Managing the Server

This chapter includes the following sections:

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Configuring the Server Boot Order

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

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters bios command mode.
Step 2	Server /bios # **set boot-order** *device1*[,*device2*[,*device3*[,*device4*[,*device5*]]]]	Specifies the boot device options and order. You can select one or more of the following: • cdrom—Bootable CD-ROM • fdd—Floppy disk drive • hdd—Hard disk drive • pxe—PXE boot

	Command or Action	Purpose
		• efi—Extensible Firmware Interface
Step 3	Server /bios # **commit**	Commits the transaction to the system configuration.

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

This example sets the boot order and commits the transaction:

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

Server /bios #
```

Resetting the Server

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **power hard-reset**	After a prompt to confirm, resets the server. **Note** • Power cycling the server is the same as pressing the physical power button to power off, and then power on the server. • Power hard-reset is the same as pressing the physical reset button on the server.

This example resets the server:

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

Shutting Down the Server

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis mode.
Step 2	Server /chassis # **power shutdown**	After the prompt to confirm, shuts down the server.

This example shuts down the server:

```
Server# scope chassis
Server /chassis # power shutdown
This operation will change the server's power state.
Do you want to continue?[y|N]y
```

Managing Server Power

Powering On the Server

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

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **power on**	After the prompt to confirm, turns on the server power.

This example turns on the server:

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

Server /chassis # show
Power Serial Number Product Name   PID            UUID
----- ------------- -------------  -------------  ------------------------------------
on    FOC16161F1P   E160D          UCS-E160D-M... 1255F7F0-9F17-0000-E312-94B74999D9E7
```

Powering Off the Server

Before You Begin

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

Procedure

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

This example turns off the server:

