  <b>cpu-frequency</b></p>	<p>Whether the CPU is allowed to drop below the maximum non-turbo frequency when idle. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>— The CPU can drop below the maximum non-turbo frequency when idle. This option decreases power consumption but may reduce system performance.</li> <li>• <b>enabled</b>— The CPU cannot drop below the maximum non-turbo frequency when idle. This option improves system performance but may increase power consumption.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>P STATE Coordination</b> set p-state-coordination-config p-state</p>	<p>Allows you to define how BIOS communicates the P-state support model to the operating system. There are 3 models as defined by the Advanced Configuration and Power Interface (ACPI) specification.</p> <ul style="list-style-type: none"> <li>• <b>hw-all</b>—The processor hardware is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package).</li> <li>• <b>sw-all</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a physical package), and must initiate the transition on all of the logical processors.</li> <li>• <b>sw-any</b>—The OS Power Manager (OSPM) is responsible for coordinating the P-state among logical processors with dependencies (all logical processors in a package), and may initiate the transition on any of the logical processors in the domain.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b>      <b>CPUPowerManagement</b> must be set to <b>Custom</b> or the server ignores the setting for this parameter.</p>
<p><b>DRAM Clock Throttling</b> set dram-clock-throttling-config dram-clock-throttling</p>	<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"> <li>• <b>auto</b> — CPU determines the DRAM Clock Throttling settings.</li> <li>• <b>balanced</b>— DRAM clock throttling is reduced, providing a balance between performance and power.</li> <li>• <b>performance</b>—DRAM clock throttling is disabled, providing increased memory bandwidth at the cost of additional power.</li> <li>• <b>Energy_Efficient</b>—DRAM clock throttling is increased to improve energy efficiency.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>External SSC enable</b>	<p>This option allows you to Enable/Disable the Clock Spread Spectrum of the external clock generators.</p> <p>For Cisco B-Series M5 and M6 servers and S-Series M5 servers, this option is Disabled by default. For Cisco C-Series rack servers, it is enabled by default.</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>— Clock Spread Spectrum support is not available.</li> <li>• <b>enabled</b>— Clock Spread Spectrum support is always available.</li> <li>• <b>platform-default</b> — The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Channel Interleaving</b> <b>set interleave-config channel-interleave</b>	<p>Whether the CPU divides memory blocks and spreads contiguous portions of data across interleaved channels to enable simultaneous read operations. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines what interleaving is done.</li> <li>• <b>1-way</b>—</li> <li>• <b>2-way</b></li> <li>• <b>3-way</b></li> <li>• <b>4-way</b>—The maximum amount of channel interleaving is used.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Rank Interleaving</b> <b>set interleave-config rank-interleave</b>	<p>Whether the CPU interleaves physical ranks of memory so that one rank can be accessed while another is being refreshed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines what interleaving is done.</li> <li>• <b>1-way</b>—</li> <li>• <b>2-way</b></li> <li>• <b>4-way</b></li> <li>• <b>8-way</b>—The maximum amount of rank interleaving is used.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<b>Sub NUMA Clustering</b>	<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"> <li>• <b>auto</b>— The BIOS determines what Sub NUMA clustering is done.</li> <li>• <b>disabled</b>— Sub NUMA clustering does not occur. This is the default option.</li> <li>• <b>enabled</b>— Sub NUMA clustering occurs.</li> <li>• <b>platform-default</b> — The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Memory Interleaving</b> <b>set interleave-config memory-interleave</b>	<p>Whether the 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"> <li>• <b>none</b></li> <li>• <b>channel</b></li> <li>• <b>die</b></li> <li>• <b>socket</b></li> <li>• <b>auto</b>—This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Demand Scrub</b> <b>set scrub-policies-config demand-scrub</b>	<p>Whether the system corrects single bit memory errors encountered when the CPU or I/O makes a demand read. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>— Single bit memory errors are not corrected.</li> <li>• <b>enabled</b>— Single bit memory errors are corrected in memory and the corrected data is set in response to the demand read.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>Patrol Scrub</b> set scrub-policies-config patrol-scrub</p>	<p>Whether the system actively searches for, and corrects, single bit memory errors even in unused portions of the memory on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The system checks for memory ECC errors only when the CPU reads or writes a memory address.</li> <li>• <b>enabled</b>—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>DCPMM Firmware Downgrade</b></p>	<p>This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Support is disabled.</li> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>Configurable TDP Control</b></p>	<p>Allows you to set customized value for Thermal Design Power (TDP). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>— Uses the rated TDP value of the processor.</li> <li>• <b>manual</b>—Allows you to customize the TDP value.</li> </ul>

Name	Description
<b>Altitude</b> <b>set altitude altitude-config</b>	<p>The approximate number of meters above sea level at which the physical server is installed. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines the physical elevation.</li> <li>• <b>300-m</b>—The server is approximately 300 meters above sea level.</li> <li>• <b>900-m</b>—The server is approximately 900 meters above sea level.</li> <li>• <b>1500-m</b>—The server is approximately 1500 meters above sea level.</li> <li>• <b>3000-m</b>—The server is approximately 3000 meters above sea level.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Package C State</b> <b>set package-c-state-limit-config</b> <b>package-c-state-limit</b>	<p>The amount of power available to the server components when they are idle. This can be one of the following:</p> <p><b>Note</b> If you are changing the <b>Package C State Limit</b> token from any other value to <b>no-limit</b>, then ensure that the <b>Power Technology</b> is set to <b>custom</b>.</p>
<b>CPU Hardware Power Management</b> <b>set</b> <b>cpu-hardware-power-management-config</b> <b>cpu-hardware-power-management</b>	<p>Enables processor Hardware Power Management (HWPM). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> <li>• <b>disabled</b>—HWPM is disabled.</li> <li>• <b>hwpm-native-mode</b>—HWPM native mode is enabled.</li> <li>• <b>hwpm-oob-mode</b>—HWPM Out-Of-Box mode is enabled.</li> <li>• <b>Native Mode with no Legacy</b> (only GUI)</li> </ul>
<b>Energy Performance Tuning</b> <b>set power-performance-tuning-support</b> <b>power-performance-tuning-config</b>	<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"> <li>• <b>bios</b>—</li> <li>• <b>os</b>—</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Workload Configuration</b>	<p>This feature allows for workload optimization. The options are Balanced and I/O Sensitive:</p> <ul style="list-style-type: none"> <li>• <b>balanced</b></li> <li>• <b>io-sensitive</b>—This is the default option.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>Cisco recommends using Balanced.</p>
<b>Core Performance Boost</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU automatically determines how to boost performance.</li> <li>• <b>disabled</b>—Core performance boost is disabled.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Uncore Frequency Scaling</b>	<p>Allows you configure the scaling of the uncore frequency of the processor. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>—Uncore frequency of the processor scales up or down based on the load. (Default.)</li> <li>• <b>disabled</b>—Uncore frequency of the processor remains fixed.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>Refer to the Intel Dear Customer Letter (DCL) to know the fixed higher and lower values for Uncore Frequency Scaling.</p>

Name	Description
<b>Configurable TDP Level</b>	<p>Allows adjustments in processor thermal design power (TDP) values. By modifying the processor behavior and the performance levels, power consumption of a processor can be configured and TDP can be adjusted at the same time. Hence, a processor operates at higher or lower performance levels, depending on the available cooling capacities and desired power consumption.</p> <p>This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>normal</b>—The CPU operates at its normal performance level. (Default.)</li> <li>• <b>level1</b></li> <li>• <b>level1</b></li> </ul> <p><b>Note</b> Refer to the Intel Dear Customer Letter (DCL) for the values for TDP level.</p>
<b>UPI Link Speed</b> <b>set-qpilinkspeed</b>	<p>Allows you to configure the Intel Ultra Path Interconnect (UPI) link speed between multiple sockets. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—Automatically configures the optimal link speed. (Default)</li> <li>• <b>9.6gt/s (gigatransfers per second)</b>—Configures the optimal link speed at 9.6GT/s</li> <li>• <b>10.4gt/s</b>—Configures the optimal link speed at 10.4GT/s</li> <li>• <b>11.2gt/s</b>—Configures the optimal link speed at 11.2GT/s</li> <li>• <b>use per link setting</b></li> </ul> <p><b>Note</b> The value <b>use per link setting</b> is not supported on UCS M6 and M7 servers.</p>
<b>Global C-state Control</b>	<p>Whether the AMD processors control IO-based C-state generation and DF C-states. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU automatically determines how to control IO-based C-state generation.</li> <li>• <b>disabled</b>—Global C-state control is disabled.</li> <li>• <b>enabled</b>—Global C-state control is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>L1 Stream HW Prefetcher</b>	<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"> <li>• <b>auto</b>—The CPU determines how to place data from I/O devices into the processor cache.</li> <li>• <b>disabled</b>—The hardware prefetcher is not used.</li> <li>• <b>enabled</b>—The processor uses the hardware prefetcher when cache issues are detected.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>L2 Stream HW Prefetcher</b>	<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"> <li>• <b>auto</b>—The CPU determines how to place data from I/O devices into the processor cache.</li> <li>• <b>disabled</b>—The hardware prefetcher is not used.</li> <li>• <b>enabled</b>—The processor uses the hardware prefetcher when cache issues are detected.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>AMD Memory Interleaving Size</b>	<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"> <li>• 1 KB</li> <li>• 2 KB</li> <li>• 256 Bytes</li> <li>• 512 Bytes</li> <li>• <b>auto</b>—The CPU determines the size of the memory block.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Chipselect Interleaving</b>	<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"> <li>• <b>auto</b>—The CPU automatically determines how to interleave chip selects.</li> <li>• <b>disabled</b>—Chip selects are not interleaved within the memory controller.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Bank Group Swap</b>	<p>Determines how physical addresses are assigned to applications. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU automatically determines how to assign physical addresses to applications.</li> <li>• <b>disabled</b>—Bank group swap is not used.</li> <li>• <b>enabled</b>—Bank group swap is used to improve the performance of applications.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Determinism Slider</b>	<p>Allows AMD processors to determine how to operate. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU automatically uses default power determinism settings.</li> <li>• <b>performance</b>—Processor operates at the best performance in a consistent manner.</li> <li>• <b>power</b>—Processor operates at the maximum allowable performance on a per die basis.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>IOMMU</b>	<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"> <li>• <b>auto</b>—The CPU determines how map these addresses.</li> <li>• <b>disabled</b>—IOMMU is not used.</li> <li>• <b>enabled</b>—Address mapping takes place through the IOMMU.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SVM Mode</b>	<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"> <li>• <b>disabled</b>—The processor does not use SVM Technology.</li> <li>• <b>enabled</b>—The processor uses SVM Technology. This is the default option.</li> <li>• <b>platform-default</b> —The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SMEE</b>	<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"> <li>• <b>auto</b>—This is the default option.</li> <li>• <b>disabled</b>—The processor does not use the SMEE function.</li> <li>• <b>enabled</b>—The processor uses the SMEE function.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>UPI Prefetch</b> <b>set-upi-prefetch</b>	<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"> <li>• <b>enabled</b>—The UPI prefetcher preloads the L1 cache with the data it determines to be the most relevant.</li> <li>• <b>disabled</b>—The processor does not preload any cache data.</li> <li>• <b>auto</b>—The processor enables the UPI prefetcher option.</li> </ul>



Name	Description
<b>SGX Auto MP Registration Agent</b> <b>set-SgxAutoRegistrationAgent</b>	Allows you to enable the registration authority service to store the platform keys. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>SProcessor Epoch <i>n</i></b> <b>scope token-feature "Processor"</b> <b>scope token-param SgxEpoc<i>n</i>/h</b>	Allows you to define the SGX EPOCH owner value for the EPOCH number designated by <i>n</i> .
<b>SGX Factory Reset</b> <b>scope token-feature "Processor"</b> <b>scope token-param SgxFactoryReset</b>	Allows the system to perform SGX factory reset on subsequent boot. This deletes all registration data. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>SGX PBUKEY HASH<i>n</i></b> <b>scope token-feature "Processor"</b> <b>scope token-param SgxLePubKeyHash<i>n</i></b>	Allows you to set the Software Guard Extensions (SGX) value. This value can be set between: <ul style="list-style-type: none"> <li>• SGX PUBKEY HASH0—Between 7-0</li> <li>• SGX PUBKEY HASH1—Between 15-8</li> <li>• SGX PUBKEY HASH2—Between 23-16</li> <li>• SGX PUBKEY HASH3—Between 31-24</li> </ul>
<b>SGX Write Enable</b> <b>scope token-feature "Processor"</b> <b>scope token-param SgxLeWr</b>	Allows you to enable SGX Write feature. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>SGX Pkg info In-Band Access</b> <b>scope token-feature "Processor"</b> <b>scope token-param SgxPackageInfoInBandAccess</b>	Allows you to enable SGX Package Info In-Band Access. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>SGX QoS</b> <b>scope token-feature "Processor"</b> <b>scope token-param SgxQoS</b>	Allows you to enable SGX QoS. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>— Support is enabled.</li> <li>• <b>disabled</b>— Support is disabled.</li> </ul>

Name	Description
<b>Intel Dynamic Speed Select</b> scope token-feature "IntelSpeedSelect Configuration" scope token-param IntelDynamicSpeedSelect	Intel Dynamic Speed Select modes allow you to run the CPU with different speed and cores in auto mode. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Intel Dynamic Speed Select is enabled.</li> <li>• <b>disabled</b>—Intel Dynamic Speed Select is disabled.</li> </ul>
<b>IIO eDPC Support</b> scope token-feature "Processor" scope token-param EdpcEn	eDPC allows a downstream link to be disabled after an uncorrectable error, making recovery possible in a controlled and robust manner. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—eDPC support is disabled.</li> <li>• <b>on fatal errors</b>—eDPC is enabled only for fatal errors.</li> <li>• <b>on fatal and non-fatal errors</b>—eDPC is enabled for both fatal and non-fatal errors.</li> </ul>
<b>Multikey Total Memory Encryption (MK-TME)</b> scope token-feature "Processor" scope token-param EnableMktme	MK-TME allows you to have multiple encryption domains with one with own key. Different memory pages can be encrypted with different keys. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>SW Guard Extensions (SGX)</b> scope token-feature "Processor" scope token-param EnableSgx	Allows you to enable Software Guard Extensions (SGX) feature. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>Total Memory Encryption (TME)</b> scope token-feature "Processor" scope token-param EnableTme	Allows you to provide the capability to encrypt the entirety of the physical memory of a system. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>Select Owner EPOCH input type</b> scope token-feature "Processor" scope token-param EpochUpdate	Allows you to change the seed for the security key used for the locked memory region that is created. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>sgx owner epoch activated</b>— Does not change the current input type.</li> <li>• <b>change to new random owner epochs</b>—Changes EPOCH to a system generated random number</li> <li>• <b>manual user defined owner epochs</b>—Changes the EPOCH seed to a hexadecimal value that you enter.</li> </ul>

Name	Description
<p><b>Enhanced CPU Performance</b>  scope token-feature "CpuPerfEnhancement"  scope token-param CpuPerfEnhancement</p>	<p>Enhances CPU performance by adjusting server settings automatically. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not run with this functionality. This is the default option.</li> <li>• <b>auto</b>—Allows to adjust server settings to increase the processor performance.</li> </ul> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• Enabling this functionality may increase power consumption.</li> <li>• The server should meet the following requirements in order to use this functionality: <ul style="list-style-type: none"> <li>• The server should not contain Barlow Pass DIMMs.</li> <li>• DIMM module size present in the Cisco UCS C220 M6 server should be less than 64GB and in Cisco UCS C240 M6 server should be less than 256GB.</li> <li>• No GPU cards are present in the server.</li> </ul> </li> </ul>
<p><b>UPI Link Enablement</b>  scope token-feature "UPI Link Enablement"  scope token-param UPILinkEnablement</p>	<p>Enables the number of Ultra Path Interconnect (UPI) links required by the processor. This can be one of the following</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—This is the default option.</li> <li>• <b>1</b></li> <li>• <b>2</b></li> </ul>
<p><b>UPI Power Manangement</b>  scope token-feature "UPI Power Manangement"  scope token-param UPIPowerManagement</p>	<p>The UPI power management can be used for conserving power on the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>—Enables the processor to support this functionality.</li> <li>• <b>disabled</b>—Disables the processor to support this functionality. This is the default option.</li> </ul>
<p><b>C1 Auto UnDemotion</b>  scope token-feature "C1 Auto UnDemotion"  scope token-param C1AutoDemotion</p>	<p>Select whether to enable processors to automatically undemote from C1. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>—Enables the processor to support this functionality. This is the default option.</li> <li>• <b>disabled</b>—Disables the processor to support this functionality.</li> </ul>

Name	Description
<b>C1 Auto Demotion</b> scope token-feature "C1 Auto Demotion" scope token-param C1AutoDemotion	If enabled, CPU automatically demotes to C1 based on un-core auto-demote information. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Enables the processor to support this functionality. This is the default option.</li> <li>• <b>disabled</b>—Disables the processor to support this functionality.</li> </ul>
<b>CPU Downcore control 7xx3</b> scope token-feature "Processor" scope token-param CbsCpuCoreCtrl	Provides the ability to remove one or more cores from operation is supported in the silicon. It may be desirable to reduce the number of cores due to OS restrictions, or power reduction requirements of the system. This item allows the control on the number of cores that are running. This setting can only reduce the number of cores from only those available in the processor. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines how many cores need to be enabled. This is the default option</li> <li>• <b>one (1+0)</b>—One core enabled on one CPU complex</li> <li>• <b>two (2+0)</b>—Two core enabled on one CPU complex</li> <li>• <b>three (3+0)</b>—Three core enabled on one CPU complex.</li> <li>• <b>four (4+0)</b>—Four core enabled on one CPU complex.</li> <li>• <b>five (5+0)</b>—Five core enabled on one CPU complex</li> <li>• <b>six (6+0)</b>—Six core enabled on one CPU complex</li> <li>• <b>seven (7+0)</b>—Seven core enabled on one CPU complex</li> </ul> <p><b>Note</b> This token is applicable only for the servers with 7xx3 Model processors.</p>
<b>Fixed SOC P-State</b> scope token-feature "Processor" scope token-param CbsCmnFixedSocPstate	This option defines the target P-state when APBDIS (to disable Algorithm Performance Boost (APB)) is set. The <b>P-x</b> specify a valid P-state for the processor installed. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—Sets a valid P-state suitable for the processor. This is the default option.</li> <li>• <b>p0</b>—Highest-performing SOC P-state</li> <li>• <b>p1</b>—Next-highest-performing SOC P-state</li> <li>• <b>p2</b>—Next-highest-performing SOC P-state</li> <li>• <b>p3</b>—Minimum SOC power P-state</li> </ul>

Name	Description
<b>APBDIS</b> scope token-feature "Processor" scope token-param CbsCmnApbdis	Allows you to select the Algorithm Performance Boost (APB) Disable value for the SMU. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—Sets an auto ApbDis for the SMU. This is the default option.</li> <li>• <b>0</b>—Clear ApbDis to SMU</li> <li>• <b>1</b>—Set ApbDis to SMU</li> </ul>
<b>CCD Control</b> scope token-feature "Processor" scope token-param CbsCpuCcdCtrlSsp	Allows you to specify the number of charge-coupled device CCDs that are desired to be enable in the system. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—The maximum CCDs provided by the processor is enabled. This is the default option.</li> <li>• <b>2 ccds</b></li> <li>• <b>3 ccds</b></li> <li>• <b>4 ccds</b></li> <li>• <b>6 ccds</b></li> </ul>
<b>Cisco xGMI Max Speed</b> scope token-feature "Processor" scope token-param CiscoXgmiMaxSpeed	This option enables 18 Gbps XGMI link speed. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The feature is disabled. This is the default option.</li> <li>• <b>enabled</b>—The feature is enabled.</li> </ul>
<b>ACPI SRAT L3 Cache As NUMA Domain</b> scope token-feature "Processor" scope token-param CbsDfCmnAcpiSratL3Numa	Creates a layer of virtual domains on top of the physical domains in which each CCX is declared to be in its on domain. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—Set to auto mode. This is the default option.</li> <li>• <b>disabled</b>—Use NPS settings for domain configuration.</li> <li>• <b>enabled</b>—Each CCX is declared to be in its own domain.</li> </ul>
<b>Streaming Stores Control</b> scope token-feature "Processor" scope token-param CbsCmnCpuStreamingStoresCtrl	Enables the streaming stores functionality. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—Set to auto mode. This is the default option.</li> <li>• <b>disabled</b>—Feature is disabled.</li> <li>• <b>enabled</b>—Feature is enabled.</li> </ul>

Name	Description
<b>DF C-States</b> scope token-feature "Processor" scope token-param CbsCmnGnbSMUDfCstates	When long duration idleness is expected in a system, this control allows the system to transition into a DF Cstate which can set the system into an even lower power state. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—Set to auto mode. This is the default option.</li> <li>• <b>disabled</b>—This option is turned off, long period of idleness are not expected so no power savings would be achieved.</li> <li>• <b>enabled</b>—This option is active, saving power when the system is idle.</li> </ul>
<b>SEV-SNP Support</b> scope token-feature "Processor" scope token-param CbsSevSnpSupport	Allows you to enable Secure Nested Paging feature. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not use the SEV-SNP function. This is the default option.</li> <li>• <b>enabled</b>—The processor uses the SEV-SNP function.</li> </ul>
<b>Efficiency Mode Enable</b> scope token-feature "Processor" scope token-param CbsCmnEfficiencyModeEn	Allows you to configure power consumption based on efficiency. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU automatically uses default settings. This is the default option.</li> <li>• <b>enabled</b>—Efficiency mode is enabled.</li> </ul>
<b>SNP Memory Coverage</b> scope token-feature "Processor" scope token-param CbsDbgCpuSnpMemCover	Allows you to configure SNP memory coverage. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—System decides the memory coverage. This is the default option.</li> <li>• <b>disabled</b>—The processor does not use this function.</li> <li>• <b>enabled</b>—This feature is enabled.</li> <li>• <b>custom</b>—Custom size can be defined in SNP Memory Size to Cover.</li> </ul>
<b>SNP Memory Size to Cover in MB</b> scope token-feature "Processor" scope token-param CbsDbgCpuSnpMemSizeCover	Allows you to configure SNP memory size. The value can range from 0-1048576. 0 is the default option.

Name	Description
<b>SMT Mode</b> scope token-feature "Processor" scope token-param SmtMode	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: <ul style="list-style-type: none"> <li>• <b>auto</b>—The processor allows for the parallel execution of multiple threads.</li> <li>• <b>enabled</b>—The processor allows permit multithreading. This is the default option.</li> <li>• <b>disabled</b>—The processor allows permit multithreading.</li> </ul>
<b>CPCC</b> scope token-feature "Processor" scope token-param CbsCmnGnbSMUCPPC	Allows you to configure Collaborative Processor Performance Control. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU automatically uses default CPPC settings. This is the default option.</li> <li>• <b>disabled</b>—Feature is disabled.</li> <li>• <b>enabled</b>—Collaborative Processor Performance is enabled.</li> </ul>
<b>Downcore control 7xx2</b> scope token-feature "Processor" scope token-param CbsCmnCpuGenDowncoreCtrl	The ability to remove one or more cores from operation is supported in the silicon. It may be desirable to reduce the number of cores due to OS restrictions, or power reduction requirements of the system. This item allows the control of how many cores are running. This setting can only reduce the number of cores from those available in the processor. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines how many cores need to be enabled. This is the default option.</li> <li>• <b>two (1+1)</b>—Two cores enabled on one CPU complex.</li> <li>• <b>four (2+2)</b>—Four cores enabled on one CPU complex.</li> <li>• <b>six (3+3)</b>—Six cores enabled on one CPU complex.</li> </ul>
<b>Processor EPP Profile</b> set processor epp profile	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>performance</b></li> <li>• <b>balanced performance</b>—This is the default option.</li> <li>• <b>balanced power</b></li> <li>• <b>power</b></li> </ul>

Name	Description
<b>Autonomous Core C-state</b> set processor autonomous core c-state	Enables CPU Autonomous C-State, which converts the HALT instructions to the MWAIT instructions. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—This is the default option.</li> <li>• <b>enabled</b></li> </ul>
<b>Energy Efficient Turbo</b> set energy efficient turbo	When energy efficient turbo is enabled, the optimal turbo frequency of the CPU turns dynamic based on CPU utilization. The power/performance bias setting also influences energy efficient turbo. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—This is the default option.</li> <li>• <b>enabled</b></li> </ul>
<b>Hardware P-States</b> set hardware p-states	Enables processor Hardware P-State. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—HWPM is disabled.</li> <li>• <b>hwpm native modeHWPM Native Mode</b>—HWPM native mode is enabled. This is the default option.</li> <li>• <b>hwpm oob modeHWPM OOB Mode</b>—HWPM Out-of-Box mode is enabled.</li> <li>• <b>native mode with no legacyNative Mode with no Legacy</b></li> </ul>
<b>Energy/Performance Bias Config</b> set energy/performance	Allows you to determine whether system performance or energy efficiency is more important on this server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>performance</b>—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power.</li> <li>• <b>balaced performanceBalanced Performance</b>—The server provides all server components with enough power to keep a balance between performance and power. This is the default option.</li> <li>• <b>balanced powerBalanced Power</b>—The server provides all server components with enough power to keep a balance between performance and power.</li> <li>• <b>powerPower</b>—The server provides all server components with maximum power to keep reduce power consumption.</li> </ul>



Name	Description
<b>Power Performance Tuning</b> <b>set power performance</b>	Determines if the BIOS or Operating System can turn on the energy performance bias tuning. The options are BIOS and OS. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>bios</b>—Chooses BIOS for energy performance tuning.</li> <li>• <b>osOS</b>—Chooses OS for energy performance tuning. This is the default option.</li> <li>• <b>peciPECI</b>—Chooses PECI for energy performance tuning.</li> </ul>
<b>Cores Enabled</b> <b>set cores enabled</b>	Allows you to disable one or more of the physical cores on the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>all</b>—Enables all physical cores. This also enables Hyper Threading on the associated logical processor cores.</li> <li>• <b>1 through 481 through 48</b>—Specifies the number of physical processor cores that can run on the server. Each physical core has an associated logical core.</li> </ul>
<b>Hyper-Threading [All]</b> <b>set hyper-threading-all</b>	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"> <li>• <b>disabled</b>—The processor does not permit hyperthreading.</li> <li>• <b>enabledEnabled</b>—The processor allows for the parallel execution of multiple threads.</li> </ul>
<b>SpeedStep (Pstates)</b> <b>set speedstep (pstates)</b>	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: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor never dynamically adjusts its voltage or frequency.</li> <li>• <b>enabledEnabled</b>—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power.</li> </ul>

Name	Description
<b>Boot Performance Mode</b> set boot performance mode	Allows the user to select the BIOS performance state that is set before the operating system handoff. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>max performance</b>—Processor P-state ratio is maximum.</li> <li>• <b>max efficientMax Efficient</b>—Processor P-state ratio is minimum.</li> <li>• <b>set by intel nmSet by Intel NM</b>—Processor P-state ratio is set by Intel.</li> </ul>
<b>EIST PSD Function</b> set eist psd function	EIST reduces the latency inherent with changing the voltage-frequency pair (P-state), thus allowing those transitions to occur more frequently. This allows for more granular, demand-based switching and can optimize the power-to-performance balance, based on the demands of the applications. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>hw all</b>—The processor is coordinates the P-state among logical processors dependencies. The OS keeps the P-state request up to date on all logical processors. This is the default option.</li> <li>• <b>sw all</b>—The OS Power Manager coordinates the P-state among logical processors with dependencies and initiates the transition on all of those Logical Processors.</li> </ul>
<b>Turbo Mode</b> set eist psd function	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not increase its frequency automatically.</li> <li>• <b>enabled</b>—The processor utilizes Turbo Boost Technology if required. This is the default option.</li> </ul>
<b>Extended APIC</b> set extended apic	Allows you to enable or disable extended APIC support. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—This is the default option.</li> <li>• <b>enabled.</b></li> </ul>

Name	Description
<b>Memory Interleaving Size</b> <b>set memory interleaving</b>	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: <ul style="list-style-type: none"> <li>• 1 KB</li> <li>• 2 KB</li> <li>• 4 KB</li> <li>• 256 Bytes</li> <li>• 512 Bytes</li> <li>• <b>auto</b>—The CPU determines the size of the memory block.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>UPI Link Frequency Select</b> <b>set upi link frequency select</b>	Allows you to enable or disable extended APIC support. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—This option configures the optimal link speed automatically. This is the default option.</li> <li>• <b>9.6gt/s</b>—This option configures the optimal link speed at 9.6GT/s.</li> <li>• <b>10.4gt/s</b>—This option configures the optimal link speed at 10.4GT/s.</li> <li>• <b>11.2gt/s</b>—This option configures the optimal link speed at 10.4GT/s.</li> </ul>
<b>X2APIC Opt Out</b> <b>set X2ApicOptOut</b>	Prevents the OS from enabling extended xAPIC (x2APIC) mode when the OS is not working with x2APIC. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Use the Extended xAPIC (x2APIC) mode. This is the default option.</li> <li>• <b>enabled</b>—Opt out from Extended xAPIC (x2APIC) mode.</li> </ul>

## I/O BIOS Settings for Intel

The following table lists the Intel Directed I/O BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Intel VT for directed IO</b> <b>set intel-vt-directed-io-config vtd</b>	<p>Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not use virtualization technology.</li> <li>• <b>enabled</b>—The processor uses virtualization technology.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This option must be enabled if you want to change any of the other Intel Directed I/O BIOS settings.</p>
<b>Intel VTD interrupt Remapping</b> <b>set intel-vt-directed-io-config interrupt-remapping</b>	<p>Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not support remapping.</li> <li>• <b>enabled</b>—The processor uses VT-d Interrupt Remapping as required.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Intel VTD coherency support</b> <b>set intel-vt-directed-io-config coherency-support</b>	<p>Whether the processor supports Intel VT-d Coherency. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not support coherency.</li> <li>• <b>enabled</b>—The processor uses VT-d Coherency as required.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Intel VTD ATS support</b> <b>set intel-vt-directed-io-config ats-support</b>	<p>Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not support ATS.</li> <li>• <b>enabled</b>—The processor uses VT-d ATS as required.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Intel VTD pass through DMA support</b> <b>set intel-vt-directed-io-config</b> <b>passthrough-dma</b>	Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not support pass-through DMA.</li> <li>• <b>enabled</b>—The processor uses VT-d Pass-through DMA as required.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## I/O BIOS Settings for AMD

The following table lists the Input/Output BIOS settings that you can configure through a BIOS policy for AMD:

Name	Description
<b>PCIe ARI Support</b> <b>scope token-feature "PCIe ARI Support"</b> <b>scope token-param "PCIeARISupport"</b>	The PCIe Alternative Routing ID (ARI) Interpretation feature specification supports greater numbers of virtual functions through the implementation of ARI, which reinterprets the device number field in the PCIe header allowing for more than eight functions. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—PCIe ARI Support is not available.</li> <li>• <b>enabled</b>—PCIe ARI Support is available.</li> <li>• <b>auto</b>—PCIe ARI Support is in auto mode. This is the default option.</li> </ul>
<b>IPv4 PXE Support</b> <b>scope token-feature "IPv4 PXE Support"</b> <b>scope token-param "IPv4PXESupport"</b>	Enables or disables IPv4 support for PXE. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—IPv6 PXE support is not available.</li> <li>• <b>enabled</b>—IPv6 PXE support is available. This is the default option.</li> </ul>
<b>IPv4 HTTP Support</b> <b>scope token-feature "HTTP BOOT"</b> <b>scope token-param "IPV4HTTP"</b>	Enables or disables IPv4 support for HTTP. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—IPv4 HTTP support is not available.</li> <li>• <b>enabled</b>—IPv4 HTTP support is available. This is the default option.</li> </ul>