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

Server /chassis # show
Power Serial Number Product Name   PID            UUID
----- ------------- -------------  -------------  ------------------------------------
off    FOC16161F1P   E160D          UCS-E160D-M... 1255F7F0-9F17-0000-E312-94B74999D9E7
```

Power Cycling the Server

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters chassis command mode.
Step 2	Server /chassis # **power cycle**	After the prompt to confirm, power cycles the server.

	Command or Action	Purpose
		Note • Power cycling the server is the same as pressing the physical power button to power off, and then power on the server. • Power hard-reset is the same as pressing the physical reset button on the server.

This example power cycles the server:

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

Managing RAID

RAID Options

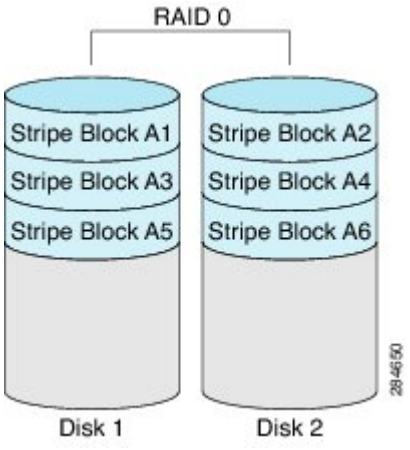
You can choose to store the E-Series Server data files on local Redundant Array of Inexpensive Disks (RAID). The following RAID levels are supported:

- Single-wide E-Series Server supports RAID 0 and RAID 1 levels.
- Double-wide E-Series Server supports RAID 0, RAID 1, and RAID 5 levels.
- Double-wide E-Series Server with PCIe option supports RAID 0 and RAID 1 levels.

RAID 0

With RAID 0, the data is stored evenly in stripe blocks across one or more disk drives without redundancy (mirroring). The data in all of the disk drives is different.

Figure 1: RAID 0



Compared to RAID 1, RAID 0 provides additional storage because both disk drives are used to store data. The performance is improved because the read and write operation occurs in parallel within the two disk drives.

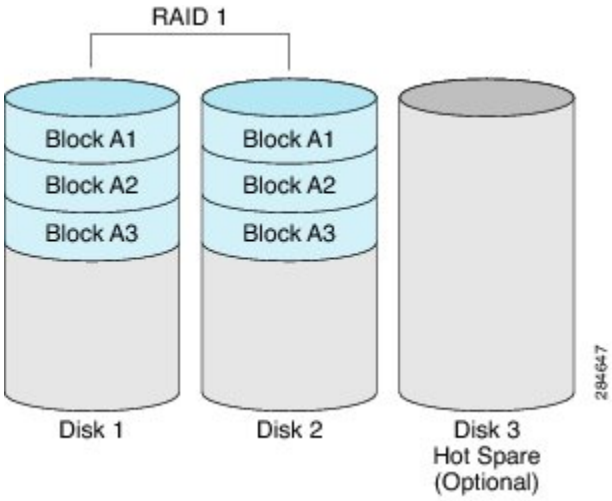
However, there is no fault tolerance, error checking, hot spare, or hot-swapping. If one disk drive fails, the data in the entire array is destroyed. Because there is no error checking or hot-swapping, the array is susceptible to unrecoverable errors.

RAID 1

RAID 1 creates a mirrored set of disk drives, where the data in both the disk drives is identical providing redundancy and high availability. If one disk drive fails, the other disk drive takes over, preserving the data.

RAID 1 also allows you to use a hot spare disk drive. The hot spare drive is always active and is held in readiness as a hot standby drive during a failover.

Figure 2: RAID 1



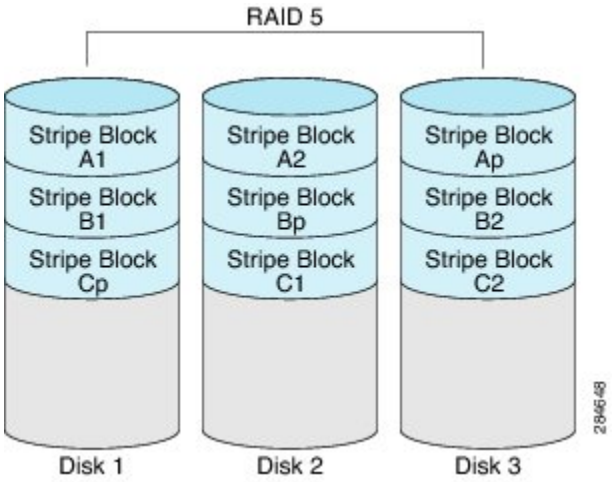
RAID 1 supports fault tolerance and hot-swapping. When one disk drive fails, you can remove the faulty disk drive and replace it with a new disk drive.

However, compared to RAID 0, there is less storage space because only half of the total potential disk space is available for storage and there is an impact on performance.

RAID 5

With RAID 5, the data is stored in stripe blocks with parity data staggered across all disk drives providing redundancy at a low cost.

Figure 3: RAID 5



RAID 5 provides more data storage capacity than RAID 1 and better data protection than RAID 0. It also supports hot swapping; however, RAID 1 offers better performance.

NON-RAID

When the disk drives of a computer are not configured as RAID, the computer is in non-RAID mode. Non-RAID mode is also referred to as Just a Bunch of Disks or Just a Bunch of Drives (JBOD). Non-RAID mode does not support fault tolerance, error checking, hot-swapping, hot spare, or redundancy.