Name	Description
<b>IPv6 HTTP Support</b> scope token-feature "HTTP BOOT" scope token-param "IPV6HTTP"	Enables or disables IPv6 support for HTTP. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—IPv6 HTTP support is not available.</li> <li>• <b>enabled</b>—IPv6 HTTP support is available. This is the default option.</li> </ul>
<b>Network Stack</b> scope token-feature "Network Stack" scope token-param "NetworkStack"	This option allows you to monitor IPv6 and IPv4. This can be one of the following <ul style="list-style-type: none"> <li>• <b>disabled</b>—Network Stack support is not available.</li> </ul> <p><b>Note</b> When disabled, the value set for <b>IPV4 PXE Support</b> does not impact the system.</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>—Network Stack support is available. This is the default option.</li> </ul> <p><b>Note</b> When Network Stack token value is Disabled, the below tokens and their values are also set</p> <ul style="list-style-type: none"> <li>• IPV4PXE - Disabled</li> <li>• IPV4HTTP - Disabled</li> <li>• IPV6HTTP - Disabled</li> </ul>
<b>SR-IOV Support</b> scope token-feature "sriov" scope token-param "sriov-support"	Whether SR-IOV (Single Root I/O Virtualization) is enabled or disabled on the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—SR-IOV is enabled. This is the default option.</li> <li>• <b>disabled</b>—SR-IOV is disabled.</li> </ul>

## RAS Memory BIOS Settings

The following table lists the RAS memory BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Error Check Scrub</b> <b>set ErrorCheckScrub</b>	<p>An error check and scrub (ECS) mode enables a memory device to perform error checking and correction (ECC) and count errors. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Does not collect any errors.</li> <li>• <b>Enabled_without_Result_Collection</b>—Collects the errors without giving the results.</li> <li>• <b>Enabled_with_Result_Collection</b>—Collects the errors with the results.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Rank Margin Tool</b> <b>set EnableRMT</b>	<p>This provides automated memory margin testing and is used to identify DDR margins at the rank level. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Does not identify the margins at the rank level.</li> <li>• <b>enabled</b>—Identifies the margins at the rank level.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Optimized Power Mode</b> <b>set OptimizedPowerMode</b>	<p>Automatically varies processor speed and <i>power</i> usage based on processor utilization. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The processor does not vary the speed automatically.</li> <li>• <b>enabled</b>—The processor varies the speed automatically.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Partial Cache Line Sparing</b> <b>scope token-feature "Partial Cache Line Sparing"</b> <b>scope token-param PartialCacheLineSparing</b>	<p>Partial cache line sparing (PCLS) is an error-prevention mechanism in memory controllers. PCLS statically encodes the locations of the faulty nibbles of bits into a sparing directory along with the corresponding data content for replacement during memory accesses. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Support is disabled.</li> <li>• <b>enabled</b>—Support is enabled.</li> </ul>

Name	Description
<b>UMA</b> <b>scope token feature "UMA"</b> <b>scope token-param UmaBasedClustering</b>	Allows you to set UMA settings. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disable-all2-all</b></li> <li>• <b>hemisphere-2-clusters</b></li> </ul>
<b>Memory Thermal Throttling Mode</b> <b>scope token-feature "Memory Thermal Throttling Mode"</b> <b>scope token-param MemoryThermalThrottling</b>	Provides a protective mechanism to ensure the memory temperature is within the limits. When the temperature exceeds the maximum threshold value, the memory access rate is reduced and Baseboard Management Controller (BMC) adjusts the fan to cool down the memory to avoid DIMM damage due to overheat. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>CLTT with PECI</b> —Closed Loop Thermal Throttling (CLTT) with Platform Environment Control Interface (PECI). This is the default option.</li> <li>• <b>disabled</b>.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state of <b>CLTT with PECI</b></p>
<b>Enhanced Memory Test</b> <b>scope token-feature "Advanced Memory Test"</b> <b>scope token-param AdvancedMemTest</b>	Enables enhanced memory tests during the system boot and increases the boot time based on the memory. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—This is the default option.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state of <b>auto</b>.</p> <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b></li> </ul> <p><b>Note</b> <ul style="list-style-type: none"> <li>• This BIOS token name modified from <b>Advanced Memory Test</b> to <b>Enhanced Memory Test</b> for M6 servers.</li> </ul> </p>
<b>Transparent Secure Memory Encryption (TSME)</b> <b>scope token-feature "Processor"</b> <b>scope token-param TSME</b>	Provides transparent hardware memory encryption of all data stored on system memory. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b></li> <li>• <b>auto</b>—This is the default option.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state of <b>auto</b> to mitigate Rowhammer-style attacks.</p>



Name	Description
<p><b>Secure Encrypted Virtualization (SEV)</b>  scope token-feature "Processor"  scope token-param SEV</p>	<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"> <li>• <b>253 ASIDs</b></li> <li>• <b>509 ASIDs</b></li> <li>• <b>auto</b>—This is the default option.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state of <b>auto</b> to mitigate Rowhammer-style attacks.</p>
<p><b>DRAM SW Thermal Throttling</b>  scope token-feature "Processor"  scope token-param  DramSwThermalThrottling</p>	<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"> <li>• <b>enabled</b></li> <li>• <b>disabled</b>—This is the default option.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state of <b>disabled</b> to mitigate Rowhammer-style attacks.</p>
<p><b>Memory Refresh Rate</b>  scope token-feature "Memory Refresh Rate"  scope token-param MemoryRefreshRate</p>	<p>Controls the refresh rate of the memory controller and might affect the memory performance and power depending on memory configuration and workload. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>1x-Refresh</b></li> <li>• <b>2x-Refresh</b>—This is the default option.</li> </ul>
<p><b>Panic and High Watermark</b>  scope token-feature "Panic and High Watermark"  scope token-param  PanicHighWatermark</p>	<p>Controls the delayed refresh capability of the memory controller. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>High</b>—The memory controller is allowed to postpone up to a maximum of eight refresh commands. The memory controller executes all the postponed refreshes within the refresh interval. For the ninth refresh command, the refresh priority becomes <b>Panic</b> and the memory controller pauses the normal memory transactions until all the postponed refresh commands are executed.</li> <li>• <b>Low</b>—This is the default option. The memory controller is not allowed to postpone refresh commands.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state (<b>Low</b>) which will help to reduce susceptibility to Rowhammer-style attacks.</p>

Name	Description
<p><b>Memory RAS configuration</b>  <b>set memory-ras-config ras-config</b></p>	<p>How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>maximum-performance</b>—Optimizes the system performance and disables all the advanced RAS features.</li> <li>• <b>lockstep</b>—If the DIMM pairs in the server have an identical type, size, and organization and are populated across the SMI channels, you can enable lockstep mode to minimize memory access latency and provide better performance. Lockstep is enabled by default for B440 servers.</li> <li>• <b>Mirror Mode 1LM</b>—Mirror Mode 1LM will set the entire 1LM memory in the system to be mirrored, consequently reducing the memory capacity by half. This mode is used for UCS M5 and M6 and M7blade servers.</li> <li>• <b>Partial Mirror Mode 1LM</b>—Partial Mirror Mode 1LM will set a part of the 1LM memory in the system to be mirrored, consequently reducing the memory capacity by half. This mode is used for UCS M5 and M6 and M7blade servers.</li> <li>• <b>sparing</b>—System reliability is optimized by holding memory in reserve so that it can be used in case other DIMMs fail. This mode provides some memory redundancy, but does not provide as much redundancy as mirroring.</li> <li>• <b>adddc-sparing</b>—System reliability is optimized by holding memory in reserve so that it can be used in case other DIMMs fail. This mode provides some memory redundancy, but does not provide as much redundancy as mirroring.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>NUMA optimized</b>  <b>set numa-config numa-optimization</b></p>	<p>Whether the BIOS supports NUMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS does not support NUMA.</li> <li>• <b>enabled</b>—The BIOS includes the ACPI tables that are required for NUMA-aware operating systems. If you enable this option, the system must disable Inter-Socket Memory interleaving on some platforms.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Post Package Repair</b> <b>scope token-feature</b> <b>"PostPackageRepair"</b> <b>scope token-param PostPackageRepair</b>	<p>Post Package Repair (PPR) provides the ability to repair faulty memory cells by replacing them with spare cells. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS does not support selecting PPR Type.</li> <li>• <b>hard-ppr</b>—This results in a permanent remapping of damaged storage cells. This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Memory Size Limit in GB</b> <b>set memory-size-limit</b>	<p>Limits the capacity in Partial Memory Mirror Mode up to 50 percent of the total memory capacity. The memory size can range from 0 GB to 65535 GB in increments of 1 GB.</p>
<b>Mirroring Mode</b> <b>set memory-mirroring-mode</b> <b>mirroring-mode</b>	<p>Memory mirroring enhances system reliability by keeping two identical data images in memory.</p> <p>This option is only available if you choose the <b>mirroring</b> option for <b>Memory RAS Config</b>. It can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>inter-socket</b>—Memory is mirrored between two Integrated Memory Controllers (IMCs) across CPU sockets.</li> <li>• <b>intra-socket</b>—One IMC is mirrored with another IMC in the same socket.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Sparing Mode</b> <b>set memory-sparing-mode</b> <b>sparing-mode</b>	<p>Sparing optimizes reliability by holding memory in reserve so that it can be used in case other DIMMs fail. This option provides some memory redundancy, but does not provide as much redundancy as mirroring. The available sparing modes depend on the current memory population.</p> <p>This option is only available if you choose <b>sparing</b> option for <b>Memory RAS Config</b>. It can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>dimm-sparing</b>—One DIMM is held in reserve. If a DIMM fails, the contents of a failing DIMM are transferred to the spare DIMM.</li> <li>• <b>rank-sparing</b>—A spare rank of DIMMs is held in reserve. If a rank of DIMMs fails, the contents of the failing rank are transferred to the spare rank.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>LV DDR Mode</b> set lv-dimm-support-config lv-ddr-mode	Whether the system prioritizes low voltage or high frequency memory operations. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—The CPU determines whether to prioritize low voltage or high frequency memory operations.</li> <li>• <b>power-saving-mode</b>—The system prioritizes low voltage memory operations over high frequency memory operations. This mode may lower memory frequency in order to keep the voltage low.</li> <li>• <b>performance-mode</b>—The system prioritizes high frequency operations over low voltage operations.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>DRAM Refresh Rate</b> set dram-refresh-rate-config dram-refresh	The refresh interval rate for internal memory. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>1x</b></li> <li>• <b>2x</b></li> <li>• <b>3x</b></li> <li>• <b>4x</b></li> <li>• <b>auto</b></li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>DDR3 Voltage Selection</b> set ddr3-voltage-config ddr3-voltage	The voltage to be used by the dual-voltage RAM. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>ddr3-1500mv</b></li> <li>• <b>ddr3-1350mv</b></li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Partial Memory Mirror Mode</b> set memory-mirroring-mode mirroring-mode	<p>Partial Memory Mirroring enables you to partially mirror by GB or by a percentage of the memory capacity. Depending on the option selected here, you can define either a partial mirror percentage or a partial mirror capacity in GB in available fields. You can partially mirror up to 50 percent of the memory capacity. It can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Partial Memory Mode is disabled. This is the default option.</li> <li>• <b>Percentage</b>—The amount of memory to be mirrored in the Partial Memory Mode is defined as a percentage of the total memory.</li> <li>• <b>Value in GB</b>—The amount of memory to be mirrored in the Partial Memory Mode is defined in GB.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b>      <b>Partial Memory Mirror Mode</b> is mutually exclusive to standard <b>Mirroring Mode</b>.</p> <p>Partial Mirrors 1-4 can be used in any number or configuration, provided they do not exceed the capacity limit set in GB or Percentage in the related options.</p>
<b>Partial Mirror Percentage</b>	Limits the amount of available memory to be mirrored as a percentage of the total memory. This can range from 0.000.01 % to 50.00 % in increments of 0.01 %.
<b>Partial Mirror1 Size in GB</b>	Limits the amount of memory in Partial Mirror1 in GB. This can range from 0 GB to 65535 GB in increments of 1 GB.
<b>Partial Mirror2 Size in GB</b>	Limits the amount of memory in Partial Mirror2 in GB. This can range from 0 GB to 65535 GB in increments of 1 GB.
<b>Partial Mirror3 Size in GB</b>	Limits the amount of memory in Partial Mirror3 in GB. This can range from 0 GB to 65535 GB in increments of 1 GB.
<b>Partial Mirror4 Size in GB</b>	Limits the amount of memory in Partial Mirror4 in GB. This can range from 0 GB to 65535 GB in increments of 1 GB.
<b>Volatile Memory Mode</b> scope token-feature "VolMemoryMode" scope token-param VolMemoryMode	<p>Allows the memory mode configuration. This can be any of the following:</p> <ul style="list-style-type: none"> <li>• <b>1lm</b>—Configures 1 Layer Memory(1LM)</li> <li>• <b>2lm</b>—Configures 2 Layer Memory(1LM)</li> </ul>

Name	Description
<b>Memory Bandwidth Boost</b> scope token-feature "MemoryBandwidthBoost" scope token-param MemoryBandwidthBoost	Allows to boost the memory bandwidth. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b></li> </ul>
<b>Burst and Postponed Refresh</b> scope token-feature "Processor" scope token-param BurstAndPostponedRefresh	Allows the memory controller to defer the refresh cycles when the memory is active and accomplishes the refresh within a specified window. The deferred refresh cycles may run in a burst of several refresh cycles. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b>—This is the default option.</li> </ul> <p><b>Note</b> It is recommended to leave this setting in the default state of <b>disabled</b> to mitigate Rowhammer-style attacks.</p>
<b>LLC Dead Line</b> scope token-feature "LLC Dead Line" scope token-param LLCAlloc	In CPU non-inclusive cache scheme, Mid-Level Cache (MLC) evictions are filled into the Last-Level Cache (LLC). When lines are evicted from the MLC, the core can flag them as dead (not likely to be read again). The LLC has the option to drop dead lines and not fill them in the LLC. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Allows the LLC to fill dead lines into the LLC if there is free space available. This is the default option.</li> <li>• <b>disabled</b>—The dead lines are always dropped and are never filled into the LLC.</li> <li>• <b>auto</b>—The CPU determines the LLC dead line allocation</li> </ul>
<b>XPT Remote Prefetch</b> scope token-feature "XPT Remote Prefetch" scope token-param XPTRemotePrefetch	This feature allows an LLC request to be duplicated and sent to an appropriate memory controller in a remote machine based on the recent LLC history to reduce latency. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b></li> <li>• <b>auto</b>—The CPU determines the functionality. This is the default option.</li> </ul>

Name	Description
<b>Virtual NUMA</b> scope token-feature "Virtual Numa" scope token-param VirtualNuma	The Virtual NUMA (virtual non-uniform memory access) is a memory-access optimization method for VMware virtual machines (VMs), which helps prevent memory-bandwidth bottlenecks. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—The functionality is enabled.</li> <li>• <b>disabled</b>—The functionality is disabled. This is the default option.</li> </ul>
<b>Above 4G Decoding</b> scope token-feature "Above 4G Decoding" scope token-param Above 4G Decoding	Enables or disables MMIO above 4GB or not. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—The server maps I/O of 64-bit PCI devices to 4GB or greater address space. This is the default option.</li> <li>• <b>disabled</b>—The server does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> </ul>
<b>NUMA Nodes per Socket</b> scope token-feature "nodes-per-socket" scope token-param nodes-per-socket	Allows you to configure the memory NUMA domains per socket. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>auto</b>—Number of channels is set to auto. This is the default option.</li> <li>• <b>nps0</b>—Zero NUMA node per socket.</li> <li>• <b>nps1</b>—One NUMA node per socket.</li> <li>• <b>nps2</b>—Two NUMA nodes per socket, one per Left/Right Half of the SoC.</li> <li>• <b>nps4</b>—Four NUMA nodes per socket, one per Quadrant.</li> </ul>
<b>Select PPR Type</b> scope token-feature "select ppr type"	Supports <b>Hard-PPR</b> , which permanently remaps accesses from a designated faulty row to a designated spare row. <ul style="list-style-type: none"> <li>• <b>hard ppr</b>—Support is enabled. This is the default option.</li> </ul> <p><b>Note</b> Hard PPR can be used only when <b>Memory RAS Configuration</b> is set to <b>ADDDC Sparing</b>. For other RAS selections, this setting should be set to <b>Disabled</b>.</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Support is disabled.</li> </ul>

Name	Description
<b>Select Memory RAS Configuration</b> scope token-feature "select memory ras configuration"	Determines how the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>Mirror Mode 1LM</b>—System reliability is optimized by using half the system memory as backup.</li> <li>• <b>ADDDC sparing</b>—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. This is the default option.</li> <li>• <b>Partial Mirror Mode 1LM</b>—Partial DIMM Mirroring creates a mirrored copy of a specific region of memory cells, rather than keeping the complete mirror copy. Partial Mirroring creates a mirrored region in memory map with the attributes of a partial mirror copy. Up to 50% of the total memory capacity can be mirrored, using up to 4 partial mirrors.</li> <li>• <b>maximum performance</b>—System performance is optimized.</li> </ul>
<b>NUMA</b> scope token-feature "numa"	Whether the BIOS supports Non-Uniform Memory Access (NUMA). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Support is enabled.</li> <li>• <b>disabled</b>—Support is disabled.</li> </ul>
<b>Operation Mode</b> scope token-feature "operation mode"	Allows you to set the Operation Mode. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>test only</b>—Support is enabled.</li> <li>• <b>test and repair</b>—Support is disabled.</li> </ul>

## Intel® Optane™ DC Persistent Memory (DCPMM) BIOS Tokens

The following table lists the Intel® Optane™ DC Persistent Memory (DCPMM) BIOS settings that you can configure through a BIOS policy or the default BIOS settings:



Name	Description
<b>NVM Performance Setting</b> <b>set NvmdimmPerformConfig</b>	<p><b>NVM Performance Setting</b> enables efficient major mode arbitration between DDR and DDRT transactions on the DDR channel to optimize channel BW and DRAM latency.</p> <p>Applies to all M5 and M6 servers.</p> <p>The values can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>BW Optimized</b>—Optimized for DDR and DDRT BW. This is the default option.</li> <li>• <b>Latency Optimized</b>—Better DDR latency in the presence of DDRT BW.</li> <li>• <b>Balanced Profile</b>—Optimized for Memory mode.</li> </ul>
<b>CR QoS</b> <b>set crqos</b>	<p>Prevents DRAM and overall system BW drop in the presence of concurrent DCPMM BW saturating threads, with minimal impact to homogenous DDRT-only usages, Good for multi-tenant use cases, VMs, etc. Targeted for App Direct, but also improves memory mode. Targets the “worst-case” degradations.</p> <p>Applies to all M5 and M6 servers.</p> <p>The values can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Feature disabled. This is the default option.</li> <li>• <b>recipe 1</b>—6 modules, 4 modules per socket optimized</li> <li>• <b>recipe 2</b>—2 modules per socket optimized</li> <li>• <b>recipe 3</b>—1 module per socket optimized</li> <li>• <b>mode 0 - disable the pmem qos feature</b></li> <li>• <b>mode 1 - m2m qos enable;cha qos disable</b></li> <li>• <b>mode 2 - m2m qos enable;cha qos enable</b></li> </ul> <p><b>Note</b> The values <b>disabled</b>, <b>recipe 1</b>, <b>recipe 2</b>, and <b>recipe 3</b> <b>recipe 4</b> are not supported on Cisco UCS M6 servers</p>

Name	Description
<p><b>CR FastGo Config</b> <b>set CrfastgoConfig</b></p>	<p><b>CR FastGo Config</b> improves DDRT non-temporal write bandwidth when FastGO is disabled. When FastGO is enabled, it gives faster flow of NT writes into the uncore, When FastGO is disabled, it lessens NT writes queueing up in the CPU uncore, thereby improving sequentially at DCPMM, resulting in improved bandwidth.</p> <p>Applies to all Cisco UCS M5 and Cisco UCS M6 servers.</p> <p>The values can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>auto</b>—Same as Option 1. Disables FastGO. Recommended for DDRT. This is the default option (not Default).</li> <li>• <b>default</b>—Enables FastGO.</li> <li>• <b>option 1</b>—Disables FastGO.</li> <li>• <b>option 2, option 3, option 4, option 5</b>—Not applicable.</li> <li>• <b>enable optimization</b></li> <li>• <b>disable optimization</b></li> </ul> <p><b>Note</b> The values <b>enable optimization, disable optimization, and auto</b> are supported on Cisco UCS M6 servers</p>
<p><b>Snoopy mode for AD</b> <b>set SnoopyModeForAD</b></p>	<p>Enables snoop-mode for DCPMM accesses while maintaining directory on all DRAM accesses. Snoops maintain cache coherence between sockets. Directory reduces snoops by keeping the remote node information locally (in memory). Directory lookups and updates add memory traffic.</p> <p>Directory is a good tradeoff for DRAM, but not necessarily for DCPMM. For non-NUMA workload, when the feature is enabled, directory updates to DCPMM are eliminated, thereby helping DDRT bandwidth bound workloads. Directory is disabled for accesses to AD and instead snoops remote sockets to check for ownership. Directory is used only for DRAM accesses.</p> <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b> This is the default option.</li> </ul>

Name	Description
<b>Snoopy mode for 2LM</b> <b>set SnoopyModeFor2LM</b>	<p>Enables snoop-mode for DCPMM accesses while maintaining directory on all DRAM accesses. Snoops maintain cache coherence between sockets. Directory reduces snoops by keeping the remote node information locally (in memory). Directory lookups and updates add memory traffic.</p> <p>Directory is a good tradeoff for DRAM, but not necessarily for DCPMM. For non-NUMA workload, when the feature is enabled, directory updates to DCPMM are eliminated, thereby helping DDRT bandwidth bound workloads. Directory is disabled for far memory accesses and instead snoops remote sockets to check for ownership. Directory is used only for DRAM (near memory).</p> <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b> This is the default option.</li> </ul>
<b>eADR Support</b> <b>scope token-feature "EadrSupport"</b> <b>scope token-param EadrSupport</b>	<p>Extended asynchronous DRAM refresh (eADR) ensures that CPU caches lines with data are flushed at the right time and in the desired order and are also included in the <b>power fail protected domain</b>. This can be any of the following:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b></li> <li>• <b>disabled</b></li> <li>• <b>auto</b>—This is the default option.</li> </ul>

## Serial Port BIOS Settings

The following table lists the serial port BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Serial port A enable</b> <b>set serial-port-a-config serial-port-a</b>	<p>Whether serial port A is enabled or disabled. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The serial port is disabled.</li> <li>• <b>enabled</b>—The serial port is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## USB BIOS Settings

The following table lists the USB BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Make Device Non Bootable</b> set usb-boot-config make-device-non-bootable	Whether the server can boot from a USB device. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The server can boot from a USB device.</li> <li>• <b>enabled</b>—The server cannot boot from a USB device.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Legacy USB Support</b> set usb-boot-config legacy-support	Whether the system supports legacy USB devices. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—USB devices are only available to EFI applications.</li> <li>• <b>enabled</b>—Legacy USB support is always available.</li> <li>• <b>auto</b>—Disables legacy USB support if no USB devices are connected.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>USB Idle Power Optimizing Setting</b> set usb-system-idle-power-optimizing-setting-config usb-idle-power-optimizing	Whether the USB Idle Power Optimizing setting is used to reduce USB EHCI idle power consumption. Depending upon the value you choose, this setting can have an impact on performance. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>high-performance</b>—The USB System Idle Power Optimizing setting is disabled, because optimal performance is preferred over power savings.  Selecting this option can significantly improve performance. We recommend you select this option unless your site has server power restrictions.</li> <li>• <b>lower-idle-power</b>—The USB System Idle Power Optimizing setting is enabled, because power savings are preferred over optimal performance.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>USB Front Panel Access Lock</b> <b>set usb-front-panel-access-lock-config</b> <b>usb-front-panel-lock</b>	USB front panel access lock is configured to enable or disable the front panel access to USB ports. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b></li> <li>• <b>enabled</b></li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Port 60/64 Emulation</b> <b>set usb-port-config usb-emulation</b>	Whether the system supports 60h/64h emulation for complete USB keyboard legacy support. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—60h/64 emulation is not supported.</li> <li>• <b>enabled</b>—60h/64 emulation is supported.</li> </ul> You should select this option if you are using a non-USB aware operating system on the server. <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>USB Port Front</b> <b>set usb-port-config usb-front</b>	Whether the front panel USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables the front panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>enabled</b>—Enables the front panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>USB Port Internal</b> set usb-port-config usb-internal	Whether the internal USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables the internal USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>enabled</b>—Enables the internal USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>USB Port KVM</b> set usb-port-config usb-kvm	Whether the vKVM ports are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables the KVM keyboard and/or mouse devices. Keyboard and/or mouse will not work in the KVM window.</li> <li>• <b>enabled</b>—Enables the KVM keyboard and/or mouse devices.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>USB Port Rear</b> set usb-port-config usb-rear	Whether the rear panel USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables the rear panel USB ports. Devices connected to these ports are not detected by the BIOS and operating system.</li> <li>• <b>enabled</b>—Enables the rear panel USB ports. Devices connected to these ports are detected by the BIOS and operating system.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>USB Port SD Card</b> <b>set usb-port-config usb-sdcard</b>	Whether the SD card drives are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables the SD card drives. The SD card drives are not detected by the BIOS and operating system.</li> <li>• <b>enabled</b>—Enables the SD card drives.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>USB Port VMedia</b> <b>set usb-port-config usb-vmedia</b>	Whether the virtual media devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables the vMedia devices.</li> <li>• <b>enabled</b>—Enables the vMedia devices.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>All USB Devices</b> <b>set all-usb-devices-config all-usb</b>	Whether all physical and virtual USB devices are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—All USB devices are disabled.</li> <li>• <b>enabled</b>—All USB devices are enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>xHCI Mode</b> <b>set usb-configuration-select-config xhci-enable-disable</b>	Whether xHCI mode is enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—xHCI mode is disabled.</li> <li>• <b>enabled</b>—xHCI mode is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>USB Port:M.2 Storage</b> <b>set usb port:m.2</b>	Whether the USB Port:M.2 Storage are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables USB Port:M.2 Storage.</li> <li>• <b>enabled</b>—Enables USB Port:M.2 Storage. This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## PCI Configuration BIOS Settings

The following table lists the PCI configuration BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Maximum memory below 4GB</b> <b>set max-memory-below-4gb-config</b> <b>max-memory</b>	Whether the BIOS maximizes memory usage below 4GB for an operating system without PAE support, depending on the system configuration. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Does not maximize memory usage. Choose this option for all operating systems with PAE support.</li> <li>• <b>enabled</b>—Maximizes memory usage below 4GB for an operating system without PAE support.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Memory mapped IO above 4GB</b> <b>set memory-mapped-io-above-4gb-config</b> <b>memory-mapped-io</b>	Whether to enable or disable memory mapped I/O of 64-bit PCI devices to 4GB or greater address space. Legacy option ROMs are not able to access addresses above 4GB. PCI devices that are 64-bit compliant but use a legacy option ROM may not function correctly with this setting enabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Does not map I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>enabled</b>—Maps I/O of 64-bit PCI devices to 4GB or greater address space.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<p><b>VGA Priority</b> set vga-priority-config vga-priority</p>	<p>Allows you to set the priority for VGA graphics devices if multiple VGA devices are found in the system. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>onboard</b>—Priority is given to the onboard VGA device. BIOS post screen and OS boot are driven through the onboard VGA port.</li> <li>• <b>offboard</b>—Priority is given to the PCIE Graphics adapter. BIOS post screen and OS boot are driven through the external graphics adapter port.</li> <li>• <b>onboard-vga-disabled</b>—Priority is given to the PCIE Graphics adapter, and the onboard VGA device is disabled.</li> </ul> <p><b>Note</b> The vKVM does not function when the onboard VGA is disabled.</p> <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> Only onboard VGA devices are supported with Cisco UCS B-Series servers.</p>
<p><b>ASPM Support</b> set aspm-support-config aspm-support</p>	<p>Allows you to set the level of ASPM (Active Power State Management) support in the BIOS. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—ASPM support is disabled in the BIOS.</li> <li>• <b>auto</b>—The CPU determines the power state.</li> <li>• <b>forceL0</b>—Force all links to L0 standby (L0s) state.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>BME DMA Mitigation Support</b> set bme-dma-config</p>	<p>Allows you to disable the PCI BME bit to mitigate the threat from an unauthorized external DMA. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—PCI BME bit is disabled in the BIOS.</li> <li>• <b>enabled</b>—PCI BME bit is enabled in the BIOS.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## QPI BIOS Settings

The following table lists the QPI BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>QPI Link Frequency Select</b> set <b>qpi-link-frequency-select-config</b> <b>qpi-link-frequency-mt-per-sec</b>	The Intel QuickPath Interconnect (QPI) link frequency, in megatransfers per second (MT/s). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>6400</b></li> <li>• <b>7200</b></li> <li>• <b>8000</b></li> <li>• <b>9600</b></li> <li>• <b>auto</b>—The CPU determines the QPI link frequency.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>QPI Snoop Mode</b> set <b>qpi-snoop-mode</b> <b>vpqpisnoopmode</b>	This can be one of the following: <ul style="list-style-type: none"> <li>• <b>home-snoop</b>—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.</li> <li>• <b>cluster-on-die</b>—This mode is available only for processors that have 10 or more cores. It is the best mode for highly NUMA optimized workloads.</li> <li>• <b>home-directory-snoop-with-osb</b></li> <li>• <b>early-snoop</b>—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.</li> <li>• <b>auto</b> —The CPU determines the QPI Snoop mode.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## Trusted Platform BIOS Settings

The following table lists the trusted platform BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Trusted Platform Module (TPM) Support</b> set <b>trusted-platform-module-config</b> <b>tpm-support</b>	Whether to enable or disable the Trusted Platform Module (TPM), which is a component that securely stores artifacts that are used to authenticate the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables TPM.</li> <li>• <b>enabled</b>—Enables TPM.</li> <li>• <b>platform-default</b>—Enables TPM.</li> </ul>
<b>Intel Trusted Execution Technology (TXT) Support</b> set <b>intel-trusted-execution-technology-config</b> <b>txt-support</b>	Whether to enable or disable Intel Trusted Execution Technology (TXT), which provides greater protection for information that is used and stored on the business server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables TXT. This is default option.</li> <li>• <b>enabled</b>—Enables TXT.</li> <li>• <b>platform-default</b>—Disables TXT.</li> </ul> <p>When you only enable TXT, it implicitly enables TPM, VT, and VTdIo.</p>
<b>SHA-1 PCR Bank</b> scope token-feature "Trusted Platform Module" scope token-param <b>SHA1PCRBank</b>	The Platform Configuration Register (PCR) is a memory location in the TPM. Multiple PCRs are collectively referred to as a PCR bank. A Secure Hash Algorithm 1 or SHA-1 PCR Bank allows to enable or disable TPM security. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables SHA-1 PCR Bank.</li> <li>• <b>enabled</b>—Enables SHA-1 PCR Bank. This is the default option.</li> </ul>
<b>SHA-256 PCR Bank</b> scope token-feature "Trusted Platform Module" scope token-param <b>SHA256PCRBank</b>	The Platform Configuration Register (PCR) is a memory location in the TPM. Multiple PCRs are collectively referred to as a PCR bank. A Secure Hash Algorithm 256-bit or SHA-256 PCR Bank allows to enable or disable TPM security. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables SHA-256 PCR Bank.</li> <li>• <b>enabled</b>—Enables SHA-256 PCR Bank. This is the default option.</li> </ul>
<b>Trusted Platform Module State</b> scope token-feature "Trusted Platform Module" scope token-param "Trusted Platform Module state"	Trusted Platform Module (TPM ) is a microchip designed to provide basic security-related functions primarily involving encryption keys. This option allows you to control the TPM Security Device support for the system. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The server does not use the TPM.</li> <li>• <b>enabled</b>—The server uses the TPM. This is the default option.</li> </ul>

Name	Description
<b>TPM Pending Operation</b> scope token-feature "TPM Pending Operation" scope token-param "TPM Pending Operation"	Trusted Platform Module (TPM) Pending Operation option allows you to control the status of the pending operation. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>none</b>—No action. This is the default option.</li> <li>• <b>tpmclear</b>—Clear the pending operations.</li> </ul>
<b>TPM Minimal Physical Presence</b> scope token-feature "Trusted Platform Module" # scope token-param TpmPpiRequired # show token-settings expand	Whether to enable or disable TPM Minimal Physical Presence, which enables or disables the communication between the OS and BIOS for administering the TPM without compromising the security. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables TPM Minimal Physical Presence. This is default option.</li> <li>• <b>enabled</b>—Enables TPM Minimal Physical Presence.</li> <li>• <b>platform-default</b>—Disables TPM Minimal Physical Presence.</li> </ul>
<b>DMA Control Opt-In Flag</b> scope token-feature "Trusted Platform Module" # scope token-param "DmaCtrlOptIn" token-param # show token-settings	Enabling this token enables Windows 2022 Kernel DMA Protection feature. The OS treats this as a hint that the IOMMU should be enabled to prevent DMA attacks from possible malicious devices. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Disables DMA Control Opt-In Flag. This is default option.</li> <li>• <b>enabled</b>—Enables DMA Control Opt-In Flag.</li> <li>• <b>platform-default</b>—Disables DMA Control Opt-In Flag.</li> </ul>
<b>Security Dev. Support</b> set TpmSupport	Enables or disables BIOS support for the security device. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—OS will not show the security device.</li> <li>• <b>enabled</b>—OS will show the security device. This is default option.</li> </ul>

## LOM and PCIe Slots BIOS Settings

The following table lists the USB BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>PCIe Slot SAS OptionROM</b>  set slot-option-rom-enable-config pcie-sas	Whether Option ROM is available on the SAS port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot <i>n</i> Link Speed</b>  set slot-link-speed-config pcie-slot <i>n</i> -link-speed	This option allows you to restrict the maximum speed of an adapter card installed in PCIe slot <i>n</i> . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot <i>n</i> OptionROM</b>  set slot-option-rom-enable-config slot <i>n</i> -option-rom-enable	Whether Option ROM is available on the port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot HBA OptionROM</b>  set slot-option-rom-enable-config pcie-hba	Whether Option ROM is available on the HBA port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>PCIe Slot MLOM OptionROM</b>  set <b>slot-option-rom-enable-config</b> <b>pcie-mlom</b>	Whether Option ROM is available on the MLOM port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot Nx OptionROM</b>  set <b>slot-option-rom-enable-config</b> <b>pcie-nx</b>	Whether Option ROM is available on the port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe 10G LOM 2 Link</b>  set <b>lom-ports-config</b> <b>pcie-lom2-link</b>	Whether Option ROM is available on the 10G LOM port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCI ROM CLP</b>  set <b>pci-rom-clp-support</b> <b>pci-rom-clp-config</b>	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. <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>SIOC1 Option ROM</b> set <b>sioc1-optionrom-config</b> <b>sioc1-optionrom</b>	Whether the server can use Option ROM present in System IO Controller 1 (SIOC1). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SIOC2 Option ROM</b> set <b>sioc2-optionrom-config</b> <b>sioc2-optionrom</b>	Whether the server can use Option ROM present in System IO Controller 2 (SIOC2). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBMEZZ1 Option ROM</b> set <b>sbmezz1-optionrom-config</b> <b>sbmezz1-optionrom</b>	Whether the server can use Option ROM present in SBMezz1 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBMEZZ2 Option ROM</b> set <b>sbmezz2-optionrom-config</b> <b>sbmezz2-optionrom</b>	Whether the server can use Option ROM present in SBMezz2 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>IOESlot1 OptionROM</b> set <b>ioeslot1-optionrom-config</b> <b>ioeslot1-optionrom</b>	Whether option ROM is enabled on the IOE slot 1. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>IOEMEZ1 OptionROM</b> set <b>ioemezz1-optionrom-config</b> <b>ioemezz1-optionrom</b>	Whether option ROM is enabled on the IOE Mezz1. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>IOE Slot2 Option ROM</b> set <b>ioeslot2-optionrom-config</b> <b>ioeslot2-optionrom</b>	Whether option ROM is enabled on the IOE slot 2. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>IO ENVME1 Option ROM</b> set <b>ioenvme1-optionrom-config</b> <b>ioenvme1-optionrom</b>	Whether option ROM is enabled on the IOE NVMe1. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<b>IO ENVME2 Option ROM</b>  set <b>ioenvme2-optionrom-config</b> <b>ioenvme2-optionrom</b>	Whether option ROM is enabled on the IOE NVMe2. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBNVME1 Option ROM</b>  set <b>sbnvme1-optionrom-config</b> <b>sbnvme1-optionrom</b>	Whether the server can use Option ROM present in SBNVMe1 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot MRAID-<i>n</i> OptionROM</b>  set <b>Pcie</b> <b>SlotMRAID<i>n</i>OptionROM</b>	Whether Option ROM is available on the MRAID port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot RAID OptionROM</b>  set <b>Pcie</b> <b>SlotRAIDOptionROM</b>	Whether Option ROM is available on the RAID port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Rear NVME <i>n</i> Link Speed</b> set Pcie SlotRearNvme1LinkSpeed	<p>This option allows you to restrict the maximum speed of an NVME card installed in the rear PCIe slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> </ul> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• For <i>Rear NVME 1 Link Speed</i> and <i>Rear NVME 2Link Speed</i>, the value <b>enabled</b> is not supported on Cisco UCS M6 servers.</li> <li>• For <i>Rear NVME 3 Link Speed</i> and <i>Rear NVME 4Link Speed</i>, the value <b>enabled</b> is available but has no effect at the BIOS level if selected.</li> </ul> <ul style="list-style-type: none"> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Front NVME <i>n</i> Link Speed</b> set Pcie SlotFrontNvmenLinkSpeed	<p>This option allows you to restrict the maximum speed of an NVME card installed in the front PCIe slot. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically. This is the default option.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> </ul> <p><b>Note</b></p> <p>For <i>Front NVME 1 Link Speed</i> and <i>Front NVME 2 Link Speed</i>, the value <b>enabled</b> is available but not supported on Cisco UCS M6 servers.</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b></p> <p>For <i>Front Nvme 13 Link Speed</i> to <i>Front Nvme 24 Link Speed</i>, the BIOS tokens and values are available but have no effect at the BIOS level if selected.</p>

Name	Description
<b>HBA Link Speed</b> <b>set HBALinkSpeed</b>	<p>This option allows you to restrict the maximum speed of an HBA card. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>MLOM Link Speed</b> <b>set Pcie</b> <b>SlotMLOMLinkSpeed</b>	<p>This option allows you to restrict the maximum speed of an MLOM adapter. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> </ul> <p><b>Note</b>      The value <b>enabled</b> is not supported on Cisco UCS M6 servers.</p> <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>MRAID Link Speed</b> scope token-feature "Pcie Slot Link Speed" scope token-param PcieSlotMRAIDLinkSpeed	This option allows you to restrict the maximum speed of MRAID. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>enabled</b>—The maximum speed is not restricted.</li> </ul> <p><b>Note</b>        The value <b>enabled</b> is not supported on Cisco UCS M6 servers.</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>RAID-<i>n</i> Link Speed</b> set Pcie SlotRAIDLinkSpeed	This option allows you to restrict the maximum speed of RAID. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> </ul> <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>All Onboard LOM</b> set AllLomPortControl	Whether all onboard LOM ports are enabled or disabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—All onboard LOM are enabled.</li> <li>• <b>disabled</b>—All onboard LOM are disabled.</li> </ul> <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>LOM Port 1 OptionRom set</b> <b>LomOpromControlPort0</b>	Whether Option ROM is available on the LOM port 1. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>LOM Port 2 OptionRom set</b> <b>LomOpromControlPort1</b>	Whether Option ROM is available on the LOM port 2. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Slot <i>n</i> State set</b> <b>SlotnState</b>	The state of the adapter card installed in PCIe slot <i>n</i> . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>uefi-only</b>—The expansion slot is available for UEFI only.</li> <li>• <b>legacy-only</b>—The expansion slot is available for legacy only.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBNVMe1 OptionROM set</b> <b>SBNVMe1OptionROM</b>	Whether the server can use Option ROM present in SBNVMe1 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>SBNVMe2 OptionROM</b> set <b>SBNVMe2OptionROM</b>	Whether the server can use Option ROM present in SBNVMe2 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SIOCNVMe1 OptionROM</b> set <b>SIOCNVMe1OptionROM</b>	Whether the server can use Option ROM present in SIOCNVMe1 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SIOCNVMe2 OptionROM</b> set <b>SIOCNVMe2OptionROM</b>	Whether the server can use Option ROM present in SIOCNVMe2 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBLom1 OptionROM</b> set <b>SBLom1OptionROM</b>	Whether the server can use Option ROM present in the SBLom1 controller. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBNVMe<math>n</math> Link Speed</b> set <b>SBNVMe<math>n</math>LinkSpeed</b>	Link speed for SBNVMe slot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>SIOCNVMe<math>n</math> Link Speed</b> set <b>SIOCNVMe<math>n</math>LinkSpeed</b>	Link speed for SIOCNVMe slot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SIOC<math>n</math> Link Speed</b> set <b>SIOC<math>n</math>LinkSpeed</b>	Link speed for SIOC slot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SBMezz<math>n</math> Link Speed</b> set <b>SBMezz<math>n</math>LinkSpeed</b>	Link speed for SBMezz slot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>IOESlot<math>n</math> Link Speed</b> <b>set IOESlot<math>n</math>LinkSpeed</b>	Link speed for IOESlot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>IOEMezz<math>n</math> Link Speed</b> <b>set IOEMezz<math>n</math>LinkSpeed</b>	Link speed for IOEMezz slot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>IOENVMe<math>n</math> Link Speed</b> <b>set IOENVMe<math>n</math>LinkSpeed</b>	Link speed for IOENVMe slot $n$ . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>enabled</b>—The maximum speed is restricted.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<b>CDN Support for LOMs</b> <b>set CdnSupport</b>	Whether the Ethernet Networking Identifier naming convention is according to Consistent Device Naming (CDN) or the traditional way of naming conventions. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—OS Ethernet Network Identifier is named in a consistent device naming (CDN) convention according to the physical LAN on Motherboard (LOM) port numbering; LOM Port 0, LOM Port 1 and so on.</li> <li>• <b>disabled</b>—OS Ethernet Networking Identifier is named in a default convention as ETH0, ETH1 and so on. By default, CDN option is disabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>VMD Enable</b> <b>set VMDEnable</b>	Whether NVMe SSDs that are connected to the PCIe bus can be hot swapped. It also standardizes the LED status light on these drives. LED status lights can be optionally programmed to display specific Failure indicator patterns. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>—Hot swap of NVMe SSDs that are connected to the PCIe bus is allowed.</li> <li>• <b>disabled</b>—Hot swap of NVMe SSDs that are connected to the PCIe bus is not allowed.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>ACS Control SLOT-<i>n</i></b> <b>set ACSctlSlot<i>n</i></b> <i>n</i> = 11 to 14	Access Control Services (ACS) allow the processor to enable or disable peer-to-peer communication between multiple devices for Control Slot <i>n</i> . This can be one of the following: <ul style="list-style-type: none"> <li>• <b>enabled</b>— Enables peer-to-peer communication between multiple devices for Control Slot <i>n</i>.</li> <li>• <b>disabled</b>— Disables peer-to-peer communication between multiple devices for Control Slot <i>n</i>.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe Slot GPU<i>n</i> OptionROM</b> Only for Cisco UCS C480 M5 ML Server	Whether the Option ROM is enabled on GPU slot <i>n</i> . <i>n</i> is the slot number, which can be numbered 1 through 8. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>ACS Control GPU-<i>n</i></b> <b>set ACSCtlGpun</b> <i>n</i> = 1 to 8	<p>Access Control Services (ACS) allow the processor to enable or disable peer-to-peer communication between multiple devices for GPUs. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>— Enables peer-to-peer communication between multiple devices for GPUs.</li> <li>• <b>enabled</b>— Disables peer-to-peer communication between multiple devices for GPUs.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>PCIe PLL SSC</b>	<p>Reduces EMI interference by down-spreading the clock by 0.5%.            Disable this feature to centralize the clock without spreading.            For all Cisco UCS M5 and M6 servers, this option is Disabled by default.</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>— Clock is centralized without spreading.</li> <li>• <b>auto</b>— EMI interference is auto adjusted.</li> <li>• <b>zeropointfive</b>— EMI interference us reduced by down-spreading the clock by 0.5%.</li> <li>• <b>platform-default</b>— The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Front Nvme <i>n</i></b> <b>OptionROM</b> <b>scope token-feature</b> <b>"PCI Slot OptionROM</b> <b>Enable"</b> <b>scope token-param</b> <b>PcieSlotFrontNvmeOptionROM</b>	<p>This options allows you to control the Option ROM execution of the PCIe adapter connected to the SSD:NVMe slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b>—This is the default option.</li> <li>• <b>disabled</b></li> </ul>
<b>PCIe Slot <i>n</i> Link Speed</b> <b>scope token-feature</b> <b>"PCI Slot LINK Speed"</b> <b>scope token-param</b> <b>PcieSlotLinkSpeed</b>	<p>Link speed for PCIe Slot designated by slot <i>n</i>. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> </ul>

Name	Description
<b>MSTOR-RAID Link Speed</b> <b>sc token-feature "PCI Slot LINK Speed"</b> <b>sc token-param PciSlotMSTORRAIDLInkSpeed</b>	<p>This option allows you to restrict the maximum speed of an MSTOR adapter. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> </ul> <p><b>Note</b> In this BIOS setting <i>MSTOR-RAID Link Speed</i>, the token and values are available but have no effect at the BIOS level if selected.</p>
<b>MSTOR-RAID OptionROM</b> <b>sc token-feature "MSTOR-RAID OptionROM"</b> <b>sc token-param PciSlotMSTORRAIDOptinROM</b>	<p>Whether the server can use the Option ROMs present in the PCIe MSTOR RAID. This can be any of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Option ROM is available.</li> <li>• <b>enabled</b>—Option ROM is not available. This is the default option.</li> </ul>
<b>MLOM OptionROM set</b> <b>slot-option-rom-enable-config pcie-mlom</b>	<p>Whether Option ROM is available on the MLOM port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>
<b>MRAID OptionROM set</b> <b>Pcie SlotMRAID OptionROM</b>	<p>Whether Option ROM is available on the MRAID port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>
<b>Rear Nvme n OptionRom set</b> <b>RearNvmenOptionROM</b>	<p>Whether Option ROM is available on the Rear NVME<math>n</math> port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<p><b>PCIe slot MSTOR Link Speed</b></p> <p>sc token-feature "PCI Slot LINK Speed"</p> <p>sc token-param PcieSlotMSTORRAIDLinkSpeed</p>	<p>This option allows you to restrict the maximum speed of an MSTOR adapter. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically. This is the default option.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> </ul>
<p><b>PCIe Slot MSTOR RAID OptionROM</b></p> <p>scope token-feature "pcie MSTOR-RAID OptionROM"</p> <p>sc token-param PcieSlotMSTORRAIDOptionROM</p>	<p>Whether the server can use the Option ROMs present in the PCIe MSTOR RAID. This can be any of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—Option ROM is available.</li> <li>• <b>enabled</b>—Option ROM is not available. This is the default option.</li> </ul>
<p><b>PCIe RAS Support</b></p> <p>sc token-feature "pcie ras-support"</p>	<p>Whether PCIe RAS Support is available on the PCIe slot. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—PCIe RAS is available on the slot.</li> <li>• <b>enabled</b>—PCIe RAS is not available on the slot. This is the default option.</li> </ul>
<p><b>MRAID<sub>n</sub> Link Speed</b></p> <p>scope token-feature "Pcie Slot Link Speed"</p> <p>scope token-param PcieSlotMRAIDLinkSpeed</p>	<p>This option allows you to restrict the maximum speed of MRAID. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>gen4</b>—16GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>MRAID<sub>n</sub> OptionROM</b></p> <p>scope token-feature "Pcie Slot OptionROM"</p> <p>scope token-param PcieSlotOptionROM</p>	<p>Whether Option ROM is available on the MRAID port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>

Name	Description
<b>NVME-<i>n</i> OptionROM</b> scope token-feature "Pcie Slot OptionROM" scope token-param PcieSlotOptionROM	Whether Option ROM is available on the NVME port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>
<b>PCIe Slot OCP Link Speed</b> scope token-feature "Pcie Slot ocp Link Speed" scope token-param PcieSlotocpLinkSpeed	This option allows you to restrict the maximum speed of OCP. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically. This is the default option.</li> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>RAID<i>n</i> OptionROM</b> scope token-feature "raid optionrom" scope token-param raidoptionrom	Whether Option ROM is available on the RAID port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>
<b>IOENVMe<i>n</i> OptionROM</b> scope token-feature "ioenvme optionrom" scope token-param ioenvmeoptionrom	Whether Option ROM is available on the IOENVMe port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>
<b>GPU<i>n</i> OptionRom</b> scope token-feature "ioemzz1 optionrom" scope token-param ioemzz1optionrom	Whether Option ROM is available on the GPU port. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The expansion slot is not available.</li> <li>• <b>enabled</b>—The expansion slot is available. This is the default option.</li> </ul>

Name	Description
<b>RAID Link Speed</b> scope token-feature "raid link speed" scope token-param RAIDLinkSpeed	<p>This option allows you to restrict the maximum speed of RAID. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>gen1</b>—2.5GT/s (gigatransfers per second) is the maximum speed allowed.</li> <li>• <b>gen2</b>—5GT/s is the maximum speed allowed.</li> <li>• <b>gen3</b>—8GT/s is the maximum speed allowed.</li> <li>• <b>auto</b>—The maximum speed is set automatically. This is the default option.</li> <li>• <b>enabled</b>—The maximum speed is not restricted.</li> </ul> <p><b>Note</b> The value <b>enabled</b> is not supported on Cisco UCS M6 servers.</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The maximum speed is not restricted.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## Graphics Configuration BIOS Settings

The following tables list the graphics configuration BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Integrated Graphics</b> set integrated-graphics-config integrated-graphics	<p>Enables integrated graphics. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> <li>• <b>enabled</b>—Integrated graphic is enabled.</li> <li>• <b>disabled</b>—Integrated graphics is disabled.</li> </ul>
<b>Integrated Graphics Aperture Size</b> set integrated-graphics-aperture-config integrated-graphics-aperture	<p>Allows you to set the size of mapped memory for the integrated graphics controller. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> <li>• <b>128mb</b></li> <li>• <b>256mb</b></li> <li>• <b>512mb</b></li> <li>• <b>1024mb</b></li> <li>• <b>2048mb</b></li> <li>• <b>4096mb</b></li> </ul>

Name	Description
<b>Onboard Graphics</b> <b>set onboard-graphics-config</b> <b>onboard-graphics</b>	Enables onboard graphics (KVM). This can be one of the following: <ul style="list-style-type: none"> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> <li>• <b>enabled</b>—Onboard graphics is enabled.</li> <li>• <b>disabled</b>—Onboard graphics is disabled.</li> </ul>

## Boot Options BIOS Settings

The following table lists the boot options BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

Name	Description
<b>Boot option retry</b> <b>set boot-option-retry-config</b> <b>retry</b>	Whether the BIOS retries NON-EFI based boot options without waiting for user input. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—Waits for user input before retrying NON-EFI based boot options. This is the default option.</li> <li>• <b>enabled</b>—Continually retries NON-EFI based boot options without waiting for user input.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SAS RAID</b> <b>set intel-entry-sas-raid-config</b> <b>sas-raid</b>	Whether the Intel SAS Entry RAID Module is enabled. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The Intel SAS Entry RAID Module is disabled.</li> <li>• <b>enabled</b>—The Intel SAS Entry RAID Module is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>SAS RAID module</b> <b>set intel-entry-sas-raid-config</b> <b>sas-raid-module</b>	How the Intel SAS Entry RAID Module is configured. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>it-ir-raid</b>—Configures the RAID module to use Intel IT/IR RAID.</li> <li>• <b>intel-esrtii</b>—Configures the RAID module to use Intel Embedded Server RAID Technology II.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>Onboard SCU Storage Support</b> <b>set onboard-sas-storage-config</b> <b>onboard-sas-ctrl</b>	Whether the onboard software RAID controller is available to the server. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The software RAID controller is not available.</li> <li>• <b>enabled</b>—The software RAID controller is available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Cool Down Time (sec)</b>	The time to wait (in seconds) before the next boot attempt. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>15</b>—System waits for 15 seconds before the next boot attempt.</li> <li>• <b>45</b>—System waits for 45 seconds before the next boot attempt.</li> <li>• <b>90</b>—System waits for 90 seconds before the next boot attempt. This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>This token is valid only when the Boot Option Retry token has been enabled.</p>
<b>Number of Retries</b>	Number of attempts to boot. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>infinite</b>—System tries all options to boot up.</li> <li>• <b>13</b>—System tries 13 times to boot up. This is the default option.</li> <li>• <b>5</b>—System tries 5 times to boot up</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>P-SATA mode</b>	This options allows you to select the P-SATA mode. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—P-SATA mode is disabled.</li> <li>• <b>lsi-sw-raid</b>—Sets both SATA and sSATA controllers to RAID mode for LSI SW RAID.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<b>Power On Password</b>	<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"> <li>• <b>disabled</b>—Power On Password is disabled.</li> <li>• <b>enabled</b>—Power On Password is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>IPV6 PXE Support</b>	<p>Enables or disables IPV6 support for PXE. This can be one of the following</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—IPV6 PXE support is not available.</li> <li>• <b>enabled</b>—IPV6 PXE support is always available.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Adaptive Memory Training</b>	<p>When this token is enabled, the BIOS saves the memory training results (optimized timing/voltage values) along with CPU/memory configuration information and reuses them on subsequent reboots to save boot time. The saved memory training results are used only if the reboot happens within 24 hours of the last save operation. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—<b>Adaptive Memory Training</b> is disabled.</li> <li>• <b>enabled</b>—<b>Adaptive Memory Training</b> is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>BIOS Tech Message Level Control (for C125 M5)</b>	<p>Enabling this token allows the BIOS Tech log output to be controlled at more a granular level. This reduces the number of BIOS Tech log messages that are redundant, or of little use. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—<b>BIOS Techlog Level</b> is disabled.</li> <li>• <b>enabled</b>—<b>BIOS Techlog Level</b> is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>OptionROM Launch Optimization</b>	<p>The Option ROM launch is controlled at the PCI Slot level, and is enabled by default. In configurations that consist of a large number of network controllers and storage HBAs having Option ROMs, all the Option ROMs may get launched if the PCI Slot Option ROM Control is enabled for all. However, only a subset of controllers may be used in the boot process. When this token is enabled, Option ROMs are launched only for those controllers that are present in boot policy. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—<b>OptionROM Launch Optimization</b> is disabled.</li> <li>• <b>enabled</b>—<b>OptionROM Launch Optimization</b> is enabled.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>BIOS Techlog Level</b> <b>BIOSTechlogLevel</b>	<p>This option denotes the type of messages in <b>BIOS tech log</b> file. The log file can be any of the following types:</p> <ul style="list-style-type: none"> <li>• <b>minimum</b>—Critical messages will be displayed in the log file. This is the default option.</li> <li>• <b>normal</b>—Warning and loading messages will be displayed in the log file.</li> <li>• <b>maximum</b>—Normal and information related messages will be displayed in the log file.</li> </ul>
<b>P-SATA OptionROM</b>	<p>This options allows you to select the P-SATA mode. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>lsi-sw-raid</b>—Sets both SATA and sSATA controllers to RAID mode for LSI SW RAID. This is the default option.</li> <li>• <b>disabled</b>—P-SATA mode is disabled.</li> <li>• <b>ahci</b>—Sets the controllers to AHCI mode.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

Name	Description
<b>M.2 SATA OptionROM</b>	<p>This options allows you to select the P-SATA mode. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>lsi-sw-raid</b>—Sets both SATA and sSATA controllers to RAID mode for LSI SW RAID. This is the default option.</li> <li>• <b>disabled</b>—P-SATA mode is disabled.</li> <li>• <b>ahci</b>—Sets the controllers to AHCI mode.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>UEFI Boot Mode</b>	<p>This options allows you to select the UEFI Boot mode. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—UEFI Boot mode is disabled.</li> <li>• <b>enabled</b>—UEFI Boot mode is enabled.</li> </ul>



**Note** BIOS parameter virtualization capability in Cisco UCS Manager maps a unified set of BIOS settings in a service profile to the actual BIOS supporting parameters. However, not all BIOS setting items are applicable to every server model/platform. When you create a custom BIOS policy and have the **Boot Option Retry** selected, and when there is no bootable option available, the reboot fails and Cisco UCS Manager displays this message : *Reboot and Select proper Boot device or Insert Boot Media in selected Boot device and press a key*. You must manually set a boot option after the boot path is corrected, in order to enable the servers to reboot after a power outage. For more information about BIOS default server policies and the BIOS options and their default settings, see [BIOS Policy, on page 302](#) and [Server BIOS Settings, on page 213](#).

## Server Management BIOS Settings

The following tables list the server management BIOS settings that you can configure through a BIOS policy or the default BIOS settings:

## General Settings

Name	Description
<b>Assert NMI on SERR</b> <b>set assert-nmi-on-serr-config assertion</b>	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS does not generate an NMI or log an error when a SERR occurs.</li> <li>• <b>enabled</b>—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable <b>Assert NMI on PERR</b>.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Assert NMI on PERR</b> <b>set assert-nmi-on-perr-config assertion</b>	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>disabled</b>—The BIOS does not generate an NMI or log an error when a PERR occurs.</li> <li>• <b>enabled</b>—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable <b>Assert NMI on SERR</b> to use this setting.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>OS Boot Watchdog Timer Policy</b> <b>set os-boot-watchdog-timer-policy-config</b> <b>os-boot-watchdog-timer-policy</b>	What action the system takes if the watchdog timer expires. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>power-off</b>—The server is powered off if the watchdog timer expires during OS boot.</li> <li>• <b>reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>This option is only available if you enable the OS Boot Watchdog Timer.</p>

Name	Description
<p><b>OS Boot Watchdog Timer Timeout</b>  <b>set</b>  <b>os-boot-watchdog-timer-timeout-config</b>  <b>os-boot-watchdog-timer-timeout</b></p>	<p>What timeout value the BIOS uses to configure the watchdog timer. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>5-minutes</b>—The watchdog timer expires 5 minutes after the OS begins to boot.</li> <li>• <b>10-minutes</b>—The watchdog timer expires 10 minutes after the OS begins to boot.</li> <li>• <b>15-minutes</b>—The watchdog timer expires 15 minutes after the OS begins to boot.</li> <li>• <b>20-minutes</b>—The watchdog timer expires 20 minutes after the OS begins to boot.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p>This option is only available if you enable the OS Boot Watchdog Timer.</p>
<p><b>FRB-2 Timer</b>  <b>set frb-2-timer-config frb-2-timer</b></p>	<p>Whether the FRB-2 timer is used to recover the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The FRB-2 timer is not used.</li> <li>• <b>enabled</b>—The FRB-2 timer is started during POST and used to recover the system if necessary.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>

## Console Redirection Settings

Name	Description
<p><b>Console redirection</b>  <b>set console-redir-config console-redir</b></p>	<p>Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—No console redirection occurs during POST.</li> <li>• <b>com 0</b>—Enables serial port for console redirection during POST. This option is valid only for M6 blade servers and rack-mount servers.</li> </ul> <p><b>Note</b> The value <b>serial-port-a</b> is not supported on M6 servers.</p> <ul style="list-style-type: none"> <li>• <b>serial-port-b</b> or <b>COM 1</b>—Enables serial port B for console redirection and allows it to perform server management tasks. This option is only valid for rack-mount servers.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.</p>
<p><b>Flow Control</b>  <b>set console-redir-config flow-control</b></p>	<p>Whether a handshake protocol is used for flow control. Request to Send / Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>none</b>—No flow control is used.</li> <li>• <b>rts-cts</b>—RTS/CTS is used for flow control.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>

Name	Description
<p><b>Baud rate</b> <b>set console-redir-config baud-rate</b></p>	<p>What Baud rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>9600</b>—A 9600 Baud rate is used.</li> <li>• <b>19200</b>—A 19200 Baud rate is used.</li> <li>• <b>38400</b>—A 38400 Baud rate is used.</li> <li>• <b>57600</b>—A 57600 Baud rate is used.</li> <li>• <b>115200</b>—A 115200 Baud rate is used. This is the default option.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>
<p><b>Terminal type</b> <b>set console-redir-config terminal-type</b></p>	<p>What type of character formatting is used for console redirection. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>pc-ansi</b>—The PC-ANSI terminal font is used.</li> <li>• <b>vt100</b>—A supported vt100 video terminal and its character set are used.</li> <li>• <b>vt100-plus</b>—A supported vt100-plus video terminal and its character set are used.</li> <li>• <b>vt-utf8</b>—A video terminal with the UTF-8 character set is used.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul> <p><b>Note</b> This setting must match the setting on the remote terminal application.</p>

Name	Description
<p><b>Legacy OS redirection</b> set console-redir-config legacy-os-redir</p>	<p>Whether redirection from a legacy operating system, such as DOS, is enabled on the serial port. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The serial port enabled for console redirection is hidden from the legacy operating system.</li> <li>• <b>enabled</b>— The serial port enabled for console redirection is visible to the legacy operating system.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<p><b>Putty KeyPad</b> set console-redir-config putty-function-keypad</p>	<p>Allows you to change the action of the PuTTY function keys and the top row of the numeric keypad. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>vt100</b>—The function keys generate <b>ESC OP</b> through <b>ESC O[</b>.</li> <li>• <b>linux</b>—Mimics the Linux virtual console. Function keys F6 to F12 behave like the default mode, but F1 to F5 generate <b>ESC [ [A</b> through <b>ESC [ [E</b>.</li> <li>• <b>xtermr6</b>—Function keys F5 to F12 behave like the default mode. Function keys F1 to F4 generate <b>ESC OP</b> through <b>ESC OS</b>, which are the sequences produced by the top row of the keypad on Digital terminals.</li> <li>• <b>sco</b>—The function keys F1 to F12 generate <b>ESC [M</b> through <b>ESC [X</b>. The function and shift keys generate <b>ESC [Y</b> through <b>ESC [j</b>. The control and function keys generate <b>ESC [k</b> through <b>ESC [v</b>. The shift, control and function keys generate <b>ESC [w</b> through <b>ESC [ {</b>.</li> <li>• <b>escn</b>—The default mode. The function keys match the general behavior of Digital terminals. The function keys generate sequences such as <b>ESC [11~</b> and <b>ESC [12~</b>.</li> <li>• <b>vt400</b>—The function keys behave like the default mode. The top row of the numeric keypad generates <b>ESC OP</b> through <b>ESC OS</b>.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>



Name	Description
<b>Out of Band Management</b>	<p>Used for Windows Special Administration Control (SAC). This option 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"> <li>• <b>disabled</b>—Configures the COM port 0 as a general purpose port for use with the Windows Operating System.</li> <li>• <b>enabled</b>—Configures the COM port 0 as a remote management port for Windows Emergency Management services.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>Redirection After BIOS POST</b> <b>set console-redir-config</b> <b>putty-function-keypad</b>	<p>Whether BIOS console redirection should be active after BIOS POST is complete and control given to the OS bootloader. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>always_enable</b>—BIOS Legacy console redirection is active during the OS boot and run time.</li> <li>• <b>bootloader</b>—BIOS Legacy console redirection is disabled before giving control to the OS boot loader.</li> <li>• <b>platform-default</b>—The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.</li> </ul>
<b>OS Watchdog Timer Policy</b> <b>scope token-feature "OS Boot Watchdog Timer Policy"</b> <b>scope token-param "OS Boot Watchdog Timer Policy"</b>	<p>What action the system takes if the watchdog timer expires. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>power_off</b>—The server is powered off if the watchdog timer expires during OS boot. This is the default option.</li> <li>• <b>reset</b>—The server is reset if the watchdog timer expires during OS boot.</li> </ul>
<b>FRB 2 Timer</b> <b>scope token-feature "FRB 2 Timer"</b> <b>scope token-param "FRB 2 Timer"</b>	<p>Whether the FRB2 timer is used for recovering the system if it hangs during POST. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>disabled</b>—The FRB2 timer is not used.</li> <li>• <b>enabled</b>—The FRB2 timer is started during POST and used to recover the system if necessary. This is the default option.</li> </ul>

Name	Description
<b>OS Watchdog Timer</b> scope token-feature "OS Boot Watchdog Timer" scope token-param "OS Boot Watchdog Timer"	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"> <li>• <b>disabled</b>—The watchdog timer is not used to track how long the server takes to boot. This is the default option.</li> <li>• <b>enabled</b>—The watchdog timer tracks how long the server takes to boot. This is the default option.</li> </ul>
<b>OS Watchdog Timer Timeout</b> scope token-feature "OS Boot Watchdog Timer Timeout" scope token-param "OS Boot Watchdog Timer Timeout"	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: <ul style="list-style-type: none"> <li>• <b>5 minutes</b>—The OS watchdog timer expires 5 minutes after it begins to boot.</li> <li>• <b>10 minutes</b>—The OS watchdog timer expires 10 minutes after it begins to boot. This is the default option.</li> <li>• <b>15 minutes</b>—The OS watchdog timer expires 15 minutes after it begins to boot.</li> <li>• <b>20 minutes</b>—The OS watchdog timer expires 20 minutes after it begins to boot.</li> </ul> <p><b>Note</b> This option is applicable only when you enable the OS Boot Watchdog Timer.</p>

## BIOS Policy

The BIOS policy is a policy that automates the configuration of BIOS settings for a server or group of servers. You can create global BIOS policies available to all servers in the root organization, or you can create BIOS policies in sub-organizations that are only available to that hierarchy.