Summary of RAID Options

RAID Options	Description	Advantages	Disadvantages
RAID 0	Data stored evenly in stripe blocks without redundancy	• Better storage • Improved performance	• No error checking • No fault tolerance • No hot-swapping • No redundancy • No hot spare
RAID 1	Mirrored set of disk drives and an optional hot spare disk drive	• High availability • Fault tolerance • Hot spare • Hot-swapping	• Less storage • Performance impact
RAID 5	Data stored in stripe blocks with parity data staggered across all disk drives	• Better storage efficiency than RAID 1 • Better fault tolerance than RAID 0 • Low cost of redundancy • Hot-swapping	• Slow performance
Non-RAID	Disk drives not configured for RAID Also referred to as JBOD	• Portable	• No error checking • No fault tolerance • No hot-swapping • No redundancy • No hot spare

Configuring RAID

Use this procedure to configure the RAID level, strip size, host access privileges, drive caching, and initialization parameters on a virtual drive.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **show physical-drive**	Displays physical disk drives. This information allows you to determine the status of the physical drives. **Note** To configure RAID, the status of the physical drives must be **unconfigured good**. To change the state of the physical drive, see Changing the Physical Drive State.
Step 5	Server /chassis/storageadapter # **create-virtualdrive** {**-r0** | **-r1** | **-r5**} *physical-drive-numbers* [**QuickInit** | **FullInit** | **NoInit**] [**RW** | **RO** | **Blocked**] [**DiskCacheUnchanged** | **DiskCacheEnable** | **DiskCacheDisable**] [**-strpsz64** | **-strpsz32** | **-strpsz16** | **-strpsz8**]	Creates a virtual drive with the specified RAID level on the physical drive. You can also specify the following options: **Note** The options are *not* case sensitive. • (Optional) Initialization options: ◦ **QuickInit**—Controller initialization the drive quickly. You can start writing data into the virtual drive in a few seconds. This is the default option. ◦ **FullInit**—Controller does a complete initialization of the new configuration. You cannot write data into the virtual drive until initialization is complete. If the drive is large, this can take a long time. ◦ **NoInit**—Controller does not initialize the drives. • (Optional) Access policy options: ◦ **RW**—The host has full access to the drive. This is the default option. ◦ **RO**—The host can only read data from the drive. ◦ **Blocked**—The host cannot access the drive.

	Command or Action	Purpose
		• (Optional) Drive cache options: ◦ **DriveCacheUnchanged**—The controller uses the caching policy specified on the physical drive. This is the default option. ◦ **DriveCacheEnable**—Caching is enabled on the physical drives. ◦ **DriveCacheDisable**—Caching is disabled on the physical drives. • (Optional) Strip size options: ◦ **-strpsz64**—This is the default option. ◦ **-strpsz32** ◦ **-strpsz16** ◦ **-strpsz8** **Caution** The smaller strip sizes have a known problem with VMware vSphere Hypervisor™ installation; therefore, if you are installing the vSphere platform, we recommend that you use the **strpsz64** option.
Step 6	Server /chassis/storageadapter # **show virtual-drive**	(Optional) Displays virtual drive information for the storage card. This information allows you to verify RAID configuration.

This example shows how to configure RAID.

```
Server# scope chassis
Server /chassis # show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ -------------- ------------------------ --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis # scope storageadapter SLOT-5

Server /chassis /storageadapter# show physical-drive

Slot Number  Controller Status               Manufacturer   Model        Drive  Firmware
Coerced Size   Type
-----------  ----------  ------------------------------------ -------------- --------------
-------------- ---
1            SLOT-5     unconfigured good    TOSHIBA        MBF2600RC    5704   571250 MB
         HDD
2            SLOT-5     unconfigured good    ATA            ST9500620NS  SN01   475883 MB
         HDD

Server /chassis /storageadapter # create-virtualdrive -r0 1 FullInit RW DiskCacheEnable
-strpsz32
---
```

```
status: ok
----------------------
Server /chassis /storageadapter # show virtual-drive
Virtual Drive  Status               Name                     Size       RAID Level
-------------- -------------------- ------------------------ ---------- ----------
0              Optimal                                       571250 MB  RAID 0
```

What to Do Next

Make the disk drive bootable. See Making the Disk Drive Bootable

Making the Disk Drive Bootable

After you configure RAID, you must make the disk drive bootable. Use this procedure to make the disk drive bootable.

Before You Begin

- Configure RAID on the disk drive.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **show physical-drive**	Displays physical disk drives. **Note** The physical drive status could be one of the following: • **system**—JBOD mode. The drive is not configured as RAID. • **online**—RAID mode. • **unconfigured good**—The drive is ready to be assigned to a drive group or hot spare pool. No mode is configured on the drive. • **hotspare**—The drive is designated as a spare drive. No mode is configured on the drive.
Step 5	Server /chassis/storageadapter # **set boot-drive {pd1 | pd2 | pd3 | vd0}**	Makes the disk drive bootable.

	Command or Action	Purpose
		Note To make the disk drive bootable, the status of the drive must be **system**. The status **system** indicates that the drive is in JBOD (non-RAID) mode.
Step 6	Server /chassis/storageadapter # **commit**	Commits the changes.
Step 7	Server /chassis/storageadapter # **show settings**	Displays settings.

This example shows how to make the disk drive bootable using the CIMC CLI.

```
Server# scope chassis
Server /chassis# show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ -------------- ------------------------ --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis# scope storageadapter SLOT-5
Server /chassis /storageadapter# show physical-drive

Slot Number  Controller Status               Manufacturer   Model        Drive  Firmware
Coerced Size   Type
-----------  ----------- ------------------------------------ -------------- --------------
-------------- -----
1            SLOT-5     system               TOSHIBA        MBF2600RC    5704   571250 MB
         HDD
2            SLOT-5     unconfigured good    ATA            ST9500620NS  SN01   475883 MB
         HDD

   Server /chassis /storageadapter# set boot-drive pd1
Server /chassis /storageadapter*# commit
Server /chassis /storageadapter# show settings
Boot Drive: pd1
```

Modifying RAID Configuration

Enabling Auto Rebuild on the Storage Controller

Use this procedure to rebuild a disk drive automatically. If one of the disk drives that is configured with RAID gets degraded, and a new drive is plugged it, the rebuild process on the new drive starts automatically.

Procedure

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

	Command or Action	Purpose
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **set global-hotspare-for-newdrives true**	Enables auto rebuild on the storage controller.
Step 5	Server /chassis/storageadapter* # **commit**	Commits the changes.

This example shows how to enable auto rebuild on the storage controller.