To use a BIOS policy, do the following:

1. Create the BIOS policy in Cisco UCS Manager.
2. Assign the BIOS policy to one or more service profiles.
3. Associate the service profile with a server.

During service profile association, Cisco UCS Manager modifies the BIOS settings on the server to match the configuration in the BIOS policy. If you do not create and assign a BIOS policy to a service profile, the server uses the default BIOS settings for that server platform.

## Default BIOS Settings

Cisco UCS Manager includes a set of default BIOS settings for each type of server supported by Cisco UCS. The default BIOS settings are available only in the root organization and are global. Only one set of default

BIOS settings can exist for each server platform supported by Cisco UCS. You can modify the default BIOS settings, but you cannot create an additional set of default BIOS settings.

Each set of default BIOS settings are designed for a particular type of supported server and are applied to all servers of that specific type which do not have a BIOS policy included in their service profiles.

Unless a Cisco UCS implementation has specific needs that are not met by the server-specific settings, we recommend that you use the default BIOS settings that are designed for each type of server in the Cisco UCS domain.

Cisco UCS Manager applies these server platform-specific BIOS settings as follows:

- The service profile associated with a server does not include a BIOS policy.
- The BIOS policy is configured with the platform-default option for a specific setting.

You can modify the default BIOS settings provided by Cisco UCS Manager. However, any changes to the default BIOS settings apply to all servers of that particular type or platform. If you want to modify the BIOS settings for only certain servers, we recommend that you use a BIOS policy.

The BIOS tokens for M5 servers and later are read-only and cannot be modified. For a complete and up to date list of BIOS tokens, defaults, and values, refer [Cisco UCS M5 Server BIOS Tokens](#).

The BIOS tokens for M6 servers and later are read-only and cannot be modified. For a complete and up to date list of BIOS tokens, defaults, and values, refer [Cisco UCS M6 Server BIOS Tokens](#).

## Creating a BIOS Policy



**Note** Cisco UCS Manager pushes BIOS configuration changes through a BIOS policy or default BIOS settings to the Cisco Integrated Management Controller (CIMC) buffer. These changes remain in the buffer and do not take effect until the server is rebooted.

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters org mode for the specified organization. To enter the default org mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create bios-policy</b> <i>policy-name</i>	Creates a BIOS policy with the specified policy name, and enters org BIOS policy mode.
<b>Step 3</b>	Configure the BIOS settings.	
<b>Step 4</b>	UCS-A /org/bios-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a BIOS policy under the root organization and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create bios-policy biosPolicy3
UCS-A /org/bios-policy* # set numa-config numa-optimization enabled
UCS-A /org/bios-policy* # commit-buffer
UCS-A /org/bios-policy #
```

## Modifying BIOS Defaults

You can use the following procedure to modify and configure the BIOS defaults for UCS M4 and earlier servers. The new BIOS settings that are introduced with the UCS M5 servers cannot be configured using this procedure.

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

Unless a Cisco UCS implementation has specific needs that are not met by the server-specific settings, we recommend that you use the default BIOS settings that are designed for each type of server in the Cisco UCS domain.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope system</b>	Enters system mode.
<b>Step 2</b>	UCS-A /system # <b>scope server-defaults</b>	Enters server defaults mode.
<b>Step 3</b>	UCS-A /system/server-defaults # <b>show platform</b>	(Optional) Displays platform descriptions for all servers.
<b>Step 4</b>	UCS-A /system/server-defaults # <b>scope platform platform-description</b>	Enters server defaults mode for the server specified. For the <i>platform-description</i> argument, enter the server description displayed by the <b>show platform</b> command using the following format: " <i>vendor</i> " <i>model revision</i> .  <b>Tip</b> You must enter the vendor exactly as shown in the <b>show platform</b> command, including all punctuation marks.
<b>Step 5</b>	UCS-A /system/server-defaults/platform # <b>scope bios-settings</b>	Enters server defaults BIOS settings mode for the server.
<b>Step 6</b>	Reconfigure the BIOS settings.	
<b>Step 7</b>	UCS-A /system/server-defaults/platform/bios-settings # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shows how to change the NUMA default BIOS setting for a platform and commit the transaction:

```
UCS-A# scope system
UCS-A /system # scope server-defaults
UCS-A /system/server-defaults # show platform

Platform:
  Product Name Vendor      Model      Revision
  -----
  Cisco B200-M1
                Cisco Systems, Inc.
                N20-B6620-1
                0

UCS-A /system/server-defaults # scope platform "Cisco Systems, Inc." N20-B6620-1 0
UCS-A /system/server-defaults/platform # scope bios-settings
UCS-A /system/server-defaults/platform/bios-settings # set numa-config numa-optimization
disabled
UCS-A /system/server-defaults/platform/bios-settings* # commit-buffer
UCS-A /system/server-defaults/platform/bios-settings #

UCS-A# scope system
UCS-A /system # scope server-defaults
UCS-A /system/server-defaults # show platform

Platform:
  Product Name Vendor      Model      Revision
  -----
  Cisco UCS B230-M2
                Cisco Systems, Inc.
                B230-BASE-M2
                0
  Cisco UCS B440 M2
                Cisco Systems, Inc.
                B440-BASE-M2
                0
  Cisco C260-M2
                Cisco Systems, Inc.
                C260-BASE-2646
                0
  Cisco B200-M1
                Cisco Systems, Inc.
                N20-B6620-1
                0
  Cisco B250-M1
                Cisco Systems, Inc.
                N20-B6620-2

UCS-A /system/server-defaults # scope platform "Cisco Systems, Inc." B230-BASE-M2 0
UCS-A /system/server-defaults/platform # scope bios-settings
UCS-A /system/server-defaults/platform/bios-settings # set numa-config numa-optimization
disabled
UCS-A /system/server-defaults/platform/bios-settings* # commit-buffer
UCS-A /system/server-defaults/platform/bios-settings* #
```

## Configuring BIOS Settings for M5 Servers

You can configure BIOS settings for UCS M5 and earlier servers through Cisco UCS Manager CLI. The new BIOS settings that are introduced with the UCS M5 servers can be configured only by using this procedure.

We recommend that you verify the support for BIOS settings in the server that you want to configure. Some settings, such as Mirroring Mode for RAS Memory, are not supported by all Cisco UCS servers.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope bios-policy</b> <i>bios-policy-name</i>	Enters the bios-policy mode for the specified BIOS policy.
<b>Step 3</b>	(Optional) UCS-A /org/bios-policy # <b>show token-feature</b>	Displays the complete list of BIOS token features in the specified BIOS policy.
<b>Step 4</b>	UCS-A /org/bios-policy # <b>scope token-feature</b> " <i>bios-token-feature-name</i> "	Enters the token feature mode for the specified BIOS token feature.
<b>Step 5</b>	(Optional) UCS-A /org/bios-policy/token-feature # <b>show token-param</b>	Displays the complete list of BIOS token parameters for the specified BIOS token feature.
<b>Step 6</b>	UCS-A /org/bios-policy/token-feature # <b>scope token-param</b> <i>bios-token-parameter-name</i>	Enters the token parameter mode for the specified BIOS token parameter name.
<b>Step 7</b>	(Optional) UCS-A /org/bios-policy/token-feature/token-param # <b>show token-settings</b>	Displays the complete list of token settings for the specified BIOS token parameter.
<b>Step 8</b>	UCS-A /org/bios-policy/token-feature/token-param # <b>scope token-settings</b> <i>token-setting</i>	Enters the token settings mode for the specified BIOS token parameter name.
<b>Step 9</b>	UCS-A /org/bios-policy/token-feature/token-param/token-settings # <b>set is-selected</b> <i>yes   no</i>	Set the specified token setting as selected or not by using the <b>yes</b> or <b>no</b> keyword.
<b>Step 10</b>	UCS-A /org/bios-policy/token-feature/token-param/token-settings # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to configure BIOS token settings:

```
UCS-A# scope org
UCS-A /org # scope bios-policy bp
UCS-A /org/bios-policy # scope token-feature "Consistent Device Name Control"
```

```
UCS-A /org/bios-policy/token-feature # scope token-param cdnEnable
UCS-A /org/bios-policy/token-feature/token-param # scope token-settings Enabled
UCS-A /org/bios-policy/token-feature/token-param/token-settings # set is-selected yes
UCS-A /org/bios-policy/token-feature/token-param/token-settings* # commit-buffer
UCS-A /org/bios-policy/token-feature/token-param/token-settings #
```

## Viewing the Actual BIOS Settings for M4 Servers

Follow this procedure to see the actual BIOS settings on a server.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope bios</b>	Enters BIOS mode for the specified server.
<b>Step 3</b>	UCS-A /chassis/server/bios # <b>scope bios-settings</b>	Enters BIOS settings mode for the specified server.
<b>Step 4</b>	UCS-A /chassis/server/bios/bios-settings # <b>show setting</b>	Displays the BIOS setting. Enter <b>show ?</b> to display a list of allowed values for <i>setting</i> .  <b>Note</b> The <b>show setting</b> command is not supported on M5 and higher servers. For M5 and higher servers, see <a href="#">Viewing the Actual BIOS Settings for M5 and Higher Servers, on page 307</a> .

### Example

The following example displays a BIOS setting for blade 3 in chassis 1:

```
UCS-A# scope server 1/3
UCS-A /chassis/server # scope bios
UCS-A /chassis/server/bios # scope bios-settings
UCS-A /chassis/server/bios/bios-settings # show intel-vt-config

Intel Vt Config:
  Vt
  --
  Enabled

UCS-A /chassis/server/bios/bios-settings #
```

## Viewing the Actual BIOS Settings for M5 and Higher Servers

Follow this procedure to see the actual BIOS settings on a server.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id / server-id</i>	Enters chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope bios</b>	Enters BIOS mode for the specified server.
<b>Step 3</b>	UCS-A /chassis/server/bios # <b>scope bios-settings</b>	Enters BIOS settings mode for the specified server.
<b>Step 4</b>	UCS-A /chassis/server/bios/bios-settings # <b>show token-feature</b> " <i>BIOS-Token-Feature-Name</i> " <b>detail expand</b>	Displays the BIOS setting for a specific BIOS token feature name. Enter <b>show ?</b> to display a list of allowed values for <i>BIOS-Token-Feature-Name</i> .
<b>Step 5</b>	(Optional) UCS-A /chassis/server/bios/bios-settings # <b>show detail</b>	Displays the BIOS setting for all the BIOS tokens.

**Example**

The following example displays BIOS setting for Consistent Device Name Control on blade 4 in chassis 1:

```
UCS-A# scope server 1/4
UCS-A /chassis/server # scope bios
UCS-A /chassis/server/bios # scope bios-settings
UCS-A /chassis/server/bios/bios-settings # show token-feature "Consistent Device Name Control" detail expand
```

Token Feature:

```
Bios Token Feature Name: Consistent Device Name Control
```

Token Parameter:

```
Bios Token Parameter Name: cdnEnable
UI Display Name: CDN Control
```

Token Settings:

```
Bios Token Settings Name: Disabled
BIOS Returned Setting Name: Disabled
Selected: Yes
```

```
UCS-A /chassis/server/bios/bios-settings #
```

## Displaying Details of BIOS Tokens in a BIOS Policy

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .



	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>scope bios-policy</b> <i>bios-policy-name</i>	Enters the bios-policy mode for the specified BIOS policy.
<b>Step 3</b>	UCS-A /org/bios-policy # <b>show detail expand</b>	Displays detailed information about all the BIOS token features, parameters, and settings that are configured for the specified BIOS policy.
<b>Step 4</b>	(Optional) UCS-A /org/bios-policy # scope token-feature " <i>bios-token-feature-name</i> "	Enters the token feature mode for the specified BIOS token feature.
<b>Step 5</b>	(Optional) UCS-A /org/bios-policy/token-feature # <b>show detail</b> [ <b>expand</b> ]	Displays the complete list of BIOS token parameters for the specified BIOS token feature.
<b>Step 6</b>	(Optional) UCS-A /org/bios-policy/token-feature # scope token-param <i>bios-token-parameter-name</i>	Enters the token parameter mode for the specified BIOS token parameter name.
<b>Step 7</b>	(Optional) UCS-A /org/bios-policy/token-feature/token-param # <b>show detail</b> [ <b>expand</b> ]	Displays the complete list of token settings for the specified BIOS token parameter.

### Example

This example shows how to display detailed information about a BIOS policy, including all the BIOS token features, parameters, and settings:

```
UCS-A# scope org
UCS-A /org # scope bios-policy bp
UCS-A /org/bios-policy # show detail expand

BIOS Policy:
  Name: bp
  Description: Recommended bios settings for bp
  Reboot on BIOS Policy Change: No
  Policy Owner: Local

Token Feature:
  Bios Token Feature Name: All USB Devices

Token Parameter:
  Bios Token Parameter Name: AllUsbDevices
  UI Display Name: All USB Devices

Token Settings:
  Bios Token Settings Name: Disabled
  BIOS Returned Setting Name: Disabled
  Selected: No

  Bios Token Settings Name: Enabled
  BIOS Returned Setting Name: Enabled
  Selected: No

Bios Token Feature Name: Altitude
```

```

Token Parameter:
  Bios Token Parameter Name: Altitude
  UI Display Name: Altitude

Token Settings:
  Bios Token Settings Name: 1500-M
  BIOS Returned Setting Name: 1500 M
  Selected: No

  Bios Token Settings Name: 300-M
  BIOS Returned Setting Name: 300 M
  Selected: No

  Bios Token Settings Name: 3000-M
  BIOS Returned Setting Name: 3000 M
  Selected: No

  Bios Token Settings Name: 900-M
  BIOS Returned Setting Name: 900 M
  Selected: No

  Bios Token Settings Name: Auto
  BIOS Returned Setting Name: Auto
  Selected: No
...

```

This example shows how to display detailed information about the BIOS token parameters for a specific BIOS token feature:

```

UCS-A# scope org
UCS-A /org # scope bios-policy bp
UCS-A /org/bios-policy # scope token-feature "Console redirection"
UCS-A /org/bios-policy/token-feature # show detail expand

```

```

Token Feature:
  Bios Token Feature Name: Console redirection

Token Parameter:
  Bios Token Parameter Name: BaudRate
  UI Display Name: Baud rate

Token Settings:
  Bios Token Settings Name: 115.2k
  BIOS Returned Setting Name: 115.2k
  Selected: No

  Bios Token Settings Name: 19.2k
  BIOS Returned Setting Name: 19.2k
  Selected: No

  Bios Token Settings Name: 38.4k
  BIOS Returned Setting Name: 38.4k
  Selected: No

  Bios Token Settings Name: 57.6k
  BIOS Returned Setting Name: 57.6k
  Selected: No

  Bios Token Settings Name: 9.6k
  BIOS Returned Setting Name: 9.6k
  Selected: No

```

```

Bios Token Parameter Name: FlowCtrl
UI Display Name: Flow Control

Token Settings:
  Bios Token Settings Name: None
  BIOS Returned Setting Name: None
  Selected: No

  Bios Token Settings Name: RTS-CTS
  BIOS Returned Setting Name: RTS-CTS
  Selected: No

```

This example shows how to display detailed information about the BIOS token settings for a specific BIOS token parameter:

```

UCS-A# scope org
UCS-A /org # scope bios-policy bp
UCS-A /org/bios-policy # scope token-feature "Console redirection"
UCS-A /org/bios-policy/token-feature # scope token-param BaudRate
UCS-A /org/bios-policy/token-feature/token-param # show detail expand

```

```

Token Parameter:
  Bios Token Parameter Name: BaudRate
  UI Display Name: Baud rate

Token Settings:
  Bios Token Settings Name: 115.2k
  BIOS Returned Setting Name: 115.2k
  Selected: No

  Bios Token Settings Name: 19.2k
  BIOS Returned Setting Name: 19.2k
  Selected: No

  Bios Token Settings Name: 38.4k
  BIOS Returned Setting Name: 38.4k
  Selected: No

  Bios Token Settings Name: 57.6k
  BIOS Returned Setting Name: 57.6k
  Selected: No

  Bios Token Settings Name: 9.6k
  BIOS Returned Setting Name: 9.6k
  Selected: No

```

## Trusted Platform Module

### Trusted Platform Module

The Trusted Platform Module (TPM) is a component that can securely store artifacts that are used to authenticate the server. These artifacts can include passwords, certificates, or encryption keys. A TPM can also be used to store platform measurements that help ensure that the platform remains trustworthy. Authentication (ensuring that the platform can prove that it is what it claims to be) and attestation (a process helping to prove that a platform is trustworthy and has not been breached) are necessary steps to ensure safer computing in all

environments. It is a requirement for the Intel Trusted Execution Technology (TXT) security feature, which must be enabled in the BIOS settings for a server equipped with a TPM. Cisco UCS M4 blade and rack-mount servers include support for TPM. TPM is enabled by default on these servers.



#### Important

- If you upgrade Cisco UCS Manager to Release 2.2(4) and higher, TPM is enabled.
- When TPM is enabled and you downgrade Cisco UCS Manager from Release 2.2(4) and higher, TPM is disabled.

## Intel Trusted Execution Technology

Intel Trusted Execution Technology (TXT) provides greater protection for information that is used and stored on the business server. A key aspect of that protection is the provision of an isolated execution environment and associated sections of memory where operations can be conducted on sensitive data, invisible to the rest of the system. Intel TXT provides for a sealed portion of storage where sensitive data such as encryption keys can be kept, helping to shield them from being compromised during an attack by malicious code. Cisco UCS M4 blade and rack-mount servers include support for TXT. TXT is disabled by default on these servers.

TXT can be enabled only after TPM, Intel Virtualization technology (VT) and Intel Virtualization Technology for Directed I/O (VT-d) are enabled. When you only enable TXT, it also implicitly enables TPM, VT, and VT-d.

## Enabling or Disabling TPM

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create bios-policy</b> <i>policy-name</i>	Creates a BIOS policy with the specified policy name, and enters org BIOS policy mode.
<b>Step 3</b>	UCS-A /org/bios-policy* # <b>set trusted-platform-module-config tpm-state</b> {disabled   enabled   platform-default}	Specifies whether TPM is <b>enabled</b> or <b>disabled</b> . <b>platform-default</b> is TPM enabled.
<b>Step 4</b>	UCS-A /org/bios-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	UCS-A /org # <b>create service-profile</b> <i>sp-name</i> }	Creates the service profile specified and enters service profile configuration mode.
<b>Step 6</b>	UCS-A /org/service-profile* # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 7</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

	Command or Action	Purpose
<b>Step 8</b>	UCS-A /org/service-profile # <b>associate server</b> <i>chassis-id / slot-id</i>	Associates the service profile with a single server.

### Example

The following example shows how to enable TPM:

```
UCS-A # scope org
UCS-A /org # create bios-policy bp1
UCS-A /org/bios-policy* # set trusted-platform-module-config tpm-state enabled
UCS-A /org/bios-policy* # commit-buffer
UCS-A /org # create service-profile spl
UCS-A /org/service-profile* # set bios-policy bp1
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile # associate server 1/2
```

## Viewing TPM Properties

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>chassis-id/cartridge-id/server-id</i>	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/cartridge/server # <b>scope tpm</b> <i>tpm-id</i>	Enters TPM mode for the specified TPM ID.
<b>Step 3</b>	UCS-A /chassis/cartridge/server/tpm # <b>show</b>	Displays the TPM properties.
<b>Step 4</b>	UCS-A /chassis/cartridge/server/tpm # <b>show detail</b>	Displays detailed TPM properties.

### Example

The following example shows how to display the TPM properties a modular server:

```
UCS-A# scope server 1/3/1
UCS-A /chassis/cartridge/server # scope tpm 1
UCS-A /chassis/cartridge/server/tpm # show

Trusted Platform Module:
  Presence: Equipped
  Enabled Status: Enabled
  Active Status: Activated
  Ownership: Unowned
UCS-A /chassis/cartridge/server/tpm # show detail

Trusted Platform Module:
  Enabled Status: Enabled
  Active Status: Activated
  Ownership: Unowned
  Tpm Revision: 2
```

```

Model: UCSX-TPM2-001
Vendor: Cisco Systems Inc
Serial: FCH19257E58
Admin Action: Unspecified
Config State: Not Applied
UCS-A /chassis/cartridge/server/tpm #

```

## Enabling or Disabling TXT

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create bios-policy</b> <i>policy-name</i>	Creates a BIOS policy with the specified policy name, and enters org BIOS policy mode.
<b>Step 3</b>	UCS-A /org/bios-policy* # <b>set intel-trusted-execution-technology-config txt-support {enabled   disabled   platform-default}</b>	Specifies whether TXT is <b>enabled</b> or <b>disabled</b> . <b>platform-default</b> is TXT disabled.
<b>Step 4</b>	UCS-A /org/bios-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	UCS-A /org # <b>create service-profile</b> <i>sp-name</i> }	Creates the service profile specified and enters service profile configuration mode.
<b>Step 6</b>	UCS-A /org/service-profile* # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 7</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 8</b>	UCS-A /org/service-profile # <b>associate server</b> <i>chassis-id / slot-id</i>	Associates the service profile with a single server.

### Example

The following example shows how to enable TXT:

```

UCS-A # scope org
UCS-A /org # create bios-policy bp1
UCS-A /org/bios-policy* # set intel-trusted-execution-technology-config txt-support enabled
UCS-A /org/bios-policy* # commit-buffer
UCS-A /org # create service-profile sp1
UCS-A /org/service-profile* # set bios-policy bp1
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile # associate server 1/2

```

## Consistent Device Naming

When there is no mechanism for the Operating System to label Ethernet interfaces in a consistent manner, it becomes difficult to manage network connections with server configuration changes. Consistent Device Naming (CDN), introduced in Cisco UCS Manager Release 2.2(4), allows Ethernet interfaces to be named in a consistent manner. This makes Ethernet interface names more persistent when adapter or other configuration changes are made.

To configure CDN for a vNIC, do the following:

- Enable consistent device naming in the BIOS policy.
- Associate the BIOS policy with a service profile.
- Configure consistent naming for a vNIC.

### Guidelines and Limitations for Consistent Device Naming (CDN)

- CDN is supported on the following Operating Systems:
  - Windows 2016 and later Windows releases
  - Windows Server 2019
  - Red Hat Enterprise Linux (RHEL) 7.x and later RHEL releases
  - SLES 12 SP3, SLES 12 SP4, and SLES 15 (for 4.0(4a) and later)
  - ESXi 6.7
- Consistent device naming (CDN) is supported on all M5 and higher blade and rack-mount servers.
- BIOS and adapter firmware must be part of the Release 2.2(4) or higher bundle to support CDN.
- If the RHEL Operating System is installed on the server, CDN will appear when running the command "**biosdevname -d**" as "**sysfs label**". CDN will not change the kernel name.
- CDN is supported for vNIC template.
- Multiple vNICs within the same service profile cannot have the same CDN name.
- When a CDN name is not specified for a vNIC, the vNIC name is used as the CDN name.
- The CDN name that you configure for a vNIC appears as **Admin CDN Name**. The CDN name that is finally applied to the vNIC appears as **Oper CDN Name**. For example, if the **Admin CDN Name** for a vNIC called "vnic0" is cdn0, then the **Oper CDN Name** for this vNIC will be cdn0, but if the **Admin CDN Name** for the same vNIC is not specified, the **Oper CDN Name** will be vnic0.
- In Cisco UCS Manager Release 3.1 and older releases, downgrade of the adapter firmware is prevented if a CDN-enabled BIOS policy is assigned to a server.
- In Cisco UCS Manager Release 2.2(4), downgrade of Cisco UCS Manager or BIOS is prevented, if CDN enabled BIOS policy is assigned on the associated server profile.
- When the applied BIOS policy is changed from CDN-disabled to CDN-enabled or from CDN-enabled to CDN-disabled, the host reboots with a warning, irrespective of whether reboot on BIOS update is enabled or not.

- It is recommended that you enable CDN in the BIOS policy and add CDN names to the vNICs before the Windows Operating System is installed.
- If the Windows Operating System is already installed on the server and CDN is then enabled in the BIOS policy, do the following:
  1. Uninstall the network drivers.
  2. Scan the system for hidden devices and uninstall them.
  3. Rescan the system for new hardware and install the network drivers again.




---

**Note** If this is not done, the vNICs will not come up with the configured CDN names.

---

- When the applied BIOS policy is changed from CDN-disabled to CDN-enabled or from CDN-enabled to CDN-disabled on a service profile, do the following:
  1. Uninstall the network drivers.
  2. Scan the system for hidden devices and delete them.
  3. Re-scan the system for new hardware and install the network drivers again.




---

**Note** When the BIOS policy is changed from CDN-enabled to CDN-disabled, ensure that the CDN names are removed from all the vNICs on the system.

---

- If any change is made to the vNICs, the BDF of all the devices on the system also changes. Following are some of the scenarios that trigger a change in the BDF of all the vNICs present on the system:
  - When a vNIC is added or deleted
  - When a vNIC is moved from one adapter on the system to another adapter on the system

When these changes are made to the system, do the following:

1. Uninstall the network driver from all the present network interfaces.
2. Scan the system for hidden devices and uninstall them.
3. Re-scan the system for new hardware and install the network driver on the network controllers again.

If the hidden devices are not deleted, the CDN names of the network adapters will not appear as configured on Cisco UCS Manager.

### CDN with a Mixed Set of Adapters

When a CDN name is configured for a vNIC in a system with a mixed set of CDN-supported adapters and CDN-unsupported adapters, then system placement may not place CDN-configured vNICs on adapters that support CDN.



If CDN is enabled in the BIOS policy, and system placement places a CDN-configured vNIC (Admin CDN configured) on an adapter that does not support CDN, an info fault will be raised, but the configuration issue for the service profile will be ignored.

If CDN is enabled in the BIOS policy, and system placement places a vNIC (Admin CDN not configured) on an adapter that does not support CDN, an info fault will be raised, but the configuration issue for the service profile will be ignored. The **Oper CDN Name** in this case will be empty and will not be derived from the vNIC name.

If you want to deploy the CDN name as the host network interface name for a server, you must manually place a vNIC on a supported adapter.

## Enabling Consistent Device Naming in a BIOS Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create bios-policy</b> <i>policy-name</i>	Creates a BIOS policy with the specified policy name, and enters org BIOS policy mode.
<b>Step 3</b>	UCS-A /org/bios-policy* # <b>set consistent-device-name-control cdn-name</b> { <b>enabled</b>   <b>disabled</b>   <b>platform-default</b> }	Specifies whether consistent device naming (CDN) is <b>enabled</b> or <b>disabled</b> .
<b>Step 4</b>	UCS-A /org/bios-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to enable CDN in a BIOS policy:

```
UCS-A # scope org
UCS-A /org # create bios-policy cdn-bios-policy
UCS-A /org/bios-policy* # set consistent-device-name-control cdn-name enabled
UCS-A /org/bios-policy* # commit-buffer
```

## Associating a BIOS Policy with a Service Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>sp-name</i> }	Enters service profile configuration mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>set bios-policy</b> <i>policy-name</i>	Associates the specified BIOS policy with the service profile.
<b>Step 4</b>	UCS-A /org/service-profile* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to associate a CDN-enabled BIOS policy with a service profile:

```
UCS-A # scope org
UCS-A /org # scope service-profile sp1
UCS-A /org/service-profile # set bios-policy cdn-bios-policy
UCS-A /org/service-profile* # commit-buffer
```

## Configuring Consistent Device Naming for a vNIC

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>sp-name</i>	Enters service profile configuration mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic</b> <i>vnic-name</i>	Enters vNIC configuration mode for the specified vNIC.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set cdn-name</b> <i>cdn-name</i>	Specifies the CDN name for the vNIC.
<b>Step 5</b>	UCS-A /org/service-profile/vnic* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to configure CDN for a vNIC:

```
UCS-A # scope org
UCS-A /org # scope service-profile sp1
UCS-A /org/service-profile # scope vnic vn1
```

```
UCS-A /org/service-profile/vnic # set cdn-name eth0
UCS-A /org/service-profile/vnic* # commit-buffer
```

## Displaying the CDN Name of a vNIC

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server-num</i>	Enters server mode for the specified server.
<b>Step 2</b>	UCS-A /server # <b>scope adapter</b> <i>adapter-id</i>	Enters adapter mode for the specified adapter.
<b>Step 3</b>	UCS-A /server/adapter # <b>show host-eth-if</b> [detail] [expand]	Displays the details of the host Ethernet interface for the specified adapter.

### Example

The following example shows how to display the CDN name of a vNIC:

```
UCS-A # scope server 3
UCS-A /server # scope adapter 1
UCS-A /server/adapter # show host-eth-if detail expand
```

```
Eth Interface:
  ID: 1
  Dynamic MAC Address: 00:25:B5:00:00:99
  Burned-In MAC Address: 00:00:00:00:00:00
  Model: UCSC-PCIE-CSC-02
  Name: vnic1
  Cdn Name: cdn0
  Admin State: Enabled
  Operability: Operable
  Order: 1
```

## Displaying the Status of a vNIC

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>sp-name</i>	Enters service profile configuration mode for the specified service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>show vnic</b> [detail] [expand]	Displays the details of the vNIC in the specified service profile.

### Example

This example shows how to display the status of a vNIC.



**Note** The CDN name that you configured for the vNIC appears as the **Admin CDN Name**. The CDN name that is finally applied to the BIOS policy appears as the **Oper CDN Name**.

```
UCS-A# scope org
UCS-A /org # scope service-profile sp1
UCS-A /org/service-profile # show vnic detail expand
```

```
vNIC:
  Name: vnic1
  Fabric ID: B
  Dynamic MAC Addr: 00:25:B5:17:47:01
  Desired Order: Unspecified
  Actual Order: 1
  Desired VCon Placement: 2
  Actual VCon Placement: 2
  Desired Host Port: ANY
  Actual Host Port: NONE
  Equipment: sys/chassis-2/blade-5/adaptor-3/host-eth-2
  Host Interface Ethernet MTU: 1500
  Ethernet Interface Admin CDN Name:cdn0
  Ethernet Interface Oper CDN Name:cdn0
  Template Name:
```

## CIMC Security Policies

Cisco UCS Manager provides the following policies to increase security:

- KVM Management Policy
- IPMI Access Profile

## IPMI Access Profile

This policy allows you to determine whether IPMI commands can be sent directly to the server, using the IP address. For example, you can send commands to retrieve sensor data from the CIMC. This policy defines the IPMI access, including a username and password that can be authenticated locally on the server, and whether the access is read-only or read-write.

You can also restrict remote connectivity by disabling or enabling IPMI over LAN in the IPMI access profile. IPMI over LAN is disabled by default on all unassociated servers, and on all servers without an IPMI access policy. When an IPMI access policy is created, the IPMI over LAN is set to enabled by default. If you do not change the value to disabled, IPMI over LAN will be enabled on all associated servers.

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

## Creating an IPMI Access Profile

### Before you begin

Obtain the following:

- Username with appropriate permissions that can be authenticated by the operating system of the server
- Password for the username
- Permissions associated with the username

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create ipmi-access-profile</b> <i>profile-name</i>	Creates the specified IPMI access profile and enters organization IPMI access profile mode.
<b>Step 3</b>	UCS-A /org/ipmi-access-profile # <b>set ipmi-over-lan</b> { <b>disable</b>   <b>enable</b> }	Determines whether remote connectivity can be established.  <b>Note</b> IPMI over LAN is disabled by default on all unassociated servers, and on all servers without an IPMI access policy. When an IPMI access policy is created, the IPMI over LAN is set to enabled by default. If you do not change the value to disabled, IPMI over LAN will be enabled on all associated servers.
<b>Step 4</b>	UCS-A /org/ipmi-access-profile # <b>create ipmi-user</b> <i>ipmi-user-name</i>	Creates the specified endpoint user and enters organization IPMI access profile endpoint user mode.  <b>Note</b> More than one endpoint user can be created within an IPMI access profile, with each endpoint user having its own password and privileges.
<b>Step 5</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set password</b>	Sets the password for the endpoint user.  After entering the <b>set password</b> command, you are prompted to enter and confirm the password. For security purposes, the password that you type does not appear in the CLI.

	Command or Action	Purpose
<b>Step 6</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set privilege {admin   readonly}</b>	Specifies whether the endpoint user has administrative or read-only privileges.
<b>Step 7</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates an IPMI access profile named ReadOnly, creates an endpoint user named bob, sets the password and the privileges for bob, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create ipmi-access-profile ReadOnly
UCS-A /org/ipmi-access-profile* # create ipmi-user bob
UCS-A /org/ipmi-access-profile/ipmi-user* # set password
Enter a password:
Confirm the password:
UCS-A /org/ipmi-access-profile/ipmi-user* # set privilege readonly
UCS-A /org/ipmi-access-profile/ipmi-user* # commit-buffer
UCS-A /org/ipmi-access-profile/ipmi-user #
```

### What to do next

Include the IPMI profile in a service profile and/or template.

## Deleting an IPMI Access Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete ipmi-access-profile</b> <i>profile-name</i>	Deletes the specified IPMI access profile.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the IPMI access profile named ReadOnly and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete ipmi-access-profile ReadOnly
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Adding an Endpoint User to an IPMI Access Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope ipmi-access-profile</b> <i>profile-name</i>	Enters organization IPMI access profile mode for the specified IPMI access profile.
<b>Step 3</b>	UCS-A /org/ipmi-access-profile # <b>create ipmi-user</b> <i>ipmi-user-name</i>	Creates the specified endpoint user and enters organization IPMI access profile endpoint user mode.  <b>Note</b> More than one endpoint user can be created within an IPMI access profile, with each endpoint user having its own password and privileges.
<b>Step 4</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set password</b>	Sets the password for the endpoint user.  After entering the <b>set password</b> command, you are prompted to enter and confirm the password. For security purposes, the password that you type does not appear in the CLI.
<b>Step 5</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>set privilege</b> { <b>admin</b>   <b>readonly</b> }	Specifies whether the endpoint user has administrative or read-only privileges.
<b>Step 6</b>	UCS-A /org/ipmi-access-profile/ipmi-user # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example adds an endpoint user named alice to the IPMI access profile named ReadOnly and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope ipmi-access-profile ReadOnly
UCS-A /org/ipmi-access-profile* # create ipmi-user alice
UCS-A /org/ipmi-access-profile/ipmi-user* # set password
Enter a password:
Confirm the password:
UCS-A /org/ipmi-access-profile/ipmi-user* # set privilege readonly
UCS-A /org/ipmi-access-profile/ipmi-user* # commit-buffer
UCS-A /org/ipmi-access-profile/ipmi-user #
```

## Deleting an Endpoint User from an IPMI Access Profile

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope ipmi-access-profile</b> <i>profile-name</i>	Enters organization IPMI access profile mode for the specified IPMI access profile.
<b>Step 3</b>	UCS-A /org/ipmi-access-profile # <b>delete ipmi-user</b> <i>epuser-name</i>	Deletes the specified endpoint user from the IPMI access profile.
<b>Step 4</b>	UCS-A /org/ipmi-access-profile # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the endpoint user named alice from the IPMI access profile named ReadOnly and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope ipmi-access-profile ReadOnly
UCS-A /org/ipmi-access-profile # delete ipmi-user alice
UCS-A /org/ipmi-access-profile* # commit-buffer
UCS-A /org/ipmi-access-profile #
```

## KVM Management Policy

The KVM Management policy allows you to determine whether vMedia encryption is enabled when you access a server via KVM.

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



**Note** After a KVM vMedia session is mapped, if you change the KVM management policy, it will result in a loss of the vMedia session. You must re-map the KVM vMedia session again.

Before Cisco UCS Manager Release 4.0(4), port 2068 was the only KVM port. Beginning with Release 4.0(4), you can configure a port number between 1024 and 49151 as the KVM port. Port 2068 continues to be the default KVM port number.



## Configuring a KVM Management Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create kvm-mgmt-policy</b> <i>policy-name</i>	Creates the specified KVM management policy and enters organization KVM management policy mode.
<b>Step 3</b>	(Optional) UCS-A /org/kvm-mgmt-policy* # <b>set descr</b> <i>description</i>	Provides a description for the policy.
<b>Step 4</b>	UCS-A /org/kvm-mgmt-policy* # <b>set vmedia-encryption</b> { <b>disable</b>   <b>enable</b> }	Specifies vMedia encryption is enabled or disabled.  <b>Note</b> Starting with UCS Manager 4.2, vMedia Encryption is always enabled for security purposes. It cannot be modified by the user.
<b>Step 5</b>	UCS-A /org/kvm-mgmt-policy* # <b>set kvm-port</b> <i>port-num</i>	Specifies the KVM port. This can be a port number between 1024 and 49151. The default port number is 2068.
<b>Step 6</b>	UCS-A /org/kvm-mgmt-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create a KVM management policy named KVM\_Policy1, enable vMedia encryption, set the KVM port number, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # create kvm-mgmt-policy KVM_Policy1
UCS-A /org/kvm-mgmt-policy* # set vmedia-encryption enable
UCS-A /org/kvm-mgmt-policy* # set kvm-port 2078
UCS-A /org/kvm-mgmt-policy* # commit-buffer
UCS-A /org/kvm-mgmt-policy #
```

## Modifying a KVM Management Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope kvm-mgmt-policy</b> <i>policy-name</i>	Enters organization KVM management policy mode for the specified KVM management policy.
<b>Step 3</b>	(Optional) UCS-A /org/kvm-mgmt-policy # <b>set descr</b> <i>description</i>	Provides a description for the policy.
<b>Step 4</b>	UCS-A /org/kvm-mgmt-policy* # <b>set vmedia-encryption</b> { <b>disable</b>   <b>enable</b> }	Specifies whether vMedia encryption is enabled or disabled.
<b>Step 5</b>	UCS-A /org/kvm-mgmt-policy* # <b>set kvm-port</b> <i>port-num</i>	Specifies the KVM port. This can be a port number between 1024 and 49151. The default port number is 2068.
<b>Step 6</b>	UCS-A /org/kvm-mgmt-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to modify a KVM management policy named KVM\_Policy1, and commit the transaction:

```
UCS-A# scope org /
UCS-A /org # scope kvm-mgmt-policy KVM_Policy1
UCS-A /org/kvm-mgmt-policy # show detail
Kvm Mgmt Policy:
  Name: KVM_Policy1
  Description:
  Vmedia Encryption: Disable
  Kvm Port: 2078
UCS-A /org/kvm-mgmt-policy* # set vmedia-encryption enable
UCS-A /org/kvm-mgmt-policy* # set kvm-port 2088
UCS-A /org/kvm-mgmt-policy* # commit-buffer
UCS-A /org/kvm-mgmt-policy # show detail
Kvm Mgmt Policy:
  Name: KVM_Policy1
  Description:
  Vmedia Encryption: Enable
  Kvm Port: 2088
```

## Displaying KVM Management Policy Properties

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope kvm-mgmt-policy</b> <i>policy-name</i>	Enters organization KVM management policy mode for the specified KVM management policy.
<b>Step 3</b>	UCS-A /org/kvm-mgmt-policy # <b>show detail</b>	Displays details of the specified policy.

### Example

The following example shows how to display details of a KVM management policy named KVM\_Policy1:

```
UCS-A# scope org /
UCS-A /org # scope kvm-mgmt-policy KVM_Policy1
UCS-A /org/kvm-mgmt-policy # show detail
Kvm Mgmt Policy:
  Name: KVM_Policy1
  Description:
  Vmedia Encryption: Enable
  Kvm Port: 2088
UCS-A /org/kvm-mgmt-policy #
```

## SPDM Security

Cisco UCS M6, M7 Servers can contain mutable components that could provide vectors for attack against a device itself or use of a device to attack another device within the system. To defend against these attacks, the Security Protocol and Data Model (SPDM) Specification enables a secure transport implementation that challenges a device to prove its identity and the correctness of its mutable component configuration. This feature is supported on Cisco UCS C220 and C240 M6, M7 Servers starting with in Cisco UCS Manager, Release 4.3(2b).



**Note** SPDM is currently not supported on the Cisco UCS C225 M6 Server and Cisco UCS C245 M6 Server.

SPDM defines messages, data objects, and sequences for performing message exchanges between devices over a variety of transport and physical media. It orchestrates message exchanges between Baseboard Management Controllers (BMC) and end-point devices over a Management Component Transport Protocol (MCTP). Message exchanges include authentication of hardware identities accessing the BMC. The SPDM enables access to low-level security capabilities and operations by specifying a managed level for device

authentication, firmware measurement, and certificate management. Endpoint devices are challenged to provide authentication, and BMC authenticates the endpoints and only allows access for trusted entities.

The UCS Manager optionally allows uploads of external security certificates to BMC. A maximum of 40 SPDM certificates is allowed, including native internal certificates. Once the limit is reached, no more certificates can be uploaded. User uploaded certificates can be deleted but internal/default certificates cannot.

A SPDM security policy allows you to specify one of three Security level settings. Security can be set at one of the three levels listed below:

- Full Security:

This is the highest MCTP security setting. When you select this setting, a fault is generated when any endpoint authentication failure or firmware measurement failure is detected. A fault will also be generated if any of the endpoints do not support either endpoint authentication or firmware measurements.

- Partial Security (default):

When you select this setting, a fault is generated when any endpoint authentication failure or firmware measurement failure is detected. There will NOT be a fault generated when the endpoint doesn't support endpoint authentication or firmware measurements.

- No Security

When you select this setting, there will NOT be a fault generated for any failure (either endpoint measurement or firmware measurement failures).

You can also upload the content of one or more external/device certificates into BMC. Using a SPDM policy allows you to change or delete security certificates or settings as desired. Certificates can be deleted or replaced when no longer needed.

Certificates are listed in all user interfaces on a system.

## Creating and Configuring a SPDM Security Certificate Policy using CLI

A Security Protocol and Data Model (SPDM) policy can be created to present security alert-level and certificate contents to BMC for authentication.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create spdm-certificate-policy</b> <i>policy-name</i>	Creates a SPDM security certificate policy with the specified policy name, and enters organization SPDM certificate policy mode.  <b>Note</b> The only supported certificate type is <b>pem</b> .

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/spdm-certificate-policy* # <b>set fault-alert</b> {full   partial   no}	Configures the fault alert level for this policy.
<b>Step 4</b>	(Optional) UCS-A /org/spdm-certificate-policy* # <b>set descr</b> <i>description</i>	Provides a description for the SPDM security certificate policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	UCS-A /org/spdm-certificate-policy* # <b>create certificate</b> <i>certificate-name</i>	
<b>Step 6</b>	UCS-A /org/spdm-certificate-policy* # <b>set content</b>	This prompts for the content of the outside certificate. Enter certificate content one line at a time. After End of Certificate, enter ENDOFBUF at the prompt to return to the command line.  <b>Note</b> To exit without committing the certificate content, enter <b>C</b> .
<b>Step 7</b>	UCS-A /org/spdm-certificate-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**What to do next**

Assign outside security certificates, if desired.

## Displaying the Security Policy Fault Alert Level

After the policy is created, you can check the alert level for the SPDM policy.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A /org/spdm-certificate-policy # <b>show fault-alert</b>  <b>Example:</b> UCS-A /server/cimc/spdm-certificate #show fault-alert	The returned result shows that the setting for this SPDM policy is Partial, the default.  SPDM Fault Alert Setting: Partial

## Loading an Outside SPDM Security Certificate Policy

The SPDM allows you to download an outside security certificate.

### Before you begin

Create a SPDM security certificate policy.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A /org # <b>scope spdm-certificate-policy</b>	Enters SPDM security certificate policy mode.
<b>Step 2</b>	UCS-A org/spdm-certificate-policy# <b>create spdm-cert</b> <i>Certificate name</i>	Creates a SPDM security certificate policy for the specified external certificate,.
<b>Step 3</b>	UCS-A /org/spdm-certificate-policy* # <b>set</b> <i>{certificate }</i>	Specifying certificate prompts for the content of the outside certificate. The only supported certificate type is <b>pem</b> .
<b>Step 4</b>	UCS-A /org/spdm-certificate-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

The following example shows loading a certificate for Broadcom of type PEM.

### Example

```
UCS-A-FI-A /org/spdm-certificate-policy# create spdm-cert?
Name - Certificate name

UCS-A-FI-A /org/spdm-certificate-policy# create spdm-cert Broadcom
UCS-A-FI-A /org/spdm-certificate-policy/spdm-cert* # set?
certificate - Certificate content

UCS-A-FI-A /org/spdm-certificate-policy/spdm-cert* # set certificate
{enter certificate content}
UCS-A-FI-A /org/spdm-certificate-policy/spdm-cert* # commit-buffer
UCS-A-FI-A /org/spdm-certificate-policy/spdm-cert# show detail
SPDM Certificate:
Name: Broadcom
Certificate Type: pem
Certificate Content:
```

## Viewing the Certificate Inventory

You can view what SPDM certificates have been uploaded and also request further details for a specified certificate.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope server</b> <i>server</i>	
<b>Step 2</b>	UCS-A/server # <b>scope cimc</b> <i>server</i>	
<b>Step 3</b>	UCS-A/server/cimc # <b>scope spdm</b> <i>server</i>	
<b>Step 4</b>	UCS-A/server/cimc/spdm # <b>show certificate</b>	The returned result shows the certificate inventory.
<b>Step 5</b>	UCS-A/server/cimc/spdm # <b>show certificate certificate-iddetail</b>  <b>Example:</b>  UCS-A /server/cimc/spdm-certificate #show certificate 3 detail Certificate Information Certificate Id : 3 Subject Country Code (C) : US Subject State (ST) : Colorado Subject Organization (O) : Broadcom Inc. Subject Organization Unit (OU) : NA Subject Common Name (CN) : NA Issuer Country Code (C) : US Issuer State (ST) : Colorado Issuer City (L) : Colorado Springs Issuer Organization (O) : Broadcom Inc. Issuer Organization Unit (OU) : NA Issuer Common Name (CN) : NA Valid From : Oct 23 00:25:13 2019 GMT Valid To : Apr 8 10:36:14 2021 GMT UserUploaded : Yes Certificate Content : <Certificate String> Certificate Type : PEM	The returned result shows the certificate ID, identifiers, and expiration date.
<b>Step 6</b>	UCS-A /org/spdm-certificate-policy/certificate # <b>show</b>  <b>Example:</b>  SPDM Certificate: Name SPDM Certificate Type  ----- ----- cert1 Pem  <b>Example:</b>  UCS-A /server/cimc/spdm-certificate/certificate #up	The returned result shows the type of certificate details.  The returned result shows the fault alert setting.

	Command or Action	Purpose
	<pre>UCS-A /server/cimc/spdm-certificate #show  SPDM Certificate Policy:   Name          Fault Alert Setting ----- -----   Broadcom          Full</pre>	

## Deleting a SPDM Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the org-name.
<b>Step 2</b>	UCS-A /org # <b>delete spdm-certificate-policy</b> <i>policy-name</i>	Deletes the specified SPDM control policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes a power control policy called VendorPolicy2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete spdm-certificate-policy VendorPolicy2
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Graphics Card Policies

Cisco UCS Manager Release 3.1(3) extends graphics card support to include the ability to change the graphics card mode. You can now configure graphics card modes by using a graphics card policy. The graphics card modes are:

- Compute
- Graphics
- Any Configuration



## Creating a Graphics Card Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b>	Enters the root organization mode
<b>Step 2</b>	UCS-A /org # <b>create graphicscard-policy</b> <i>policy name</i>	Creates a graphics card policy with the specified policy name, and enters the graphics card policy mode.
<b>Step 3</b>	UCS-A /org/graphicscard-policy # <b>commit</b> <b>buffer</b>	Commits the transaction to the system configuration.

### Example

This example shows how to create a graphics card policy:

```
UCS-A# scope org
UCS-A /org # create graphicscard-policy sample
UCS-A /org/graphicscard-policy* # commit-buffer
UCS-A /org/graphicscard-policy #
```

## Setting Mode of the Graphics Card Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b>	Enters the root organization mode
<b>Step 2</b>	UCS-A /org # <b>scope graphicscard-policy</b> <i>policy name</i>	Enters organization graphics card policy mode.
<b>Step 3</b>	UCS-A /org/graphicscard-policy # <b>set</b> <b>graphicscard-policy-mode</b> [compute]   [graphic]   [any configuration]	Specifies the mode for the graphics card policy.
<b>Step 4</b>	UCS-A /org/graphicscard-policy # <b>commit</b> <b>buffer</b>	Commits the transaction to the system configuration.

### Example

This example shows how to set the mode of a graphics card policy:

```
UCS-A# scope org
UCS-A /org # scope graphicscard-policy sample
UCS-A /org/graphicscard-policy # set graphicscard-policy-mode graphics
UCS-A /org/graphicscard-policy* # commit-buffer
```

```
UCS-A /org/graphicscard-policy #
```

## Displaying Details of the Graphics Card

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope server</b> <i>server number</i>	Enters the chassis server mode for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope graphics-card</b> <i>identifier</i>	Enters the graphics card configuration mode for the specified server.
<b>Step 3</b>	UCS-A /chassis/server/graphics-card # <b>show graphics-card</b> [ <b>detail</b> ] [ <b>expand</b> ]	Displays the details of the graphics card for the specified server.

### Example

This example shows how to display the details of a graphics card:

```
UCS-A# scope server 1/3
UCS-A /chassis/server # scope graphics-card 2
UCS-A /chassis/server/graphics-card* # show detail
```

```
Graphics Card:
  ID: 2
  Slot Id: 2
  Magma Expander Slot Id:
  Is Supported: Yes
  Vendor: Cisco Systems Inc
  Model: UCSB-GPU-M6
  Serial: FHH1924002B
  Mode: Graphics
  PID: UCSB-GPU-M6
  Firmware Version: 84.04.89.00.01|2754.0200.01.02
  Vendor Id: 0x10de
  Subvendor Id: 0x10de
  Device Id: 0x13f3
  Subdevice Id: 0x1143
UCS-A /chassis/server/graphics-card #
```

## Displaying Details of the Graphics Card Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b>	Enters the root organization mode
<b>Step 2</b>	UCS-A /org # <b>show graphicscard-policy detail</b>	Displays the details of the graphics card policy.

### Example

This example shows how to display the details of a graphics card policy:

```
UCS-A# scope org
UCS-A /org # show graphicscard-policy detail

Graphics Card Policy:
  Name: sample
  Description:
  Graphics Card Policy Mode: Compute

  Name: default
  Description:
  Graphics Card Policy Mode: Any Configuration

  Name: graphics
  Description:
  Graphics Card Policy Mode: Graphics
UCS-A /org #
```

## Configuring Local Disk Configuration Policies

### Local Disk Configuration Policy

This policy configures any optional SAS local drives that have been installed on a server through the onboard RAID controller of the local drive. This policy enables you to set a local disk mode for all servers that are associated with a service profile that includes the local disk configuration policy.

The local disk modes include the following:

- **No Local Storage**—For a diskless server or a SAN only configuration. If you select this option, you cannot associate any service profile which uses this policy with a server that has a local disk.
- **RAID 0 Striped**—Data is striped across all disks in the array, providing fast throughput. There is no data redundancy, and all data is lost if any disk fails.
- **RAID 1 Mirrored**—Data is written to two disks, providing complete data redundancy if one disk fails. The maximum array size is equal to the available space on the smaller of the two drives.
- **Any Configuration**—For a server configuration that carries forward the local disk configuration without any changes.
- **No RAID**—For a server configuration that removes the RAID and leaves the disk MBR and payload unaltered.

If you choose **No RAID** and you apply this policy to a server that already has an operating system with RAID storage configured, the system does not remove the disk contents. Therefore, there may be no visible differences on the server after you apply the **No RAID** mode. This can lead to a mismatch between the RAID configuration in the policy and the actual disk configuration shown in the **Inventory > Storage** tab for the server.

To make sure that any previous RAID configuration information is removed from a disk, apply a scrub policy that removes all disk information after you apply the **No RAID** configuration mode.

- **RAID 5 Striped Parity**—Data is striped across all disks in the array. Part of the capacity of each disk stores parity information that can be used to reconstruct data if a disk fails. RAID 5 provides good data throughput for applications with high read request rates.
- **RAID 6 Striped Dual Parity**—Data is striped across all disks in the array and two parity disks are used to provide protection against the failure of up to two physical disks. In each row of data blocks, two sets of parity data are stored.
- **RAID 10 Mirrored and Striped**—RAID 10 uses mirrored pairs of disks to provide complete data redundancy and high throughput rates.
- **RAID 50 Striped Parity and Striped**—Data is striped across multiple striped parity disk sets to provide high throughput and multiple disk failure tolerance.
- **RAID 60 Striped Dual Parity and Striped**—Data is striped across multiple striped dual parity disk sets to provide high throughput and greater disk failure tolerance.

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




---

**Note** For a Cisco UCS C-Series server integrated with Cisco UCS Manager, with an embedded on-board RAID controller, the local disk mode should always be **Any Configuration**, and the RAID must be configured directly on the controller.

---

## Guidelines for all Local Disk Configuration Policies

Before you create a local disk configuration policy, consider the following guidelines:

### No Mixed HDDs and SSDs

Do not include HDDs and SSDs in a single server or RAID configuration.

## Guidelines for Local Disk Configuration Policies Configured for RAID

### Configure RAID Settings in Local Disk Configuration Policy for Servers with MegaRAID Storage Controllers

If a blade server or integrated rack-mount server has a MegaRAID controller, you must configure RAID settings for the drives in the Local Disk Configuration policy included in the service profile for that server. You can do this either by configuring the local disk configuration policy in the service profile using one of the defined RAID modes for that server, or you can use the **Any Configuration** mode with the LSI Utilities toolset to create the RAID volumes.

If you do not configure your RAID LUNs before installing the OS, disk discovery failures might occur during the installation and you might see error messages such as “No Device Found.”

### Server May Not Boot After RAID1 Cluster Migration if Any Configuration Mode Specified in Service Profile

After RAID1 clusters are migrated, you need to associate a service profile with the server. If the local disk configuration policy in the service profile is configured with **Any Configuration** mode rather than **RAID1**, the RAID LUN remains in "inactive" state during and after association. As a result, the server cannot boot.

To avoid this issue, ensure that the service profile you associate with the server contains the identical local disk configuration policy as the original service profile before the migration and does not include the **Any Configuration** mode.

### Do Not Use JBOD Mode on Servers with MegaRAID Storage Controllers

Do not configure or use JBOD mode or JBOD operations on any blade server or integrated rack-mount server with a MegaRAID storage controllers. JBOD mode and operations are not intended for nor are they fully functional on these servers.

### Maximum of One RAID Volume and One RAID Controller in Integrated Rack-Mount Servers

A rack-mount server that has been integrated with Cisco UCS Manager can have a maximum of one RAID volume irrespective of how many hard drives are present on the server.

All the local hard drives in an integrated rack-mount server must be connected to only one RAID Controller. Integration with Cisco UCS Manager does not support the connection of local hard drives to multiple RAID Controllers in a single rack-mount server. We therefore recommend that you request a single RAID Controller configuration when you order rack-mount servers to be integrated with Cisco UCS Manager.

In addition, do not use third party tools to create multiple RAID LUNs on rack-mount servers. Cisco UCS Manager does not support that configuration.

### Maximum of One RAID Volume and One RAID Controller in Blade Servers

A blade server can have a maximum of one RAID volume irrespective of how many drives are present in the server. All the local hard drives must be connected to only one RAID controller.

In addition, do not use third party tools to create multiple RAID LUNs on blade servers. Cisco UCS Manager does not support that configuration.

### License Required for Certain RAID Configuration Options on Some Servers

Some Cisco UCS servers require a license for certain RAID configuration options. When Cisco UCS Manager associates a service profile containing this local disk policy with a server, Cisco UCS Manager verifies that the selected RAID option is properly licensed. If there are issues, Cisco UCS Manager displays a configuration error during the service profile association.

For RAID license information for a specific Cisco UCS server, see the *Hardware Installation Guide* for that server.

## Creating a Local Disk Configuration Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>create local-disk-config-policy</b> <i>policy-name</i>	Creates a local disk configuration policy and enters local disk configuration policy mode.

	Command or Action	Purpose
<b>Step 3</b>	(Optional) UCS-A /org/local-disk-config-policy # <b>set descr</b> <i>description</i>	Provides a description for the local disk configuration policy.
<b>Step 4</b>	UCS-A /org/local-disk-config-policy # <b>set mode</b> { <b>any-configuration</b>   <b>no-local-storage</b>   <b>no-raid</b>   <b>raid-0-striped</b>   <b>raid-1-mirrored</b>   <b>raid-5-striped-parity</b>   <b>raid-6-striped-dual-parity</b>   <b>raid-10-mirrored-and-striped</b> }	Specifies the mode for the local disk configuration policy.
<b>Step 5</b>	UCS-A /org/local-disk-config-policy # <b>set protect</b> { <b>yes</b>   <b>no</b> }	<p>Specifies whether the server retains the configuration in the local disk configuration policy even if the server is disassociated from the service profile.</p> <p><b>Caution</b> Protect Configuration becomes non-functional if one or more disks in the server are defective or faulty.</p> <p>When a service profile is disassociated from a server and a new service profile associated, the setting for the Protect Configuration property in the new service profile takes precedence and overwrites the setting in the previous service profile.</p> <p>With this option enabled, the data on the disk is protected even after the server is decommissioned and then recommissioned. Hence, reassociation of the server with a service profile fails.</p> <p><b>Note</b> If you disassociate the server from a service profile with this option enabled and then associate it with a new service profile that includes a local disk configuration policy with different properties, the server returns a configuration mismatch error and the association fails.</p>
<b>Step 6</b>	UCS-A /org/local-disk-config-policy # <b>set flexflash-state</b> { <b>enable</b>   <b>disable</b> }	Specifies whether FlexFlash SD card support is enabled.
<b>Step 7</b>	UCS-A /org/local-disk-config-policy # <b>set flexflash-raid-reporting-state</b> { <b>enable</b>   <b>disable</b> }	Specifies whether FlexFlash RAID reporting support is enabled.

	Command or Action	Purpose
		<b>Note</b> If only one SD card is installed, the FlexFlash inventory displays the RAID State as Disabled and the RAID Health as NA.
<b>Step 8</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a local disk configuration policy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create local-disk-config-policy DiskPolicy7
UCS-A /org/local-disk-config-policy* # set mode raid-1-mirrored
UCS-A /org/local-disk-config-policy* # set protect yes
UCS-A /org/local-disk-config-policy* # commit-buffer
UCS-A /org/local-disk-config-policy #
```

## Viewing a Local Disk Configuration Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>show local-disk-config-policy</b> <i>policy-name</i>	Displays the local disk policy. If you have not configured a local disk policy, the local disk configuration (created by the create local-disk-config command) displays.  Displays the local disk definition (set by the create local-disk-config command). If the serial over LAN definition is not set, and if a policy is set (using the set local-disk-config-policy command), then the policy will be displayed.

### Example

The following example shows how to display local disk policy information for a local disk configuration policy called DiskPolicy7:

```
UCS-A# scope org /
UCS-A /org # show local-disk-config-policy DiskPolicy7
```

```
Local Disk Config Policy:
Name: DiskPolicy7
```

```
Mode: Raid 1 Mirrored
Description:
Protect Configuration: Yes
```

## Deleting a Local Disk Configuration Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete local-disk-config-policy</b> <i>policy-name</i>	Deletes the specified local disk configuration policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the local disk configuration policy named DiskPolicy7 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete local-disk-config-policy DiskPolicy7
UCS-A /org* # commit-buffer
UCS-A /org #
```

## FlexFlash Secure Digital Card Support

### Overview

The SD cards are hosted by the Cisco Flexible Flash storage controller, a PCI-based controller which has two slots for SD cards. The cards contain a single partition called HV. When FlexFlash is enabled, Cisco UCS Manager displays the HV partition as a USB drive to both the BIOS and the host operating system.

You can populate one or both the SD card slots that are provided. If two SD cards are populated, you can use them in a mirrored mode.

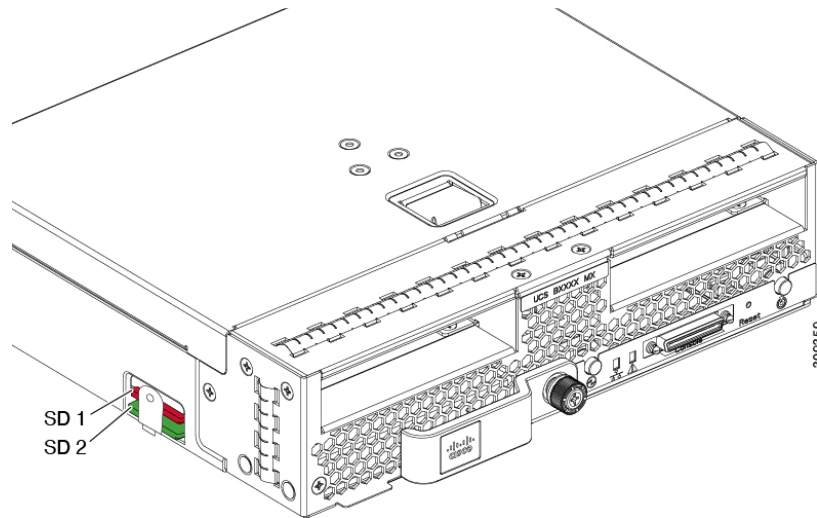


**Note** Do not mix different capacity cards in the same server.

The SD cards can be used to store operating system boot images or other information. The following figure illustrates the SD card slots.



Figure 1: SD Card Slots



FlexFlash is disabled by default. You can enable FlexFlash in a local disk policy used in a service profile. When FlexFlash is enabled in a local disk policy, and the server is capable of supporting SD cards, the FlexFlash controller is enabled during service profile association. If a server is not capable of supporting SD cards or has an older CIMC version, a config failure message is displayed.

If you disable FlexFlash in a supported server, the Hypervisor or HV partition is immediately disconnected from the host. The FlexFlash controller will also be disabled as part of a related service profile disassociation.

The FlexFlash controller supports RAID-1 for dual SD cards. The FlexFlash scrub policy erases the HV partition in both cards, and brings the cards to a healthy RAID state.

You can configure new SD cards in a RAID pair and format them using one of the following methods:

- Format the SD cards.
- For an associated server, create a FlexFlash scrub policy and disassociate the service profile from the server. For an unassociated server, create a FlexFlash scrub policy and reacknowledge the server after modifying the default scrub policy.

The *Scrub Policy Settings* section in the *Cisco UCS Manager Server Management Guide* provides more details about the usage of the scrub policy.




---

**Note** Disable the scrub policy as soon as the pairing is complete.

---

To boot from the HV partition, the SD card must be present in the boot policy used in the service profile.

### FlexFlash Firmware Management

The FlexFlash controller firmware is bundled as part of the CIMC image. When you upgrade the CIMC, if a newer firmware version is available for the FlexFlash controller, the controller can no longer be managed, and the FlexFlash inventory displays the **Controller State** as **Waiting For User Action** and the **Controller Health** as **Old Firmware Running**. To upgrade the FlexFlash controller firmware, you need to perform a board controller update. For more information, see the appropriate *Cisco UCS B-Series Firmware Management*

*Guide*, available at the following URL:

[http://www.cisco.com/en/US/products/ps10281/products\\_installation\\_and\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps10281/products_installation_and_configuration_guides_list.html).

#### **Limitations for the Cisco Flexible Flash Storage Controller:**

- The Cisco Flexible Flash storage controller only supports 16 GB, 32 GB, and 64 GB SD cards.
- We do not recommend using an SD card from a rack server in a blade server, or using an SD card from a blade server in a rack server. Switching SD cards between server types might result in data loss from the SD card.
- Some Cisco UCS C-Series rack-mount servers have SD cards with four partitions: HV, HUU, SCU, and Drivers. Only the HV partition is visible in Cisco UCS Manager. You can migrate a four-partition SD card to a single HV partition card with a FlexFlash scrub policy.
- The FlexFlash controller does not support RAID-1 sync (mirror rebuild). If the SD cards are in a degraded RAID state, or if any metadata errors are reported by the controller, you must run the FlexFlash scrub policy to pair the cards for RAID. For more information about the FlexFlash scrub policy, see [Server-Related Policies](#). The following conditions might result in degraded RAID or metadata errors:
  - Inserting a new or used SD card in one slot, when the server already has an SD card populated in the second slot.
  - Inserting two SD cards from different servers.
- The server firmware version must be at 2.2(1a) or higher.

## **FlexFlash FX3S Support**

Beginning with Release 2.2(3), Cisco UCS Manager allows additional FlexFlash support with the FX3S controller. The FX3S controller is present on the following servers:

- Cisco UCS M5 blade server
- Cisco UCS M5 rack server
- Cisco UCS M5 rack server
- C480 M5 rack server
- C480 M5 ML blade server
- B480 M5 blade server
- Cisco UCS C125 M5 Server

FlexFlash operations with the FX3S control are similar to those with the Cisco Flexible Flash storage controller. FlexFlash is disabled by default, and is enabled using a local disk policy. You can also reset the controller, format the SD cards, and enable automatic synchronization of your paired SD cards.

The SD cards for the FX3S controller contain a single partition called Hypervisor.

#### **Limitations for the Cisco FX3S Controller:**

- The FX3S controller supports only 32 GB and 64 GB SD cards. 16 GB cards are not supported.
- The FX3S controller supports 128 GB cards on M5 blades and above.

- We do not recommend using an SD card from a rack server in a blade server, or using an SD card from a blade server in a rack server. Switching SD cards between server types might result in data loss from the SD card.
- The server firmware version must be at 2.2(3a) or higher.

## Starting up Blade Servers with FlexFlash SD Cards

Use this procedure to start up blade servers using FlexFlash cards 16 GB and larger. This procedure requires that you know how to setup the blade server, software, and the associated infrastructure, and ensure that they are working. This Cisco UCS Manager controlled procedure is applicable to all blade servers, running any version of firmware. This procedure does not apply to rack servers. Follow this procedure before you enable FlexFlash cards in a working environment.



**Caution** If you use the following procedure with FlexFlash cards already in use, you will lose all data from the cards.



**Note** This procedure does not cover FlexFlash card usage or other functions of the FlexFlash system.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope local-disk-config-policy</b> <i>FlexFlash-name</i>	Enters the specified local disk configuration policy mode.
<b>Step 3</b>	UCS-A /org/local-disk-config-policy # <b>set flexflash-state</b> {enable   disable}	Specifies whether FlexFlash SD card support is enabled.
<b>Step 4</b>	UCS-A /org/local-disk-config-policy # <b>set flexflash-raid-reporting-state</b> {enable   disable}	Specifies whether FlexFlash RAID reporting support is enabled.  <b>Note</b> If only one SD card is installed, the FlexFlash inventory displays the RAID State as Disabled and the RAID Health as NA.
<b>Step 5</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system.
<b>Step 6</b>	UCS-A/org/local-disk-config-policy # <b>show detail</b>	Displays the detailed FlexFlash controller properties. / as the <i>org-name</i> .
<b>Step 7</b>	UCS-A# <b>top</b>	

	Command or Action	Purpose
<b>Step 8</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 9</b>	UCS-A /org # <b>scope service-profile</b> <i>slot-3-name</i>	Enters organization service profile mode for the specified service. Slot 3 represents the particular blade's service profile.
<b>Step 10</b>	UCS-A /org/scope service-profile# <b>set local-disk-policy-state</b> <i>FlexFlash-name</i>	Associates the specified local disk policy with the service profile. FlexFlash represents the particular local disk policy.
<b>Step 11</b>	UCS-A /org/scope service-profile# <b>associate server</b> <i>1/1</i>	Associates the service profile with the specified blade server. 1 represents the blade number and the other represents the chassis number.
<b>Step 12</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system.
<b>Step 13</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 14</b>	UCS-A /org # <b>create scrub-policy</b> <i>Scrub-FF-name</i>	Creates a scrub policy with the specified policy name, and enters organization scrub policy mode.
<b>Step 15</b>	(Optional) UCS-A /org/scrub-policy # <b>set descr</b> <i>Scrub FlexFlash ONLY-name</i>	Provides a description for the scrub policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 16</b>	UCS-A /org/scrub-policy # <b>set disk-scrub no</b>	Disables disk scrubbing on servers using this scrub policy.
<b>Step 17</b>	UCS-A /org/scrub-policy # <b>set bios-settings-scrub no</b>	Disables BIOS settings scrubbing on servers using this scrub policy.
<b>Step 18</b>	UCS-A /org/scrub-policy # <b>set flexflash-scrub yes</b>	Enables FlexFlash settings scrubbing on servers using this scrub policy.
<b>Step 19</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system.
<b>Step 20</b>	UCS-A# <b>top</b>	

	Command or Action	Purpose
<b>Step 21</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 22</b>	UCS-A /org # <b>scope service-profile</b> <i>slot-3-name</i>	Enters organization service profile mode for the specified service. Slot 3 represents the particular blade's service profile.
<b>Step 23</b>	UCS-A # <b>acknowledge server</b> <i>1/3-name</i>	Acknowledges the specified blade server. 1 represents the chassis-num and 3 represents the server number.
<b>Step 24</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system. Wait for the blade server to complete committing the transaction.
<b>Step 25</b>	UCS-A # <b>acknowledge server</b> <i>1/3-name</i>	Acknowledges the specified blade server. 1 represents the chassis-num and 3 represents the server number.
<b>Step 26</b>	UCS-A /org/local-disk-config-policy # <b>commit-buffer</b>	Commits the transaction to the system. The FlexFlash cards are now synced and ready to use.

### Example

The following example shows the output from the console for starting up the FlexFlash card and creating the policies:

```
#Creating the FlexFlash off policy

UCS-A# scope org
UCS-A /org # create local-disk-config-policy FF-off
UCS-A /org/local-disk-config-policy* # set flexflash-state disable
UCS-A/org/local-disk-config-policy* # commit-buffer
UCS-A/org/local-disk-config-policy # show detail

#Creating a Local Disk Configuration Policy

UCS-A# scope org
UCS-A /org # scope service-profile slot_4
UCS-A /org/service-profile # set local-disk-policy FF-off
UCS-A /org/service-profile* #

UCS-A/org/service-profile* # associate server 1/4
UCS-A/org/service-profile* # commit-buffer
UCS-A /org/service-profile # show detail

#Creating a FlexFlash On policy

UCS-A /org # top
UCS-A# scope org
UCS-A /org # create local-disk-config-policy FF-ON
UCS-A /org/local-disk-config-policy* # set flexflash-state enable
UCS-A /org/local-disk-config-policy* # set flexflash-raid-reporting-state enable
```

```

UCS-A /org/local-disk-config-policy* # commit-buffer
UCS-A /org/local-disk-config-policy #
UCS-A /org/local-disk-config-policy #
UCS-A /org/local-disk-config-policy # show detail

UCS-A /org # top
UCS-A# scope org
UCS-A /org # scope service-profile slot_4
UCS-A /org/service-profile # set local-disk-policy FF-ON
UCS-A /org/service-profile* #

UCS-A /org/service-profile* # associate server 1/4
UCS-A /org/service-profile* # commit-buffer
UCS-A /org/service-profile # show detail

```

## Enabling Auto-Sync

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope server</b> <i>server-num</i>	Enters server chassis mode.
<b>Step 3</b>	UCS-A /chassis/server # <b>scope flexflash-controller</b> <i>controller-id</i>	Enters flexflash controller server chassis mode.
<b>Step 4</b>	UCS-A /chassis/server/flexflash-controller # <b>pair</b> <i>primary_slot_number</i>	Resyncs the SD cards if they are out of sync, using the card in the selected slot number as the primary. This can be one of the following: <ul style="list-style-type: none"> <li>• <b>1</b>—The SD card in slot 1 will be used as the primary.</li> <li>• <b>2</b>—The SD card in slot 2 will be used as the primary.</li> </ul>
<b>Step 5</b>	UCS-A /chassis/server/flexflash-controller # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example resyncs the SD cards using the SD card in slot 2 as the primary:

```

UCS-A# scope chassis 1
UCS-A /chassis # scope server 1
UCS-A /chassis/server # scope flexflash-controller 1
UCS-A /chassis/server/flexflash-controller # pair 2
UCS-A /chassis/server/flexflash-controller* # commit-buffer
UCS-A /chassis/server/flexflash-controller #

```

## Formatting the FlexFlash Cards

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope server</b> <i>server-num</i>	Enters server chassis mode.
<b>Step 3</b>	UCS-A /chassis/server # <b>scope flexflash-controller</b> <i>controller-id</i>	Enters flexflash controller server chassis mode.
<b>Step 4</b>	UCS-A /chassis/server/flexflash-controller # <b>format</b>	Formats the SD cards.
<b>Step 5</b>	UCS-A /chassis/server/flexflash-controller # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to format the FlexFlash controller:

```
UCS-A# scope chassis 1
UCS-A /chassis # scope server 1
UCS-A /chassis/server # scope flexflash-controller 1
UCS-A /chassis/server/flexflash-controller # format
Warning: When committed, UCSM will format the SD Cards.
This will completely erase the data on the SD Cards!!

UCS-A /chassis/server/flexflash-controller* # commit-buffer
UCS-A /chassis/server/flexflash-controller #
```

## Resetting the FlexFlash Controller

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope server</b> <i>server-num</i>	Enters server chassis mode.
<b>Step 3</b>	UCS-A /chassis/server # <b>scope flexflash-controller</b> <i>controller-id</i>	Enters flexflash controller server chassis mode.
<b>Step 4</b>	UCS-A /chassis/server/flexflash-controller # <b>reset</b>	Resets the specified FlexFlash controller.
<b>Step 5</b>	UCS-A /chassis/server/flexflash-controller # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shows how to reset the FlexFlash controller:

```
UCS-A# scope chassis 1
UCS-A /chassis # scope server 1
UCS-A /chassis/server # scope flexflash-controller 1
UCS-A /chassis/server/flexflash-controller # reset
Warning: When committed, UCSM will reset the FlexFlash Controller.
This will cause the host OS to lose connectivity to the SD Cards.

UCS-A /chassis/server/flexflash-controller* # commit-buffer
UCS-A /chassis/server/flexflash-controller #
```

**Viewing the FlexFlash Controller Status****Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A /chassis # <b>scope server</b> <i>server-num</i>	Enters server chassis mode.
<b>Step 3</b>	UCS-A /chassis/server # <b>scope flexflash-controller</b> <i>controller-id</i>	Enters flexflash controller server chassis mode.
<b>Step 4</b>	UCS-A /chassis/server/flexflash-controller # <b>show detail expand</b>	Displays the detailed FlexFlash controller properties.

**Example**

The following example shows the status of the FlexFlash controller and SD cards:

```
UCS-A# scope chassis 1
UCS-A /chassis # scope server 1
UCS-A /chassis/server # scope flexflash-controller 1
UCS-A /chassis/server/flexflash-controller # show detail expand
```

```
FlexFlash Controller:
  ID: 1
  Type: SD
  FlexFlash Type: FX3S
  Vendor: Cypress
  Model: FX3S
  Serial: NA
  Firmware Version: 1.3.2 build 158
  Controller State: Connected Partition Over USB To Host
  Controller Health: Old Firmware Running
  RAID State: Enabled Paired
  RAID Health: OK
  Physical Drive Count: 2
  Virtual Drive Count: 1
  RAID Sync Support: Supported
  Operability: Operable
  Oper Qualifier Reason:
  Presence: Equipped
```



Current Task:

FlexFlash Card:

Controller Index: 1  
Slot Number: 1  
Vendor: SE32G  
Model: SE32G  
HW Rev: 8.0  
Serial: Oxa2140794  
Manufacturer ID: 3  
OEM ID: SD  
Manufacturer Date: 2/14  
Size (MB): 30436  
Block Size: 512  
Card Type: FX3S configured  
Write Enabled: Not Write Protected  
Card Health: OK  
Card Mode: Secondary Active  
Operation State: Raid Partition  
Card State: Active  
Write IO Error Count: 0  
Read IO Error Count: 0  
Operability: Operable  
Oper Qualifier Reason:  
Presence: Equipped

FlexFlash Card Drive:

Name: Hypervisor  
Size (MB): 30432  
Removable: Yes  
Operability: Operable  
Operation State: Raid Partition

Controller Index: 1

Slot Number: 2  
Vendor: SE32G  
Model: SE32G  
HW Rev: 8.0  
Serial: Oxa2140742  
Manufacturer ID: 3  
OEM ID: SD  
Manufacturer Date: 2/14  
Size (MB): 30436  
Block Size: 512  
Card Type: FX3S configured  
Write Enabled: Not Write Protected  
Card Health: OK  
Card Mode: Primary  
Operation State: Raid Partition  
Card State: Active  
Write IO Error Count: 0  
Read IO Error Count: 0  
Operability: Operable  
Oper Qualifier Reason:  
Presence: Equipped

FlexFlash Card Drive:

Name: Hypervisor  
Size (MB): 30432  
Removable: Yes  
Operability: Operable  
Operation State: Raid Partition

Local Disk Config Definition:

```
Mode: Any Configuration
Description:
Protect Configuration: Yes
```

```
UCS-A /chassis/server/flexflash-controller #
```

## Persistent Memory Modules

Cisco UCS Manager 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. Starting with Cisco UCS Manager Release 4.2, the support for the Intel® Optane™ Data Center persistent memory modules on the UCS M6 servers that are based on the Second Generation Intel® Xeon® Scalable processors are also provided. 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*.

## Scrub Policies

### Scrub Policy Settings

This policy determines what happens to local data and to the BIOS settings on a server during the discovery process, when the server is re-acknowledged, or when the server is disassociated from a service profile.




---

**Note** Local disk scrub policies only apply to hard drives that are managed by Cisco UCS Manager and do not apply to other devices such as USB drives.

---

Depending upon how you configure a scrub policy, the following can occur at those times:

#### Disk scrub

One of the following occurs to the data on any local drives on disassociation:

- If enabled, deletes initial 200MB of data from master boot record or the boot sectors. Thus, preventing the system to boot from an already installed OS if any. For secure deletion of data on drives, refer [UCS Secure Data Deletion For Commission Regulation \(EU\) 2019 /424 Users Guide](#).




---

**Note** Though the disk scrub policy is not intended to delete the user data that exceeds 200MB, Cisco UCS Manager cannot guarantee against data loss.

---

- If disabled (default), preserves all data on any local drives, including local storage configuration.

For a server associated with a service profile, disk scrub occurs during disassociation, based on the scrub policy used in the service profile. For an un-associated server, disk scrub occurs during the server discovery process, based on the default scrub policy.

Scrub policies are supported on all B-Series platforms and only on the following C-Series platforms:

- Cisco UCS C220 M5 Server
- Cisco UCS C240 M5 Server
- Cisco UCS C480 M5 Server
- Cisco UCS C220 M6 Server
- Cisco UCS C240 M6 Server
- Cisco UCS C220 M7 Server
- Cisco UCS C240 M7 Server
- Cisco UCS C225 M6 Server
- Cisco UCS C245 M6 Server
- Cisco UCS C480 M5 ML Server
- Cisco UCS S3260 M5 Storage Server—You can scrub only the boot drives and VDs created using the same drives.



---

**Note** You must re-acknowledge the server to see the changes related to LUN deletion if:

- you are scrubbing boot drives which have LUNs under the SAS controller in a set up with Cisco UCS S3260 M5 Storage Server.
  - you are scrubbing the LUNs on Cisco boot optimized M.2 RAID controller.
- 

### BIOS Settings Scrub

One of the following occurs to the BIOS settings when a service profile containing the scrub policy is disassociated from a server:

- If enabled, erases all BIOS settings for the server and resets them to the BIOS defaults for that server type and vendor.
- If disabled (default), preserves the existing BIOS settings on the server.

### FlexFlash Scrub

FlexFlash Scrub enables you to pair new or degraded SD cards, resolve FlexFlash metadata configuration failures, and migrate older SD cards with 4 partitions to single partition SD cards. One of the following occurs to the SD card when a service profile containing the scrub policy is disassociated from a server, or when the server is reacknowledged:

- If enabled, the HV partition on the SD card is formatted using the PNUOS formatting utility. If two SD cards are present, the cards are RAID-1 paired, and the HV partitions in both cards are marked as valid. The card in slot 1 is marked as primary, and the card in slot 2 is marked as secondary.
- If disabled (default), preserves the existing SD card settings.

**Note**

- For a server associated with a service profile, FlexFlash scrub occurs during disassociation, based on the scrub policy used in the service profile. For an un-associated server, FlexFlash scrub occurs during the server discovery process, based on the default scrub policy.
- Because the FlexFlash scrub erases the HV partition on the SD cards, we recommend that you take a full backup of the SD card(s) using your preferred host operating system utilities before performing the FlexFlash scrub.
- To resolve metadata config failures in a service profile, you need to disable FlexFlash in the local disk config policy before you run the FlexFlash scrub, then enable FlexFlash after the server is reacknowledged.
- Disable the scrub policy as soon as the pairing is complete or the metadata failures are resolved.
- FlexFlash scrub is not supported for Cisco UCS S3260 Storage Server.

**Persistent Memory Scrub**

Persistent memory scrub enables you to preserve or remove the persistent memory configuration and data on a server.

- If enabled:
  - erases all the persistent memory data
  - resets the configuration to factory default
  - disables DIMM security
- If disabled (default), preserves the existing persistent memory configuration and data on the server. It does not change the DIMM lock state.

## Creating a Scrub Policy

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create scrub-policy</b> <i>policy-name</i>	Creates a scrub policy with the specified policy name, and enters organization scrub policy mode.

	Command or Action	Purpose
<b>Step 3</b>	(Optional) UCS-A /org/scrub-policy # <b>set descr</b> <i>description</i>	Provides a description for the scrub policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/scrub-policy # <b>set disk-scrub</b> {no   yes}	Disables or enables disk scrubbing on servers using this scrub policy as follows: <ul style="list-style-type: none"> <li>• If enabled, deletes initial 200MB of data from master boot record or the boot sectors. Thus, preventing the system to boot from an already installed OS if any. For secure deletion of data on drives, refer <a href="#">UCS Secure Data Deletion For Commission Regulation (EU) 2019 /424 Users Guide</a>.</li> </ul> <b>Note</b> Though the disk scrub policy is not intended to delete the user data that exceeds 200MB, Cisco UCS Manager cannot guarantee against data loss. <ul style="list-style-type: none"> <li>• If disabled (default), preserves all data on any local drives, including local storage configuration.</li> </ul>
<b>Step 5</b>	UCS-A /org/scrub-policy # <b>set bios-settings-scrub</b> {no   yes}	Disables or enables BIOS settings scrubbing on servers using this scrub policy as follows: <ul style="list-style-type: none"> <li>• If enabled, erases all BIOS settings for the server and resets them to the BIOS defaults for that server type and vendor.</li> <li>• If disabled (default), preserves the existing BIOS settings on the server.</li> </ul>
<b>Step 6</b>	UCS-A /org/scrub-policy # <b>set flexflash-scrub</b> {no   yes}	Disables or enables flexflash scrubbing on servers using this scrub policy as follows: <ul style="list-style-type: none"> <li>• If enabled, the HV partition on the SD card is formatted using the PNUOS formatting utility. If two SD cards are present, the cards are RAID-1 paired, and the HV</li> </ul>

	Command or Action	Purpose
		partitions in both cards are marked as valid. The card in slot 1 is marked as primary, and the card in slot 2 is marked as secondary. <ul style="list-style-type: none"> <li>• If disabled (default), preserves the existing SD card settings.</li> </ul>
<b>Step 7</b>	UCS-A /org/scrub-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a scrub policy named ScrubPolicy2, enables disk scrubbing on servers using the scrub policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create scrub-policy ScrubPolicy2
UCS-A /org/scrub-policy* # set descr "Scrub disk but not BIOS."
UCS-A /org/scrub-policy* # set disk-scrub yes
UCS-A /org/scrub-policy* # set bios-settings-scrub no
UCS-A /org/scrub-policy* # set flexflash-scrub no
UCS-A /org/scrub-policy* # commit-buffer
UCS-A /org/scrub-policy #
```

## Deleting a Scrub Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete scrub-policy</b> <i>policy-name</i>	Deletes the specified scrub policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the scrub policy named ScrubPolicy2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete scrub-policy ScrubPolicy2
UCS-A /org* # commit-buffer
UCS-A /org #
```

# Configuring DIMM Error Management

## DIMM Correctable Error Handling

In Cisco UCS Manager, when a DIMM encounters a significant correctable error in a given predefined window, it is stated as degraded and considered as a non-functional device.

The DIMM correctable error handling feature enables you to reset all the correctable and uncorrectable memory errors on all the DIMMs in a server. When you reset the error configuration, the error count of a given DIMM is cleared, the status changes to operable, and it resets the sensor state of the given DIMM.

## Resetting Memory Errors

Use this procedure to reset all correctable and uncorrectable memory errors encountered by Cisco UCS Manager and the baseboard management controller (BMC).

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope chassis</b> <i>chassis-num</i>	Enters chassis mode for the specified chassis.
<b>Step 2</b>	UCS-A/chassis # <b>scope server</b> <i>server-num</i>	Enters server mode for the specified server.
<b>Step 3</b>	UCS-A/chassis/server # <b>reset-all-memory-errors</b>	Resets the correctable and uncorrectable errors on all the DIMMs in a server.
<b>Step 4</b>	UCS-A /chassis/server* # <b>commit-buffer</b>	Commits any pending transactions.

### Example

This example shows how to reset the memory errors for the selected memory unit(s):

```
UCS-A# scope chassis 1
UCS-A/chassis # scope server 1
UCS-A/chassis/server # reset-all-memory-errors
UCS-A/chassis/server* # commit-buffer
UCS-A/chassis/server #
```

## DIMM Blacklisting

In Cisco UCS Manager, the state of the Dual In-line Memory Module (DIMM) is based on SEL event records. When the BIOS encounters a noncorrectable memory error during memory test execution, the DIMM is marked as faulty. A faulty DIMM is considered a nonfunctional device.

If you enable DIMM blacklisting, Cisco UCS Manager monitors the memory test execution messages and blacklists any DIMMs that encounter memory errors in the DIMM SPD data. To allow the host to map out any DIMMs that encounter uncorrectable ECC errors.

## Enabling DIMM Blacklisting

The memory policy is a global policy that you can apply to existing servers on a Cisco UCS domain and also to the servers that are added after you set the memory policy.



- Note**
- This feature is supported both on the Cisco UCS B-Series blade servers and UCS C-Series rack servers.
  - This global policy cannot be added to a service profile.

### Before you begin

- For Cisco B-Series blade server, the server firmware must be at Release 2.2(1) or a later release.
- For Cisco C-Series rack server, the server firmware must be at Release 2.2(3).
- You must be logged in with one of the following privileges:
  - Admin
  - Server policy
  - Server profile server policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters root organization mode.
<b>Step 2</b>	UCS-A /org # <b>scope memory-config-policy default</b>	Enters memory policy mode for the global memory policy.
<b>Step 3</b>	UCS-A /org/memory-config-policy # <b>set blacklisting enabled</b>	Enables DIMM blacklisting for the domain level policy and these changes applies to all the servers on that particular domain.  <b>Note</b> If the Cisco IMC of a server does not support DIMM blacklisting, an information level fault is generated.
<b>Step 4</b>	UCS-A /org/memory-config-policy* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to enable DIMM blacklisting:

```
UCS-A# scope org /
UCS-A /chassis/org # scope memory-config-policy default
UCS-A /chassis/org/memory-config-policy # set blacklisting enabled
```



```
UCS-A /chassis/org/memory-config-policy* # commit-buffer
UCS-A /chassis/org/memory-config-policy #
UCS-A /chassis/org/memory-config-policy # show detail
```

```
Memory Config Policy:
  Blacklisting: enabled
```

# Serial over LAN Policy

## Serial over LAN Policy Overview

This policy sets the configuration for the serial over LAN connection for all servers associated with service profiles that use the policy. By default, the serial over LAN connection is disabled.

If you implement a serial over LAN policy, we recommend that you also create an IPMI profile.

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

## Configuring a Serial over LAN Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>create sol-policy</b> <i>policy-name</i>	Creates a serial over LAN policy and enters organization serial over LAN policy mode.
<b>Step 3</b>	(Optional) UCS-A /org/sol-policy # <b>set descr</b> <i>description</i>	Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/sol-policy # <b>set speed</b> { <b>9600</b>   <b>19200</b>   <b>38400</b>   <b>57600</b>   <b>115200</b> }	Specifies the serial baud rate.
<b>Step 5</b>	UCS-A /org/sol-policy # { <b>disable</b>   <b>enable</b> }	Disables or enables the serial over LAN policy. By default, the serial over LAN policy is disabled; you must enable it before it can be applied.

	Command or Action	Purpose
<b>Step 6</b>	UCS-A /org/sol-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a serial over LAN policy named Sol115200, provides a description for the policy, sets the speed to 115200 baud, enables the policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create sol-policy Sol115200
UCS-A /org/sol-policy* # set descr "Sets serial over LAN policy to 115200 baud."
UCS-A /org/sol-policy* # set speed 115200
UCS-A /org/sol-policy* # enable
UCS-A /org/sol-policy* # commit-buffer
UCS-A /org/sol-policy #
```

## Viewing a Serial over LAN Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org org-name</b>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>show sol-policy policy-name</b>	Displays the serial over LAN definition (set by the create sol-config command). If the serial over LAN definition is not set, and if a policy is set (using the set sol-policy command), then the policy will be displayed.

### Example

The following example shows how to display serial over LAN information for a serial over LAN policy called Sol115200:

```
UCS-A# scope org /
UCS-A /org # show sol-policy Sol115200 detail

SOL Policy:
  Name: Sol115200
  SOL State: Enable
  Speed: 115200
  Description:
  Policy Owner: Local

UCS-A /org # show sol-policy Sol115200
SOL Policy:
  Name                               SOL State Speed
  -----
```

```
Sol115200          Enable  115200
UCS-A /org #
```

## Deleting a Serial over LAN Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete sol-policy</b> <i>policy-name</i>	Deletes the specified serial over LAN policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the serial over LAN policy named Sol115200 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete sol-policy Sol115200
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Server Autoconfiguration Policy

### Server Autoconfiguration Policy Overview

Cisco UCS Manager uses this policy to determine how to configure a new server. If you create a server autoconfiguration policy, the following occurs when a new server starts:

1. The qualification in the server autoconfiguration policy is executed against the server.
2. If the server meets the required qualifications, the server is associated with a service profile created from the service profile template configured in the server autoconfiguration policy. The name of that service profile is based on the name given to the server by Cisco UCS Manager.
3. The service profile is assigned to the organization configured in the server autoconfiguration policy.

## Configuring a Server Autoconfiguration Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org# <b>create server-autoconfig-policy</b> <i>policy-name</i>	Creates a server autoconfiguration policy with the specified policy name, and enters organization server autoconfiguration policy mode.
<b>Step 3</b>	(Optional) UCS-A /org/server-autoconfig-policy # <b>set descr</b> <i>description</i>	Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	(Optional) UCS-A /org/server-autoconfig-policy # <b>set destination org</b> <i>org-name</i>	Specifies the organization for which the server is to be used.
<b>Step 5</b>	(Optional) UCS-A /org/server-autoconfig-policy # <b>set qualifier</b> <i>server-qual-name</i>	Specifies server pool policy qualification to use for qualifying the server.
<b>Step 6</b>	(Optional) UCS-A /org/server-autoconfig-policy # <b>set template</b> <i>profile-name</i>	Specifies a service profile template to use for creating a service profile instance for the server.
<b>Step 7</b>	UCS-A /org/server-autoconfig-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a server autoconfiguration policy named AutoConfigFinance, provides a description for the policy, specifies finance as the destination organization, ServPoolQual22 as the server pool policy qualification, and ServTemp2 as the service profile template, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create server-autoconfig-policy AutoConfigFinance
UCS-A /org/server-autoconfig-policy* # set descr "Server Autoconfiguration Policy for Finance"
UCS-A /org/server-autoconfig-policy* # set destination org finance
UCS-A /org/server-autoconfig-policy* # set qualifier ServPoolQual22
UCS-A /org/server-autoconfig-policy* # set template ServTemp2
```

```
UCS-A /org/server-autoconfig-policy* # commit-buffer
UCS-A /org/server-autoconfig-policy #
```

## Deleting a Server Autoconfiguration Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-autoconfig-policy</b> <i>policy-name</i>	Deletes the specified server autoconfiguration policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the server autoconfiguration policy named AutoConfigFinance and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete server-autoconfig-policy AutoConfigFinance
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Server Discovery Policy

### Server Discovery Policy Overview

The server discovery policy determines how the UCS Manager reacts when you add a new UCS Blade Server and UCS Mini. If you create a server discovery policy, you can control whether the system conducts a deep discovery when a server is added to a chassis, or whether a user must first acknowledge the new server. By default, the system conducts a full discovery.

If you create a server discovery policy, the following occurs when a new server starts:

1. The server discovery policy qualification is executed against the server.
2. If the server meets the required qualifications, Cisco UCS Manager applies the following to the server:
  - Depending on the option that you select for the action, UCS Manager discovers the new server immediately, or waits for a user acknowledgment of the new server
  - Applies the scrub policy to the server

If automatic deep discovery is triggered by any hardware insertion, removal, or replacement, the following occurs:

1. The server is moved to a “pending activities” list.
2. A critical hardware mismatch fault is raised on the server, indicating that UCSM has detected a hardware mismatch.
3. User must explicitly acknowledge the server to trigger the deep discovery.



**Important** In Cisco UCS Manager Release 2.2 (4), blade servers do not support drives with a block size of 4K, but rack-mount servers support such drives. If a drive with a block size of 4K is inserted into a blade server, discovery fails and the following error message appears:

```
Unable to get Scsi Device Information from the system
```

If this error occurs, do the following:

1. Remove the 4K drive.
2. Reacknowledge the server.

Reacknowledging the server causes the server to reboot and results in loss of service.

## Configuring a Server Discovery Policy

### Before you begin

If you plan to associate this policy with a server pool, create server pool policy qualifications.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.  <b>Note</b> Chassis discovery policies can only be accessed from the root organization.
<b>Step 2</b>	UCS-A /org # <b>create server-disc-policy</b> <i>policy-name</i>	Creates a server discovery policy with the specified policy name, and enters org server discovery policy mode.
<b>Step 3</b>	UCS-A /org/server-disc-policy # <b>set action</b> { <b>diag</b>   <b>immediate</b>   <b>user-acknowledged</b> }	Specifies when the system will attempt to discover new servers.
<b>Step 4</b>	(Optional) UCS-A /org/chassis-disc-policy # <b>set descr</b> <i>description</i>	Provides a description for the server discovery policy.

	Command or Action	Purpose
		<b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	(Optional) UCS-A /org/server-disc-policy # <b>set qualifier</b> <i>qualifier</i>	Uses the specified server pool policy qualifications to associates this policy with a server pool.
<b>Step 6</b>	UCS-A /org/server-disc-policy # <b>set scrub-policy</b>	Specifies the scrub policy to be used by this policy. The scrub policy defines whether the disk drive on a server should be scrubbed clean upon discovery.
<b>Step 7</b>	UCS-A /org/server-disc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a server discovery policy named ServDiscPolExample, sets it to immediately discover new servers, provides a description for the policy, specifies the server pool policy qualifications and scrub policy, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create server-disc-policy ServDiscPolExample
UCS-A /org/server-disc-policy* # set action immediate
UCS-A /org/server-disc-policy* # set descr "This is an example server discovery policy."
UCS-A /org/server-disc-policy* # set qualifier ExampleQual
UCS-A /org/server-disc-policy* # set scrub-policy NoScrub
UCS-A /org/server-disc-policy # commit-buffer
```

### What to do next

Include the server discovery policy in a service profile and/or template.

## Deleting a Server Discovery Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .

	Command or Action	Purpose
<b>Step 2</b>	UCS-A /org # <b>Delete server-disc-policy</b> <i>policy-name</i>	Deletes the specified server discovery policy.
<b>Step 3</b>	UCS-A /org/server-disc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the server discovery policy named ServDiscPolExample and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete server-disc-policy ServDiscPolExample
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Hardware Change Discovery Policy

The Hardware Change Discovery is a global policy used to set the how Cisco UCS Manager behaves when there is a hardware component change. The policy has two values:

- User Acknowledged: You must acknowledge the server to clear all the hardware inventory mismatch faults.
- Auto Acknowledged: Triggers automatic deep discovery when a hardware component change is detected.

When UCSM detects any change in the server hardware component, a critical hardware inventory mismatch fault is raised on the server. You must manually acknowledge the server to clear the fault and complete the hardware inventory. Once you have acknowledged the server, deep discovery and deep association is triggered.

For rack servers, you must decommission and recommission the server to clear the fault and complete the hardware inventory.

You cannot make changes to the policy if there is a hardware inventory mismatch fault.

## Configuring a Hardware Change Discovery Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org /</b>	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>scope</b> <b>server-hwchange-disc-policy</b> <i>policy-name</i>	Enters org hardware change discovery policy mode.
<b>Step 3</b>	UCS-A /org/server-hwchange-disc-policy # <b>set action</b> {   <b>auto-acknowledged</b>   <b>user-acknowledged</b> }	Specifies when the system will attempt to discover new servers.



	Command or Action	Purpose
<b>Step 4</b>	UCS-A /org/server-hwchange-disc-policy # <b>set action auto-acknowledged</b>	Specifies the hardware change discovery policy to be used..
<b>Step 5</b>	UCS-A /org/server-hwchange-disc-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a hardware change discovery policy and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-hwchange-disc-policy
UCS-A /org/server-hwchange-disc-policy # set action
UCS-A /org/server-hwchange-disc-policy # set action auto-acknowledged
UCS-A /org/server-hwchange-disc-policy # commit-buffer
```

## Viewing a Hardware Change Discovery Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> .	Enters the root organization mode.
<b>Step 2</b>	UCS-A /org # <b>scope server-hwchange-disc-policy</b> <i>policy-name</i>	Enters org hardware change discovery policy mode.
<b>Step 3</b>	UCS-A /org/server-hwchange-disc-policy # <b>show detail</b>	Displays the Hardware Change Discovery Policy setting.

### Example

The following example shows to to view the policy setting:

```
UCS-A# scope org /
UCS-A /org # scope server-hwchange-disc-policy
UCS-A /org/server-hwchange-disc-policy # show detail
Server Hardware Change Discovery Policy:
    Action: User Acknowledged
```

## Server Inheritance Policies

### Server Inheritance Policy Overview

This policy is invoked during the server discovery process to create a service profile for the server. All service profiles created from this policy use the values burned into the blade at manufacture. The policy performs the following:

- Analyzes the inventory of the server
- If configured, assigns the server to the selected organization
- Creates a service profile for the server with the identity burned into the server at manufacture

You cannot migrate a service profile created with this policy to another server.

## Configuring a Server Inheritance Policy

A blade server or rack-mount server with a VIC adapter, such as the Cisco UCS M81KR Virtual Interface Card, does not have server identity values burned into the server hardware at manufacture. As a result, the identity of the adapter must be derived from default pools. If the default pools do not include sufficient entries for one to be assigned to the server, service profile association fails with a configuration error.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create server-inherit-policy</b> <i>policy-name</i>	Creates a server inheritance policy with the specified policy name, and enters organization server inheritance policy mode.
<b>Step 3</b>	(Optional) UCS-A /org/server-inherit-policy # <b>set descr</b> <i>description</i>	Provides a description for the policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	(Optional) UCS-A /org/server-inherit-policy # <b>set destination org</b> <i>org-name</i>	Specifies the organization for which the server is to be used.
<b>Step 5</b>	(Optional) UCS-A /org/server-inherit-policy # <b>set qualifier</b> <i>server-qual-name</i>	Specifies server pool policy qualification to use for qualifying the server.
<b>Step 6</b>	UCS-A /org/server-inherit-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a server inheritance policy named `InheritEngineering`, provides a description for the policy, specifies `engineering` as the destination organization and `ServPoolQual22` as the server pool policy qualification, and commits the transaction:

```

UCS-A# scope org /
UCS-A /org* # create server-inherit-policy InheritEngineering
UCS-A /org/server-inherit-policy* # set descr "Server Inheritance Policy for Engineering"
UCS-A /org/server-inherit-policy* # set destination org engineering
UCS-A /org/server-inherit-policy* # set qualifier ServPoolQual22
UCS-A /org/server-inherit-policy* # commit-buffer
UCS-A /org/server-inherit-policy #

```

## Deleting a Server Inheritance Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-inherit-policy</b> <i>policy-name</i>	Deletes the specified server inheritance policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the server inheritance policy named InheritEngineering and commits the transaction:

```

UCS-A# scope org /
UCS-A /org* # delete server-inherit-policy InheritEngineering
UCS-A /org* # commit-buffer
UCS-A /org #

```

## Server Pool Policy

### Server Pool Policy Overview

This policy is invoked during the server discovery process. It determines what happens if server pool policy qualifications match a server to the target pool specified in the policy.

If a server qualifies for more than one pool and those pools have server pool policies, the server is added to all those pools.

## Configuring a Server Pool Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create pooling-policy</b> <i>policy-name</i>	Creates a server pool policy with the specified name, and enters organization pooling policy mode.
<b>Step 3</b>	(Optional) UCS-A /org/pooling-policy # <b>set descr</b> <i>description</i>	Provides a description for the server pool policy.  <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 4</b>	UCS-A /org/pooling-policy # <b>set pool</b> <i>pool-distinguished-name</i>	Specifies the server pool to use with the server pool policy. You must specify the full distinguished name for the pool.
<b>Step 5</b>	UCS-A /org/pooling-policy # <b>set qualifier</b> <i>qualifier-name</i>	Specifies the server pool qualifier to use with the server pool policy.
<b>Step 6</b>	UCS-A /org/pooling-policy # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a server pool policy named ServerPoolPolicy4 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create pooling-policy ServerPoolPolicy4
UCS-A /org/pooling-policy* # set pool org-root/compute-pool-pool3
UCS-A /org/pooling-policy* # set qualifier ServPoolQual8
UCS-A /org/pooling-policy* # commit-buffer
UCS-A /org/pooling-policy #
```

## Deleting a Server Pool Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete pooling-policy</b> <i>policy-name</i>	Deletes the specified server pool policy.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the server pool policy named ServerPoolPolicy4 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete pooling-policy ServerPoolPolicy4
UCS-A /org/pooling-policy* # commit-buffer
UCS-A /org/pooling-policy #
```

## Server Pool Policy Qualification

### Server Pool Policy Qualification Overview

This policy qualifies servers based on the inventory of a server conducted during the discovery process. The qualifications are individual rules that you configure in the policy to determine whether a server meets the selection criteria. For example, you can create a rule that specifies the minimum memory capacity for servers in a data center pool.

Qualifications are used in other policies to place servers, not just by the server pool policies. For example, if a server meets the criteria in a qualification policy, it can be added to one or more server pools or have a service profile automatically associated with it.

You can use the server pool policy qualifications to qualify servers according to the following criteria:

- Adapter type
- Chassis location
- Memory type and configuration
- Power group
- CPU cores, type, and configuration

- Storage configuration and capacity
- Server model

Depending upon the implementation, you might need to configure several policies with server pool policy qualifications including the following:

- Autoconfiguration policy
- Chassis discovery policy
- Server discovery policy
- Server inheritance policy
- Server pool policy

## Creating a Server Pool Policy Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create server-qual</b> <i>server-qual-name</i>	Creates a server pool qualification with the specified name, and enters organization server qualification mode.
<b>Step 3</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a server pool qualification named ServPoolQual22 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # create server-qual ServPoolQual22
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

### What to do next

Configure one or more of the following server component qualifications:

- Adapter qualification
- Chassis qualification
- Memory qualification

- Power group qualification
- Processor qualification
- Storage qualification

## Deleting a Server Pool Policy Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete server-qual</b> <i>server-qual-name</i>	Deletes the specified server pool qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the server pool qualification named ServPoolQual22 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # delete server-qual ServPoolQual22
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Creating an Adapter Qualification

### Before you begin

Create a server pool policy qualification.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create adapter</b>	Creates an adapter qualification and enters organization server qualification adapter mode.

	Command or Action	Purpose
<b>Step 4</b>	UCS-A /org/server-qual/adapter # <b>create cap-qual</b> <i>adapter-type</i>	<p>Creates an adapter capacity qualification for the specified adapter type and enters organization server qualification adapter capacity qualification mode. The <i>adapter-type</i> argument can be any of the following values:</p> <ul style="list-style-type: none"> <li>• <b>fcoe</b> —Fibre Channel over Ethernet</li> <li>• <b>non-virtualized-eth-if</b> —Non-virtualized Ethernet interface</li> <li>• <b>non-virtualized-fc-if</b> —Non-virtualized Fibre Channel interface</li> <li>• <b>path-encap-consolidated</b> —Path encapsulation consolidated</li> <li>• <b>path-encap-virtual</b> —Path encapsulation virtual</li> <li>• <b>protected-eth-if</b> —Protected Ethernet interface</li> <li>• <b>protected-fc-if</b> —Protected Fibre Channel interface</li> <li>• <b>protected-fcoe</b> —Protected Fibre Channel over Ethernet</li> <li>• <b>virtualized-eth-if</b> —Virtualized Ethernet interface</li> <li>• <b>virtualized-fc-if</b> —Virtualized Fibre Channel interface</li> <li>• <b>virtualized-scsi-if</b> —Virtualized SCSI interface</li> </ul>
<b>Step 5</b>	UCS-A /org/server-qual/adapter/cap-qual # <b>set maximum</b> { <i>max-cap</i>   <b>unspecified</b> }	Specifies the maximum capacity for the selected adapter type.
<b>Step 6</b>	UCS-A /org/server-qual/adapter/cap-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates and configures an adapter qualification for a non-virtualized Ethernet interface and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual122
UCS-A /org/server-qual # create adapter
UCS-A /org/server-qual/adapter* # create cap-qual non-virtualized-eth-if
UCS-A /org/server-qual/adapter/cap-qual* # set maximum 2500000000
```



```
UCS-A /org/server-qual/adapter/cap-qual* # commit-buffer
UCS-A /org/server-qual/adapter/cap-qual #
```

## Deleting an Adapter Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete adapter</b>	Deletes the adapter qualification from the server pool policy qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the adapter qualification from the server pool policy qualification named ServPoolQual22 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete adapter
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Configuring a Chassis Qualification

### Before you begin

Create a server pool policy qualification.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.

	Command or Action	Purpose
<b>Step 3</b>	UCS-A /org/server-qual # <b>create chassis</b> <i>min-chassis-num max-chassis-num</i>	Creates a chassis qualification for the specified chassis range and enters organization server qualification chassis mode.
<b>Step 4</b>	UCS-A /org/server-qual/chassis # <b>create slot</b> <i>min-slot-num max-slot-num</i>	Creates a chassis slot qualification for the specified slot range and enters organization server qualification chassis slot mode.
<b>Step 5</b>	UCS-A /org/server-qual/chassis/slot # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a chassis qualification for slots 1 to 4 on chassis 1 and 2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org* # scope server-qual ServPoolQual22
UCS-A /org/server-qual* # create chassis 1 2
UCS-A /org/server-qual/chassis* # create slot 1 4
UCS-A /org/server-qual/chassis/slot* # commit-buffer
UCS-A /org/server-qual/chassis/slot #
```

## Deleting a Chassis Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete chassis</b> <i>min-chassis-num max-chassis-num</i>	Deletes the chassis qualification for the specified chassis range.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the chassis qualification for chassis 1 and 2 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
```

```
UCS-A /org/server-qual # delete chassis 1 2
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a CPU Qualification

### Before you begin

Create a server pool policy qualification.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create cpu</b>	Creates a CPU qualification and enters organization server qualification processor mode.
<b>Step 4</b>	UCS-A /org/server-qual/cpu # <b>set arch</b> { <b>any</b>   <b>dual-core-opteron</b>   <b>intel-p4-c</b>   <b>opteron</b>   <b>pentium-4</b>   <b>turion-64</b>   <b>xeon</b>   <b>xeon-mp</b> }	Specifies the processor architecture type.
<b>Step 5</b>	UCS-A /org/server-qual/cpu # <b>set maxcores</b> { <i>max-core-num</i>   <b>unspecified</b> }	Specifies the maximum number of processor cores.
<b>Step 6</b>	UCS-A /org/server-qual/cpu # <b>set mincores</b> { <i>min-core-num</i>   <b>unspecified</b> }	Specifies the minimum number of processor cores.
<b>Step 7</b>	UCS-A /org/server-qual/cpu # <b>set maxprocs</b> { <i>max-proc-num</i>   <b>unspecified</b> }	Specifies the maximum number of processors.
<b>Step 8</b>	UCS-A /org/server-qual/cpu # <b>set minprocs</b> { <i>min-proc-num</i>   <b>unspecified</b> }	Specifies the minimum number of processors.
<b>Step 9</b>	UCS-A /org/server-qual/cpu # <b>set maxthreads</b> { <i>max-thread-num</i>   <b>unspecified</b> }	Specifies the maximum number of threads.
<b>Step 10</b>	UCS-A /org/server-qual/cpu # <b>set minthreads</b> { <i>min-thread-num</i>   <b>unspecified</b> }	Specifies the minimum number of threads.
<b>Step 11</b>	UCS-A /org/server-qual/cpu # <b>set stepping</b> { <i>step-num</i>   <b>unspecified</b> }	Specifies the processor stepping number.
<b>Step 12</b>	UCS-A /org/server-qual/cpu # <b>set model-regex</b> <i>regex</i>	Specifies a regular expression that the processor name must match.

	Command or Action	Purpose
<b>Step 13</b>	UCS-A /org/server-qual/cpu # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates and configures a CPU qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create processor
UCS-A /org/server-qual/cpu* # set arch xeon
UCS-A /org/server-qual/cpu* # set maxcores 8
UCS-A /org/server-qual/cpu* # set mincores 4
UCS-A /org/server-qual/cpu* # set maxprocs 2
UCS-A /org/server-qual/cpu* # set minprocs 1
UCS-A /org/server-qual/cpu* # set maxthreads 16
UCS-A /org/server-qual/cpu* # set minthreads 8
UCS-A /org/server-qual/cpu* # set stepping 5
UCS-A /org/server-qual/cpu* # commit-buffer
UCS-A /org/server-qual/cpu #
```

## Deleting a CPU Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete cpu</b>	Deletes the processor qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the processor qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete cpu
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Power Group Qualification

### Before you begin

Create a server pool policy qualification.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create power-group</b> <i>power-group-name</i>	Creates a power group qualification for the specified power group name.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example configures a power group qualification for a power group called powergroup1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create power-group powergroup1
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Deleting a Power Group Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete power-group</b> <i>power-group-name</i>	Deletes the specified power group qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example deletes a power group qualification for a power group called powergroup1 and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete power-group powergroup1
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Memory Qualification

**Before you begin**

Create a server pool policy qualification.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create memory</b>	Creates a memory qualification and enters organization server qualification memory mode.
<b>Step 4</b>	UCS-A /org/server-qual/memory # <b>set clock</b> { <i>clock-num</i>   <b>unspec</b> }	Specifies the memory clock speed.
<b>Step 5</b>	UCS-A /org/server-qual/memory # <b>set maxcap</b> { <i>max-cap-num</i>   <b>unspec</b> }	Specifies the maximum capacity of the memory array.
<b>Step 6</b>	UCS-A /org/server-qual/memory # <b>set mincap</b> { <i>min-cap-num</i>   <b>unspec</b> }	Specifies the minimum capacity of the memory array.
<b>Step 7</b>	UCS-A /org/server-qual/memory # <b>set speed</b> { <i>speed-num</i>   <b>unspec</b> }	Specifies the memory data rate.
<b>Step 8</b>	UCS-A /org/server-qual/memory # <b>set units</b> { <i>unit-num</i>   <b>unspec</b> }	Specifies the number of memory units (DRAM chips mounted to the memory board).
<b>Step 9</b>	UCS-A /org/server-qual/memory # <b>set width</b> { <i>width-num</i>   <b>unspec</b> }	Specifies the bit width of the data bus.
<b>Step 10</b>	UCS-A /org/server-qual/memory # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates and configures a memory qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create memory
UCS-A /org/server-qual/memory* # set clock 1067
UCS-A /org/server-qual/memory* # set maxcap 4096
UCS-A /org/server-qual/memory* # set mincap 2048
UCS-A /org/server-qual/memory* # set speed unspec
UCS-A /org/server-qual/memory* # set units 16
UCS-A /org/server-qual/memory* # set width 64
UCS-A /org/server-qual/memory* # commit-buffer
UCS-A /org/server-qual/memory #
```

## Deleting a Memory Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete memory</b>	Deletes the memory qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the memory qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete memory
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Physical Qualification

### Before you begin

Create a server pool policy qualification.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create physical-qual</b>	Creates a physical qualification and enters organization server qualification physical mode.
<b>Step 4</b>	UCS-A /org/server-qual/physical-qual # <b>set model-regex</b> <i>regex</i>	Specifies a regular expression that the model name must match.
<b>Step 5</b>	UCS-A /org/server-qual/physical-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example creates and configures a physical qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # create physical-qual
UCS-A /org/server-qual/physical-qual* # set model-regex
UCS-A /org/server-qual/physical-qual* # commit-buffer
UCS-A /org/server-qual/physical-qual #
```

## Deleting a Physical Qualification

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete physical-qual</b>	Deletes the physical qualification.
<b>Step 4</b>	UCS-A /org/server-qual # <b>commit-buffer</b>	Commits the transaction to the system configuration.



**Example**

The following example deletes a physical qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete physical-qual
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Creating a Storage Qualification

**Before you begin**

Create a server pool policy qualification.

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>create storage</b>	Creates a storage qualification and enters organization server qualification storage mode.
<b>Step 4</b>	UCS-A /org/server-qual/storage # <b>set blocksize</b> { <i>block-size-num</i>   <b>unknown</b> }	Specifies the storage block size.
<b>Step 5</b>	UCS-A /org/server-qual/storage # <b>set diskless</b> { <b>no</b>   <b>unspecified</b>   <b>yes</b> }	Specifies whether the available storage must be diskless.
<b>Step 6</b>	UCS-A /org/server-qual/storage # <b>set disktype</b> { <b>hdd</b>   <b>ssd</b>   <b>unspecified</b> }	Specifies the type of disk that can be used. The options are: <ul style="list-style-type: none"> <li>• <b>Unspecified</b>—Either disk type is acceptable.</li> <li>• <b>HDD</b>—The disk must be HDD.</li> <li>• <b>SSD</b>—The disk must be SSD (SATA or SAS).</li> </ul>
<b>Step 7</b>	UCS-A /org/server-qual/storage # <b>set flexflash-num-cards</b> { <i>ff_card-num</i>   <b>unknown</b> }	Specifies the number of FlexFlash cards.
<b>Step 8</b>	UCS-A /org/server-qual/storage # <b>set maxcap</b> { <i>max-cap-num</i>   <b>unknown</b> }	Specifies the maximum capacity of the storage array.

	Command or Action	Purpose
<b>Step 9</b>	UCS-A /org/server-qual/storage # <b>set mincap</b> { <i>min-cap-num</i>   <b>unknown</b> }	Specifies the minimum capacity of the storage array.
<b>Step 10</b>	UCS-A /org/server-qual/storage # <b>set numberofblocks</b> { <i>block-num</i>   <b>unknown</b> }	Specifies the number of blocks.
<b>Step 11</b>	UCS-A /org/server-qual/storage # <b>set perdiskcap</b> { <i>disk-cap-num</i>   <b>unknown</b> }	Specifies the per-disk capacity.
<b>Step 12</b>	UCS-A /org/server-qual/storage # <b>set units</b> { <i>unit-num</i>   <b>unspecified</b> }	Specifies the number of storage units.
<b>Step 13</b>	UCS-A /org/server-qual/storage # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example shows how to create and configure a storage qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual122
UCS-A /org/server-qual # create storage
UCS-A /org/server-qual/storage* # set blocksize 512
UCS-A /org/server-qual/storage* # set disktype hdd
UCS-A /org/server-qual/storage* # set maxcap 420000
UCS-A /org/server-qual/storage* # set mincap 140000
UCS-A /org/server-qual/storage* # set numberofblocks 287277984
UCS-A /org/server-qual/storage* # set perdiskcap 140000
UCS-A /org/server-qual/storage* # set units 1
UCS-A /org/server-qual/storage* # set flexflash-num-cards 2
UCS-A /org/server-qual/storage* # commit-buffer
UCS-A /org/server-qual/storage #
```

## Deleting a Storage Qualification

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope server-qual</b> <i>server-qual-name</i>	Enters organization server qualification mode for the specified server pool policy qualification.
<b>Step 3</b>	UCS-A /org/server-qual # <b>delete storage</b>	Deletes the storage qualification.
<b>Step 4</b>	UCS-A /org/server-qual/ # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example deletes the storage qualification and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope server-qual ServPoolQual22
UCS-A /org/server-qual # delete storage
UCS-A /org/server-qual* # commit-buffer
UCS-A /org/server-qual #
```

## Configuring vNIC/vHBA Placement Policies

### vNIC/vHBA Placement Policies

vNIC/vHBA placement policies are used to determine the following:

- How the virtual network interface connections (vCons) are mapped to the physical adapters on a server.
- What types of vNICs or vHBAs can be assigned to each vCon.

Each vNIC/vHBA placement policy contains four vCons that are virtual representations of the physical adapters. When a vNIC/vHBA placement policy is assigned to a service profile, and the service profile is associated with a server, the vCons in the vNIC/vHBA placement policy are assigned to the physical adapters and the vNICs and vHBAs are assigned to those vCons.

For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4.

For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the type of server and the selected virtual slot mapping scheme, which can be **Round Robin** or **Linear Ordered**. For details about the available mapping schemes, see [vCon to Adapter Placement, on page 384](#).

After Cisco UCS assigns the vCons, it assigns the vNICs and vHBAs based on the **Selection Preference** for each vCon. This can be one of the following:



---

**Note** You can specify the PCI order for the vHBA; however, the desired order works within a class of devices, such as vNICs or vHBAs and not across them. Within an adapter, vNICs are always placed ahead of the vHBAs.

---

- **all**—All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.
- **assigned-only**—vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.
- **exclude-dynamic**—Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.

- **exclude-unassigned**—Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.
- **exclude-usnic**—Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.




---

**Note** An SRIOV usNIC that is explicitly assigned to a vCon set to **exclude-usnic** will remain assigned to that vCon.

---

If you do not include a vNIC/vHBA placement policy in the service profile, Cisco UCS Manager defaults to the **Round Robin** vCon mapping scheme and the **All** vNIC/vHBA selection preference, distributing the vNICs and vHBAs between the adapters based on the capabilities and relative capacities of each adapter.

## vCon to Adapter Placement

Cisco UCS maps every vCon in a service profile to a physical adapter on the server. How that mapping occurs and how the vCons are assigned to a specific adapter in a server depends on the following:

- The type of server. N20-B6620-2 and N20-B6625-2 blade servers with two adapter cards use a different mapping scheme than other supported rack or blade servers.
- The number of adapters in the server.
- The setting of the virtual slot mapping scheme in the vNIC/vHBA placement policy, if applicable.

You must consider this placement when you configure the vNIC/vHBA selection preference to assign vNICs and vHBAs to vCons.




---

**Note** vCon to adapter placement is not dependent upon the PCIE slot number of the adapter. The adapter numbers used for the purpose of vCon placement are not the PCIE slot numbers of the adapters, but the ID assigned to them during server discovery.

---

### vCon to Adapter Placement for N20-B6620-2 and N20-B6625-2 Blade Servers

In N20-B6620-2 and N20-B6625-2 blade servers, the two adapters are numbered left to right while vCons are numbered right to left. If one of these blade servers has a single adapter, Cisco UCS assigns all vCons to that adapter. If the server has two adapters, the vCon assignment depends upon the virtual slot mapping scheme:

- **round-robin**—Cisco UCS assigns vCon2 and vCon4 to Adapter1 and vCon1 and vCon3 to Adapter2. This is the default.
- **linear-ordered**—Cisco UCS assigns vCon3 and vCon4 to Adapter1 and vCon1 and vCon2 to Adapter2.

## vCon to Adapter Placement for All Other Supported Servers

For all other servers supported by Cisco UCS in addition to the N20-B6620-2 and N20-B6625-2 blade servers, the vCon assignment depends on the number of adapters in the server and the virtual slot mapping scheme.

For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4.

For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the selected virtual slot mapping scheme: Round Robin or Linear Ordered.

**Table 8: vCon to Adapter Placement Using the Round - Robin Mapping Scheme**

Number of Adapters	vCon1 Assignment	vCon2 Assignment	vCon3 Assignment	vCon4 Assignment
1	Adapter1	Adapter1	Adapter1	Adapter1
2	Adapter1	Adapter2	Adapter1	Adapter2
3	Adapter1	Adapter2	Adapter3	Adapter2
4	Adapter1	Adapter2	Adapter3	Adapter4

Round Robin is the default mapping scheme.

**Table 9: vCon to Adapter Placement Using the Linear Ordered Mapping Scheme**

Number of Adapters	vCon1 Assignment	vCon2 Assignment	vCon3 Assignment	vCon4 Assignment
1	Adapter1	Adapter1	Adapter1	Adapter1
2	Adapter1	Adapter1	Adapter2	Adapter2
3	Adapter1	Adapter2	Adapter3	Adapter3
4	Adapter1	Adapter2	Adapter3	Adapter4

## vNIC/vHBA to vCon Assignment

Cisco UCS Manager provides two options for assigning vNICs and vHBAs to vCons through the vNIC/vHBA placement policy: explicit assignment and implicit assignment.

### Explicit Assignment of vNICs and vHBAs

With explicit assignment, you specify the vCon and, therefore, the adapter to which a vNIC or vHBA is assigned. Use this assignment option when you need to determine how the vNICs and vHBAs are distributed between the adapters on a server.

To configure a vCon and the associated vNICs and vHBAs for explicit assignment, do the following:

- Set the vCon configuration to any of the available options. You can configure the vCons through a vNIC/vHBA placement policy or in the service profile associated with the server. If a vCon is configured for **All**, you can still explicitly assign a vNIC or vHBA to that vCon.

- Assign the vNICs and vHBAs to a vCon. You can make this assignment through the virtual host interface placement properties of the vNIC or vHBA or in the service profile associated with the server.

If you attempt to assign a vNIC or vHBA to a vCon that is not configured for that type of vNIC or vHBA, Cisco UCS Manager displays a message advising you of the configuration error.

During service profile association, Cisco UCS Manager validates the configured placement of the vNICs and vHBAs against the number and capabilities of the physical adapters in the server before assigning the vNICs and vHBAs according to the configuration in the policy. Load distribution is based upon the explicit assignments to the vCons and adapters configured in this policy.

If the adapters do not support the assignment of one or more vNICs or vHBAs, Cisco UCS Manager raises a fault against the service profile.




---

**Note** You can specify the PCI order for the vHBA; however, the desired order works within a class of devices, such as vNICs or vHBAs and not across them. Within an adapter, vNICs are always placed ahead of the vHBAs.

---

### Implicit Assignment of vNICs and vHBAs

With implicit assignment, Cisco UCS Manager determines the vCon and, therefore, the adapter to which a vNIC or vHBA is assigned according to the capability of the adapters and their relative capacity. Use this assignment option if the adapter to which a vNIC or vHBA is assigned is not important to your system configuration.

To configure a vCon for implicit assignment, do the following:

- Set the vCon configuration to **All**, **Exclude Dynamic**, or **Exclude Unassigned**. You can configure the vCons through a vNIC/vHBA placement policy or in the service profile associated with the server.
- Do not set the vCon configuration to **Assigned Only**. Implicit assignment cannot be performed with this setting.
- Do not assign any vNICs or vHBAs to a vCon.

During service profile association, Cisco UCS Manager verifies the number and capabilities of the physical adapters in the server and assigns the vNICs and vHBAs accordingly. Load distribution is based upon the capabilities of the adapters, and placement of the vNICs and vHBAs is performed according to the actual order determined by the system. For example, if one adapter can accommodate more vNICs than another, that adapter is assigned more vNICs.

If the adapters cannot support the number of vNICs and vHBAs configured for that server, Cisco UCS Manager raises a fault against the service profile.

### Implicit Assignment of vNICs in a Dual Adapter Environment

When you use implicit vNIC assignment for a dual slot server with an adapter card in each slot, Cisco UCS Manager typically assigns the vNICs/vHBAs as follows:

- If the server has the same adapter in both slots, Cisco UCS Manager assigns half the vNICs and half the vHBAs to each adapter.
- If the server has one non-VIC adapter and one VIC adapter, Cisco UCS Manager assigns two vNICs and two vHBAs to the non-VIC adapter and the remaining vNICs and vHBAs to the VIC adapter.

- If the server has two different VIC adapters, Cisco UCS Manager assigns the vNICs and vHBAs proportionally, based on the relative capabilities of the two adapters.

The following examples show how Cisco UCS Manager would typically assign the vNICs and vHBAs with different combinations of supported adapter cards:

- If you want to configure four vNICs and the server contains two Cisco UCS M51KR-B Broadcom BCM57711 adapters (with two vNICs each), Cisco UCS Manager assigns two vNICs to each adapter.
- If you want to configure 50 vNICs and the server contains a Cisco UCS CNA M72KR-E adapter (2 vNICs) and a Cisco UCS M81KR Virtual Interface Card adapter (128 vNICs), Cisco UCS Manager assigns two vNICs to the Cisco UCS CNA M72KR-E adapter and 48 vNICs to the Cisco UCS M81KR Virtual Interface Card adapter.
- If you want to configure 150 vNICs and the server contains a Cisco UCS M81KR Virtual Interface Card adapter (128 vNICs) and a Cisco UCS VIC-1240 Virtual Interface Card adapter (256 vNICs), Cisco UCS Manager assigns 50 vNICs to the Cisco UCS M81KR Virtual Interface Card adapter and 100 vNICs to the Cisco UCS VIC-1240 Virtual Interface Card adapter.



**Note** Exceptions to this implicit assignment occur if you configure the vNICs for fabric failover and if you configure dynamic vNICs for the server.

For a configuration that includes vNIC fabric failover where one adapter does not support vNIC failover, Cisco UCS Manager implicitly assigns all vNICs that have fabric failover enabled to the adapter that supports them. If the configuration includes only vNICs that are configured for fabric failover, no vNICs are implicitly assigned to the adapter that does not support them. If some vNICs are configured for fabric failover and some are not, Cisco UCS Manager assigns all failover vNICs to the adapter that supports them and a minimum of one nonfailover vNIC to the adapter that does not support them, according to the ratio above.

For a configuration that includes dynamic vNICs, the same implicit assignment would occur. Cisco UCS Manager assigns all dynamic vNICs to the adapter that supports them. However, with a combination of dynamic vNICs and static vNICs, at least one static vNIC is assigned to the adapter that does not support dynamic vNICs.

## Configuring a vNIC/vHBA Placement Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create vcon-policy</b> <i>policy-name</i>	Creates the specified vNIC/vHBA placement profile and enters organization vcon policy mode.
<b>Step 3</b>	(Optional) UCS-A /org/vcon-policy # <b>set descr</b> <i>description</i>	Provides a description for the vNIC/vHBA Placement Profile.

	Command or Action	Purpose
		<p>Enter up to 256 characters. You can use any characters or spaces except ` (accent mark), \ (backslash), ^ (carat), " (double quote), = (equal sign), &gt; (greater than), &lt; (less than), or ' (single quote).</p> <p><b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.</p>
<b>Step 4</b>	(Optional) UCS-A /org/vcon-policy # <b>set mapping-scheme {round-robin   linear-ordered}</b>	<p>For blade or rack servers that contain one adapter, Cisco UCS assigns all vCons to that adapter. For servers that contain four adapters, Cisco UCS assigns vCon1 to Adapter1, vCon2 to Adapter2, vCon3 to Adapter3, and vCon4 to Adapter4.</p> <p>For blade or rack servers that contain two or three adapters, Cisco UCS assigns the vCons based on the selected virtual slot mapping scheme. This can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>round-robin</b>— In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon3 to Adapter1, then assigns vCon2 and vCon4 to Adapter2.</li> </ul> <p>In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1, vCon2 and vCon4 to Adapter2, and vCon3 to Adapter3.</p> <p>This is the default scheme.</p> <ul style="list-style-type: none"> <li>• <b>linear-ordered</b>— In a server with two adapter cards, Cisco UCS assigns vCon1 and vCon2 to Adapter1, then assigns vCon3 and vCon4 to Adapter2.</li> </ul> <p>In a server with three adapter cards, Cisco UCS assigns vCon1 to Adapter1 and vCon2 to Adapter2, then assigns vCon3 and vCon4 to Adapter3.</p> <p>In N20-B6620-2 and N20-B6625-2 blade servers, the two adapters are numbered left to right while vCons are numbered right to left. If one of these blade servers has a single adapter,</p>



	Command or Action	Purpose
		<p>Cisco UCS assigns all vCons to that adapter. If the server has two adapters, the vCon assignment depends upon the virtual slot mapping scheme:</p> <ul style="list-style-type: none"> <li>• <b>round-robin</b>—Cisco UCS assigns vCon2 and vCon4 to Adapter1 and vCon1 and vCon3 to Adapter2. This is the default.</li> <li>• <b>linear-ordered</b>—Cisco UCS assigns vCon3 and vCon4 to Adapter1 and vCon1 and vCon2 to Adapter2.</li> </ul>
<b>Step 5</b>	<pre>UCS-A /org/vcon-policy # set vcon {1   2   3   4} selection {all   assigned-only   exclude-dynamic   exclude-unassigned}</pre>	<p>Specifies the selection preference for the specified vCon. The options are:</p> <ul style="list-style-type: none"> <li>• <b>all</b>—All configured vNICs and vHBAs can be assigned to the vCon, whether they are explicitly assigned to it, unassigned, or dynamic. This is the default.</li> <li>• <b>assigned-only</b>—vNICs and vHBAs must be explicitly assigned to the vCon. You can assign them explicitly through the service profile or the properties of the vNIC or vHBA.</li> <li>• <b>exclude-dynamic</b>—Dynamic vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for all static vNICs and vHBAs, whether they are unassigned or explicitly assigned to it.</li> <li>• <b>exclude-unassigned</b>—Unassigned vNICs and vHBAs cannot be assigned to the vCon. The vCon can be used for dynamic vNICs and vHBAs and for static vNICs and vHBAs that are explicitly assigned to it.</li> <li>• <b>exclude-usnic</b>—Cisco usNICs cannot be assigned to the vCon. The vCon can be used for all other configured vNICs and vHBAs, whether they are explicitly assigned to it, unassigned, or dynamic.</li> </ul> <p><b>Note</b> An SRIOV usNIC that is explicitly assigned to a vCon set to <b>exclude-usnic</b> will remain assigned to that vCon.</p>

	Command or Action	Purpose
<b>Step 6</b>	UCS-A /org/vcon-policy # <b>commit-buffer</b>	Commits the transaction.

### Example

The following example creates a vNIC/vHBA placement policy named Adapter1All, sets the vCon mapping scheme to Linear Ordered, specifies that only assigned vNICs and vHBAs can be placed on adapter 1, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create vcon-policy Adapter1
UCS-A /org/vcon-policy* # set descr "This profile places all vNICs and vHBAs on adapter 1."
UCS-A /org/vcon-policy* # set mapping-scheme linear-ordered
UCS-A /org/vcon-policy* # set vcon 1 selection assigned-only
UCS-A /org/vcon-policy* # commit-buffer
UCS-A /org/vcon-policy* #
UCS-A /org #
```

## Deleting a vNIC/vHBA Placement Policy

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>delete vcon-policy</b> <i>policy-name</i>	Deletes the specified vNIC/vHBA placement profile.
<b>Step 3</b>	UCS-A /org # <b>commit-buffer</b>	Commits the transaction.

### Example

The following example deletes the vNIC/vHBA placement profile named Adapter1All and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # delete vcon-policy Adapter1All
UCS-A /org* # commit-buffer
UCS-A /org #
```

## Explicitly Assigning a vNIC to a vCon

### Before you begin

Configure the vCons through a vNIC/vHBA placement policy or in the service profile with one of the following values:

- **Assigned Only**
- **Exclude Dynamic**
- **Exclude Unassigned**

If a vCon is configured for **All**, you can explicitly assign a vNIC or vHBA to that vCon. However, there is less control with this configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the organization which contains the service profile whose vNICs you want to explicitly assign to a vCon. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic</b> <i>vnic-name</i>	Enters organization service profile mode for the specified vnic.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set vcon</b> {1   2   3   4   any}	Sets the virtual network interface connection (vCon) placement for the specified vNIC.  Entering a value of any allows Cisco UCS Manager to determine the vCon to which the vNIC is assigned.
<b>Step 5</b>	UCS-A /org/service-profile/vnic # <b>set order</b> { <i>order-num</i>   unspecified}	Specifies the desired PCI order for the vNIC.  Valid values include 0-128 and unspecified.
<b>Step 6</b>	UCS-A /org/service-profile/vnic # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example sets the vCon placement for a vNIC called vnic3 to 2, sets the desired order to 10, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
UCS-A /org/service-profile # scope vnic vnic3
UCS-A /org/service-profile/vnic # set vcon 2
UCS-A /org/service-profile/vnic* # set order 10
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic #
```

## Explicitly Assigning a vHBA to a vCon

### Before you begin

Configure the vCons through a vNIC/vHBA placement policy or in the service profile with one of the following values:

- **Assigned Only**
- **Exclude Dynamic**
- **Exclude Unassigned**

If a vCon is configured for **All**, you can explicitly assign a vNIC or vHBA to that vCon. However, there is less control with this configuration.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the organization which contains the service profile whose vHBAs you want to explicitly assign to a vCon. To enter the root organization mode, type <i>/</i> as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters organization service profile mode for the specified service.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vhma</b> <i>vhba-name</i>	Enters organization service profile mode for the specified vHBA.
<b>Step 4</b>	UCS-A /org/service-profile/vhma # <b>set vcon</b> { <b>1</b>   <b>2</b>   <b>3</b>   <b>4</b>   <b>any</b> }	Sets the virtual network interface connection (vCon) placement for the specified vHBA.  Entering a value of <b>any</b> allows Cisco UCS Manager to determine the vCon to which the vHBA is assigned.
<b>Step 5</b>	UCS-A /org/service-profile/vhma # <b>set order</b> { <i>order-num</i>   <b>unspecified</b> }	Specifies the desired PCI order for the vHBA.  Valid desired order number values include 0-128 and unspecified.
<b>Step 6</b>	UCS-A /org/service-profile/vhma # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example sets the vCon placement for a vHBA called `vhba3` to `2`, sets the desired order to `10`, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # scope service-profile accounting
```

```
UCS-A /org/service-profile # scope vhma vhma3
UCS-A /org/service-profile/vhma # set vcon 2
UCS-A /org/service-profile/vhma* # set order 10
UCS-A /org/service-profile/vhma* # commit-buffer
UCS-A /org/service-profile/vhma #
```

## Placing Static vNICs Before Dynamic vNICs

For optimal performance, static vNICs and vHBAs should be placed before dynamic vNICs on the PCIe bus. Static vNICs refer to both static vNICs and vHBAs. Cisco UCS Manager Release 2.1 provides the following functionality regarding the order of static and dynamic vNICs:

- After upgrading to Cisco UCS Manager Release 2.1, if no change is made to existing service profiles (profiles that are defined in releases prior to Cisco UCS Manager Release 2.1), the vNIC order does not change.
- After an upgrade to Cisco UCS Manager Release 2.1, any vNIC-related change would reorder the vNIC map. As a result, all dynamic vNICs would be placed after the static vNICs.
- For newly created service profiles in Cisco UCS Manager Release 2.1, static vNICs are always ordered before dynamic vNICs.
- The above behavior is independent of the sequence of creating or deleting static or dynamic vNICs.
- For SRIOV-enabled service profiles, UCSM places the vNIC Physical Function(PF) before the corresponding Virtual Functions (VFs). This scheme guarantees that the VFs are placed close to the parent PF vNIC on the PCIe bus and BDFs are in successive incremental order for the VFs.

### Example

Beginning Device Order in Cisco UCS Manager Release 2.0:

```
dyn-vNIC-1 1
dyn-vNIC-2 2
```

New Device Order in Cisco UCS Manager Release 2.0 (Add 2 static vNICs):

```
dyn-vNIC-1 1
dyn-vNIC-2 2
eth-vNIC-1 3
eth-vNIC-2 4
```

After upgrading to Cisco UCS Manager Release 2.1, (Before any vNIC-related change is made to the service profile.)

```
dyn-vNIC-1 1
dyn-vNIC-2 2
eth-vNIC-1 3
eth-vNIC-2 4
```

New Device Order in Cisco UCS Manager Release 2.1 (Add 2 dynamic vNICs by changing the policy count from 2 to 4.)

```
dyn-vNIC-1 3
dyn-vNIC-2 4
eth-vNIC-1 1
eth-vNIC-2 2
```

dyn-vNIC-3 5  
 dyn-vNIC-4 6

### Dynamic vNICs as Multifunction PCIe Devices

Cisco UCS Manager Version 2.1 provisions static vNICs as 0-function devices (new BUS for every static vNIC). Multifunction dynamic vNICs are placed from the new Bus-slot after the last static vNIC/vHBA.



**Note** Cisco UCS Manager Version 2.1 supports the new StaticZero mode.

**Table 10: Version Compatibility**

Cisco UCS Manager		
Version 1.4 Scheme: ZeroFunction	Version 2.0 Scheme: ZeroFunction / MultiFunction	Version 2.1 Scheme: ZeroFunction / MultiFunction / StaticZero
Static and Dynamic vNICs are all on Bus [0-57], Function [0] < ZeroFunction Mode >	Static vNICs and Dynamic vNICs are on Bus [0-57], Function [0-7]. Bus 0, Function 0  Bus 0, Function 7  Bus 1, Function 0 < MultiFunction Mode >	Static vNICs or PFs will be on Bus [0-57], Function [0]. SRIOV: Corresponding VFs will be on the same Bus and Functions [1-255] No-SRIOV: Dynamic vNICs are on Bus [0-57], Function [0-7] < StaticZero Mode >
	Upgrade from Balboa will not renumber BDFs (remain in ZeroFunction mode) until Bus <= 57.  Once devices exceed 58, switch to MultiFunction mode.	Upgrade from Balboa will not renumber BDFs (remain in ZeroFunction mode) until Bus <=57. Once devices exceed 58 or Platform specific maximum PCIe Bus number or change to SRIOV configuration, switch to StaticZero mode.
		Upgrade from Cisco UCS Manager Version 2.0 will not renumber BDFs (remain in ZeroFunction / MultiFunction mode). Once devices exceed 58 or Platform specific maximum PCIe Bus number OR Change to SRIOV configuration, switch to StaticZero mode.

## vNIC/vHBA Host Port Placement

After a vNIC/vHBA is assigned to a vCON, it can be placed on one of the host ports of specific adapters. You can either explicitly specify the host port for placement, or allow Cisco UCS Manager to automatically assign vNICs/vHBAs to host ports.



**Note** You can perform vNIC/vHBA host port placement on servers that support Cisco UCS VIC 1340 and VIC 1380 adapters.

Cisco UCS 13xx Series adapters have 2x8 PCIe third generation host ports. Each PCIe host port is capable of a maximum of 64 Gbps bandwidth.

The host port placement of the vNIC/vHBA determines the order of the vNIC/vHBA on the adapter. The vNICs/vHBAs placed on the first host port will be enumerated first, followed by the vNICs/vHBAs on the second host port.



**Note** The 64 Gbps maximum is a theoretical maximum, actual data transfer is limited to around 40 Gbps.

All the vNICs sharing the same PCIe Host Port will share this bandwidth. To make the optimal use of PCIe host port bandwidth, vNICs should be distributed across the two host ports.

## Configuring Host Port Placement

You can configure host port placement for vNICs on servers that support Cisco UCS VIC 1340 and VIC 1380 adapters.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters the organization mode for the specified organization. To enter the root organization mode, enter / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>scope service-profile</b> <i>profile-name</i>	Enters service profile organization mode for the service profile.
<b>Step 3</b>	UCS-A /org/service-profile # <b>scope vnic</b> <i>vnic-name</i>	Enters organization service profile mode for the specified vNIC.
<b>Step 4</b>	UCS-A /org/service-profile/vnic # <b>set host-port</b> {1   2   any}	Sets the host port for the specified vNIC. Entering a value of <b>any</b> allows Cisco UCS Manager to determine the host port to which the vNIC is assigned. If you set the host port for a vNIC on an adapter that does not support host port placement, the <b>Actual Host Port</b> parameter displays <b>None</b> .
<b>Step 5</b>	UCS-A /org/service-profile/vnic* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 6</b>	UCS-A /org/service-profile/vnic # <b>show detail</b>	Displays details about the specified vNIC.

### Example

The following example places a vNIC called vnic3 to host port 2, commits the transaction, and displays the host port information:

```
UCS-A# scope org
UCS-A /org # scope service-profile SP-2
UCS-A /org/service-profile # scope vnic vnic3
UCS-A /org/service-profile/vnic # set host-port 2
UCS-A /org/service-profile/vnic* # commit-buffer
UCS-A /org/service-profile/vnic # show detail
vNIC:
  Name: vnic3
  Fabric ID: A
  Dynamic MAC Addr: 00:25:B5:13:13:11
  Desired Order: 2
  Actual Order: 3
  Desired VCon Placement: 1
  Actual VCon Placement: 1
  Desired Host Port: 2
  Actual Host Port: 2
  ...
UCS-A /org/service-profile/vnic #
```

## CIMC Mounted vMedia

### Using Scriptable vMedia

Cisco UCS Manager allows provisioning of vMedia devices iso images for remote UCS servers. Using Scriptable vMedia, you can programmatically mount an IMG or an ISO image on a remote server. CIMC mounted vMedia provide communications between other mounted media inside your datacenter with no additional requirements media connection. Scriptable vMedia allows you to control virtual media devices without using a browser to manually map each UCS server individually.

**Scriptable vMedia** supports multiple share types including NFS, CIFS, HTTP, and HTTPS shares. **Scriptable vMedia** is enabled through BIOS configuration and configured through a Web GUI and CLI interface.

Cisco UCS Manager Scriptable vMedia supports the following functionality:

- Booting from a specific vMedia device
- Copying files from a mounted share to a local disk
- Installation and updating OS drivers




---

**Note** Cisco UCS Manager support for Scriptable vMedia is applicable for CIMC mapped devices only. Existing KVM based vMedia devices are not supported.

---

vMedia mount fails when the following conditions are met:

1. The remote vMedia image filename in the vMedia policy is set to **Service-Profile-Name**.



- The service profile is renamed.

This is because the change in the name of the service profile does not change the remote vMedia image filename in the vMedia policy. The image filename still points to the older image on the remote device, which cannot be found.

## Creating a CIMC vMedia Policy

### Before you begin

Make sure that you have access to the following:

- Remote vMedia Server
- vMedia Devices

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A# <b>scope org</b> <i>org-name</i>	Enters organization mode for the specified organization. To enter the root organization mode, type / as the <i>org-name</i> .
<b>Step 2</b>	UCS-A /org # <b>create vmedia-policy</b> <i>policy-name</i>	Creates a vMedia policy with the specified policy name. This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
<b>Step 3</b>	UCS-A /org/vmedia-policy* # <b>create vmedia-mapping</b> <i>mapping -name</i>	Creates a vMedia policy sub-directory with the specified mapping name.
<b>Step 4</b>	(Optional) UCS-A /org/vmedia-policy/vmedia-mapping # <b>set descr</b> <i>description</i>	Provides a description for the vMedia policy. <b>Note</b> If your description includes spaces, special characters, or punctuation, you must begin and end your description with quotation marks. The quotation marks will not appear in the description field of any <b>show</b> command output.
<b>Step 5</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set device type</b> <i>device-type</i>	Specifies the remote vMedia image type you wish to mount. Options are: <ul style="list-style-type: none"> <li>• <b>CDD</b> - Scriptable vMedia CD.</li> <li>• <b>HDD</b> - Scriptable vMedia HDD.</li> </ul>

	Command or Action	Purpose
<b>Step 6</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set image-file</b> <i>image-file-name</i>	Specifies the type of remote vMedia image file name. Enter the full path to the backup configuration file. This field can contain the filename [with the file extension] only.  <b>Note</b> Ensure that the full path to the file begins with “/” after the share name.
<b>Step 7</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set image-path</b> <i>image-path</i>	Specifies the remote vMedia image path. Enter the full path to the remote vMedia configuration file.
<b>Step 8</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set mount-protocol</b> <i>mount-protocol</i>	Specifies the remote vMedia mount protocol. Options are:  <ul style="list-style-type: none"> <li>• CIFS</li> <li>• NFS</li> <li>• HTTP</li> <li>• HTTPS</li> </ul>
<b>Step 9</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set password</b>	Specifies the remote vMedia image password.
<b>Step 10</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set remote-ip</b> <i>remote-ip</i>	Specifies the remote vMedia image IP address.
<b>Step 11</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>set user-id</b> <i>user-id</i>	Specifies the user id for mounting the vMedia device. Enter the username that Cisco UCS Manager should use to log in to the remote server.  This field does not apply if the protocol is NFS. This field is optional if the protocol is HTTP.
<b>Step 12</b>	UCS-A /org/vmedia-policy/vmedia-mapping* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

### Example

The following example creates a vMedia policy named vMediaPolicy2, selects remote vMedia device type, mount protocol, image location, and commits the transaction:

```
UCS-A# scope org /
UCS-A /org # create vmedia-policy vmediapolicy2
UCS-A /org/vmedia-policy* # create vmedia-mapping map1
UCS-A /org/vmedia-policy/vmedia-mapping* # set descr vmedia-map
UCS-A /org/vmedia-policy/vmedia-mapping* # set device-type cdd
UCS-A /org/vmedia-policy/vmedia-mapping* # set image-file-name win2011.iso
```

```
UCS-A /org/vmedia-policy/vmedia-mapping* # set image-path cifs
UCS-A /org/vmedia-policy/vmedia-mapping* # set image-variable-name service-profile-name
UCS-A /org/vmedia-policy/vmedia-mapping* # set mount-protocol cifs
UCS-A /org/vmedia-policy/vmedia-mapping* # set auth-option default
UCS-A /org/vmedia-policy/vmedia-mapping* # set password Password:
UCS-A /org/vmedia-policy/vmedia-mapping* # set remote-ip 172.41.1.158
UCS-A /org/vmedia-policy/vmedia-mapping* # set user-id Administrator
UCS-A /org/vmedia-policy/vmedia-mapping* # commit-buffer
```



---

**Note** When vMedia policy is created the **Retry on Mount Fail** option is set to **Yes**. The following example changes the **Retry on Mount Fail** option to **No**.

---

```
UCS-A# scope org /
UCS-A /org # create vmedia-policy vmediapolicy2
UCS-A /org/vmedia-policy* # set retry-on-mount-fail No
UCS-A /org/vmedia-policy* # commit-buffer
```



---

**Warning** When you set the **Retry on Mount Fail** option to **No**, a warning message appears stating: **This will disable automatic retry of mount in case of any vMedia mount failure.**

---





## CHAPTER 12

# Firmware Upgrades

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- [Firmware Upgrades, on page 401](#)

## Firmware Upgrades

Beginning with Cisco UCS Manager Release 4.2(3), Cisco is releasing unified Cisco UCS Manager software and firmware upgrades for the following platforms with every release of Cisco UCS Manager:

- Cisco UCS 6500 Series Fabric Interconnect with Cisco UCS B-Series, C-Series, and S-Series Servers
- Cisco UCS 6400 Series Fabric Interconnect with Cisco UCS B-Series, C-Series, and S-Series Servers
- Cisco UCS 6300 Series Fabric Interconnect with Cisco UCS B-Series, C-Series, and S-Series Servers
- Cisco UCS 6324 Fabric Interconnect with Cisco UCS B-Series Servers and C-Series Servers, which is also known as UCS Mini

You can upgrade the firmware through Auto Install, packages in service profiles, using the firmware automatic synchronization server policy, and directly at endpoints. For more information on guidelines and installing firmware, see the *Cisco UCS Firmware Management Guide*.





## CHAPTER 13

# Diagnostics Configuration

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- [Overview of Cisco UCS Manager Diagnostics, on page 403](#)
- [Creating a Diagnostics Policy, on page 403](#)
- [Configuring a Memory Test for a Diagnostics Policy, on page 404](#)
- [Deleting a Diagnostic Policy, on page 406](#)
- [Running a Diagnostics Test on a Server, on page 407](#)
- [Stopping a Diagnostics Test, on page 407](#)
- [Diagnostics Troubleshooting, on page 408](#)

## Overview of Cisco UCS Manager Diagnostics

The Cisco UCS Manager diagnostics tool enables you to verify the health of the hardware components on your servers. The diagnostics tool provides a variety of tests to exercise and stress the various hardware subsystems on the servers, such as memory and CPU. You can use the tool to run a sanity check on the state of your servers after you fix or replace a hardware component. You can also use this tool to run comprehensive burn-in tests before you deploy a new server in your production environment.

When a system is new, a default diagnostics policy is created in org scope. This default policy is named default and it cannot be deleted. The user will receive an error message if they try to delete it. The default diagnostic policy is the preferred way to execute the same set of tests across all servers. Any diagnostic policy, including the default can be customized.

The default policy only has one memory test. The default parameters of the memory test can be modified. In addition, the memory test within the default diagnostics policy can be deleted. If it does not have a memory test, the diagnostic policy will not run.

## Creating a Diagnostics Policy

### Before you begin

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

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope org</b>	Enters the organization configuration mode.
<b>Step 2</b>	UCS-A /org # <b>create diag-policy</b> <diag-policy>	Creates a diagnostic policy.  <b>Note</b> The diagnostic policy name can contain up to 16 characters.
<b>Step 3</b>	UCS-A /org/diag-policy # <b>commit buffer</b>	

**Example**

The following example shows how to create and set description for a diagnostic policy:

```
UCS-A# scope org
UCS-A /org # create diag-policy new-policy
UCS-A /org/diag-policy* # commit-buffer
```

## Configuring a Memory Test for a Diagnostics Policy

**Before you begin**

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

**Procedure**

	Command or Action	Purpose				
<b>Step 1</b>	UCS-A # <b>scope org</b>	Enters the organization configuration mode.				
<b>Step 2</b>	UCS-A /org # <b>create diag-policy-name</b> <diag-polic-name>	Creates a custom diagnostic policy. The diagnostic policy can contain up to 16 characters.				
<b>Step 3</b>	UCS-A /org/diag-policy-name* # <b>commit buffer</b>	Commits the transaction to the system configuration.				
<b>Step 4</b>	UCS-A /org/diag-policy # <b>create memory-test</b> <memory-test <test order>	Creates a custom memory test for the diagnostic policy. The memory test ID can range from 1 to 64.  The memory test has the following values which the user can set: <table border="1"> <thead> <tr> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><b>Order</b></td> <td>The order in which the tests will be executed.</td> </tr> </tbody> </table>	Name	Description	<b>Order</b>	The order in which the tests will be executed.
Name	Description					
<b>Order</b>	The order in which the tests will be executed.					



	Command or Action	Purpose	
		Name	Description
		<b>CPU Filter</b>	Sets the CPU filter to all CPUs or to a specified CPU.
		<b>Loop Count</b>	Sets the loop count to the specified iterations. The range is from 1-1000.
		<b>Memory Chunk Size</b>	Sets the memory chunk to 5mb-chunk or big-chunk.
		<b>Memory Size</b>	Sets the memory size to a specific value.
		<b>Pattern</b>	Sets the memory test to butterfly, killer, prbs, prbs-addr, or prbs-killer.
<b>Step 5</b>	UCS-A /org/diag-policy/memory-test* # <b>set cpu-filter {all cpus   p0-p1-cpus}</b>	Sets the CPU filter to all CPUs or on the core 0 and 1 CPUs. Values are all cups or p0-p1-cpus.	
<b>Step 6</b>	UCS-A /org/diag-policy/memory-test* # <b>set memchunksize {5mb-chunk   big-chunk}</b>	Sets the memory chunk size to the specified value in GiB. Values are 5mb-chunk or big-chunk	
<b>Step 7</b>	UCS-A /org/diag-policy/memory-test* # <b>set memsize {0-4096   all}</b>	Sets the memory size to the specified value. The available values are 0-4096 or all	
<b>Step 8</b>	UCS-A /org/diag-policy/memory-test* # <b>set pattern {butterfly  killer  prbs  prbs-addr  prbs-killer}</b>	Sets the memory test to the specified pattern. Available patterns are butterfly, killer, prbs, prbs-addr, or prbs-killer.	
<b>Step 9</b>	UCS-A /org/diag-policy/memory-test* # <b>set loopcount 1-1000</b>	Sets the loop count to the specified iterations. The loop count can range from 1 to 1000.	
<b>Step 10</b>	UCS-A /org/diag-policy/memory-test* # <b>commit-buffer</b>	Commits the transaction to the system configuration.	
<b>Step 11</b>	UCS-A /org/diag-policy/memory-test # <b>exit</b>	Exits from the memory test scope.	
<b>Step 12</b>	UCS-A /org/diag-policy # <b>show configuration</b>	Displays the configuration values set for the memory test of the custom diagnostic policy.	

### Example

The following example shows how to create a memory test for a diagnostic policy:

```
UCS-A# scope org
UCS-A /org # create diag-policy P2
```

```

UCS-A /org/diag-policy* # commit-buffer
UCS-A /org/diag-policy # create memory-test 1
UCS-A /org/diag-policy/memory-test* # set cpu-filter all-cpus
UCS-A /org/diag-policy/memory-test* # set memchunksize big-chunk
UCS-A /org/diag-policy/memory-test* # set memsize all
UCS-A /org/diag-policy/memory-test* # set pattern butterfly
UCS-A /org/diag-policy/memory-test* # set loopcount 1000
UCS-A /org/diag-policy/memory-test* # commit-buffer
UCS-A /org/diag-policy/memory-test # exit
UCS-A /org/diag-policy # show configuration
enter diag-policy P2
enter memory-test 1
set cpu-filter all-cpus
set loopcount 1000
set memchunksize big-chunk
set memsize all
set pattern butterfly
exit
set descr ""
set policy-owner local
exit
UCS-A /org/diag-policy #

```

## Deleting a Diagnostic Policy

### Before you begin

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

### Procedure

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

### Example

The following example shows how to delete a diagnostic policy:

```

UCS-A # scope org
UCS-A /org # delete diag-policy P2
UCS-A /org* # commit-buffer
UCS-A /org #

```

# Running a Diagnostics Test on a Server

## Before you begin

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

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	UCS-A # <b>scope server</b> <i>chassis-id</i> / <i>server-id</i>	Enters chassis server scope for the specified server.
<b>Step 2</b>	UCS-A /chassis/server # <b>scope diag</b>	Enters the diagnostic mode.
<b>Step 3</b>	UCS-A /chassis/server/diag # <b>set diag-policy-name</b> < <i>diag-policy-name</i> >	Associates the specified diagnostic policy with the server.
<b>Step 4</b>	UCS-A /chassis/server/diag* # <b>commit-buffer</b>	Commits the transaction to the system configuration.
<b>Step 5</b>	UCS-A /chassis/server/diag # <b>show</b>	Displays the server diagnostic details.
<b>Step 6</b>	UCS-A /chassis/server/diag # <b>start</b>	Runs the diagnostic test on the server.
<b>Step 7</b>	UCS-A /chassis/server/diag* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

## Example

The following example shows how to run a diagnostic test on server 1/7:

```
UCS-A # scope server 1/7
UCS-A /chassis/server # scope diag
UCS-A /chassis/server/diag # set diag-policy-name P1
UCS-A /chassis/server/diag* # commit-buffer
UCS-A /chassis/server/diag # show
Oper State      Diag Overall Progress      Diag Policy Name
-----
Completed      100
UCS-A /chassis/server/diag # start
UCS-A /chassis/server/diag* # commit-buffer
UCS-A /chassis/server/diag #
```

# Stopping a Diagnostics Test

## Before you begin

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

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	UCS-A # <b>scope server</b>	Enters the server configuration mode.
<b>Step 2</b>	UCS-A chassis/server # <b>scope diag</b>	Enters diagnostics configuration mode.
<b>Step 3</b>	UCS-A chassis/server/diag # <b>stop</b>	Stops the diagnostic policy.
<b>Step 4</b>	UCS-A /chassis/server/diag* # <b>commit-buffer</b>	Commits the transaction to the system configuration.

**Example**

The following example shows how to stop a diagnostic policy:

```
UCS-A# scope server 1/2
UCS-A /chassis/server # scope diag
UCS-A /chassis/server/diag # stop
UCS-A /chassis/server/diag* # commit-buffer
```

## Diagnostics Troubleshooting

<b>Issue</b>	<b>Steps to Debug</b>
If the BIOS detects a bad DIMM, the DIMM is disabled and is not visible to the Diagnostics operation.	Refer to memory-related faults in addition to the diagnostics operation results.
If the DIMM blacklisting feature is enabled and a DIMM is blacklisted, it is not visible to the Diagnostics operation.	Refer to memory-related faults in addition to the diagnostics operation results.

The Diagnostics operation may not execute successfully, if the server has bad DIMMs which prevent the server from booting.	NA
The Diagnostics operation can fail, if an uncorrectable error causes a server reboot.	NA
A Diagnostics operation failure can occur if there are memory errors that cause the Diagnostics operation to hang.	NA

<p>The Diagnostics operation can be interrupted by external events, such as a managed endpoint failover or a critical UCSM process restart. In these cases, the Diagnostics operation is cancelled and the Memory Tests are marked as failed.</p>	<p>The failure is triggered by external events. Retry the Diagnostics operation.</p>
<p>A Memory test fails with the error: Uncorrectable errors detected.</p>	<p>Check for server faults under the Chassis/Server/Faults tab. See the SEL logs for the DIMM errors under the Chassis/Server/SEL Logs tab.</p>
<p>A Memory test failure needs further analysis.</p>	<p>See the diagnostics operation logs in following log file archive on the primary FI in the /workspace partition: diagnostics/diag_log_&lt;system-name&gt;_&lt;timestamp&gt;_&lt;chassis-id&gt;_&lt;blade-id&gt;.tar.gz</p> <p>See the analysis file: tmp/ServerDiags/MemoryPmem2.&lt;id&gt;/MemoryPmem2.analysis in the previously mentioned log file archive.</p> <p>Use the following command to find the diagnostics logs with the analysis files:</p> <pre># for file in `ls /workspace/diagnostics/*diag*`; do tar -tzvf \$file   grep analysis &amp;&amp; echo "IN " \$file; done</pre>