```
Server# scope chassis
Server /chassis # show storageadapter
PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ -------------- ----------------------- --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis# scope storageadapter SLOT-5
Server /chassis /storageadapter# set global-hotspare-for-newdrives true
Server /chassis /storageadapter*# commit
```

Performing a Consistency Check on a Virtual Drive

Use this procedure to verify the drives for consistency.

- **For RAID 5**—This procedure checks if the data in all of the parity stripe blocks is correct.
- **For RAID 1**—This procedure checks if the data in both disk drives is identical.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 5	Server /chassis/storageadapter /virtual-drive # **verify**	Verifies the drive for consistency.

	Command or Action	Purpose
		• **For RAID 5**—Checks if the data in all of the parity stripe blocks is correct. • **For RAID 1**—Checks if the data in both disk drives is identical.
Step 6	Server /chassis/storageadapter /virtual-drive # **show detail**	Displays information about the specified virtual drive

This example shows how to perform a consistency check on a virtual drive.

```
Server# scope chassis
Server /chassis # show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ -------------- ----------------------- --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis# scope storageadapter SLOT-5
Server /chassis /storageadapter# scope virtual-drive 0
Server /chassis /storageadapter/virtual-drive# verify
---
status: ok
...
Server /chassis /storageadapter/virtual-drive# show detail
Status: Optimal
    Name:
    Size: 475883 MB
    RAID Level: RAID 1
    Target ID: 0
    Stripe Size: 64 KB
    Drives Per Span: 2
    Span Depth: 1
    Access Policy: Read-Write
    Disk Cache Policy: Unchanged
    Write Cache Policy: Write Through
    Cache Policy: Direct
    Read Ahead Policy: None
    Auto Snapshot: false
    Auto Delete Oldest: true
    Allow Background Init: true
    Consistency Check Progress: 0 %
    Consistency Check Elapsed Seconds: 0 s
```

Reconstructing the Virtual Drive Options

To migrate (reconstruct) the virtual drive to a new RAID level, you must add or remove physical drives. When you add or remove the physical drives, the size of the virtual drive is either retained or increased.

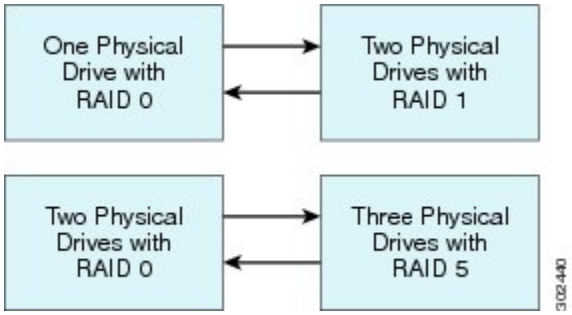
You can retain or increase the size of the virtual drive but you cannot decrease its size. For example, if you have two physical drives with RAID 0, you cannot migrate to RAID 1 with the same number of drives. Because RAID 1 creates a mirrored set of disk drives, the RAID 0 to RAID 1 migration would cause the size of the virtual drive to decrease, which is not supported.

Caution The virtual drive reconstruction process might take several hours to complete. You can continue to use the system during the reconstruction process.

Retaining the Size of the Virtual Drive Options

See the following figure and the table that follows for options that retain the size of the virtual drive when you migrate the virtual drive to a new RAID level.

Figure 4: Retaining the Virtual Drive Size Options



The following table lists the options that retain the size of the virtual drive and provides information about how many physical drives you must add or remove to migrate the virtual drive to a specific RAID level.

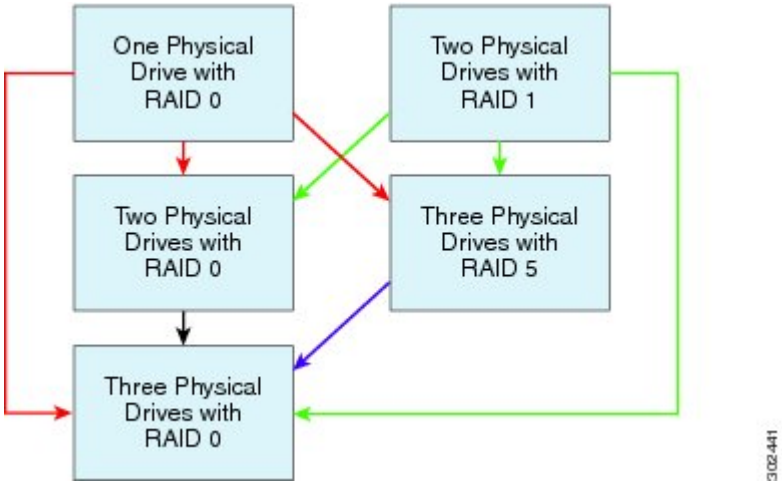
Table 1: Retaining the Virtual Drive Size

From:	Migrate to:	Add or Remove Disks
One physical drive with RAID 0	Two physical drives with RAID 1	Add one disk.
Two physical drives with RAID 1	One physical drive with RAID 0	Remove one disk.
Two physical drives with RAID 0	Three physical drives with RAID 5	Add one disk.
Three physical drives with RAID 5	Two physical drives with RAID 0	Remove one disk.

Increasing the Size of the Virtual Drive Options

See the following figure and the table that follows for options that increase the size of the virtual drive when you migrate the virtual drive to a new RAID level.

Figure 5: Increasing the Virtual Drive Size Options



The following table lists the options that increase the size of the virtual drive and provides information about how many physical drives you must add or remove to migrate the virtual drive to a specific RAID level.

Table 2: Increasing the Virtual Drive Size

From:	Migrate to:	Add or Remove Disks
One physical drive with RAID 0 See the **Red** arrows in the figure.	Two physical drives with RAID 0	Add one disk.
	Three physical drives with RAID 5	Add two disks.
	Three physical drives with RAID 0	Add two disks.
Two physical drives with RAID 1 See the **Green** arrows in the figure.	Two physical drives with RAID 0	—
	Three physical drives with RAID 5	Add one disk.
	Three physical drives with RAID 0	Add one disk.
Two physical drives with RAID 0 See the **Black** arrow in the figure.	Three physical drives with RAID 0	Add one disk.
Three physical drives with RAID 5 See the **Purple** arrow in the figure.	Three physical drives with RAID 0	—

Reconstructing a Virtual Drive

Use this procedure to add or remove the physical drive in order to migrate the virtual drive to the specified RAID level.

Before You Begin

- See Reconstructing the Virtual Drive Options.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **scope virtual-drive** *drive-number*	Enters command mode for the specified virtual drive.
Step 5	Server /chassis/storageadapter /virtual-drive # **reconstruct** {**-r0** | **-r1** | **-r5**} [**-add** | **-rmv**] *new-physical-drive-slot-number(s)*	Adds or removes the physical drive to migrate the virtual drive to the new specified RAID level. • **-r0** | **-r1** | **-r5**—Available RAID levels are: RAID 0, RAID 1, or RAID 5. • **-add** | **-rmv** —Adds or removes the physical drive.
Step 6	Server /chassis/storageadapter /virtual-drive # **show detail**	Displays information about the specified virtual drive.

This example shows how to migrate one of two discs that was initially configured as RAID 1 to RAID 0.

```
Server# scope chassis
Server /chassis # show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ ------------- ----------------------- --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis# scope storageadapter SLOT-5
Server /chassis /storageadapter# scope virtual-drive 0
Server /chassis /storageadapter/virtual-drive# reconstruct -r0 -rmv 1
---
status: ok
...
Server /chassis /storageadapter/virtual-drive# show detail
Status: Optimal
    Status: Optimal
```

```
Name:
Size: 475883 MB
RAID Level: RAID 1
Target ID: 0
Stripe Size: 64 KB
Drives Per Span: 2
Span Depth: 1
Access Policy: Read-Write
Disk Cache Policy: Unchanged
Write Cache Policy: Write Through
Cache Policy: Direct
Read Ahead Policy: None
Auto Snapshot: false
Auto Delete Oldest: true
Allow Background Init: true
ReConstruct Progress: 0 %
ReConstruct Elapsed Seconds: 3 s
```

Deleting RAID Configuration

Use this procedure to clear all RAID configuration.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis /storageadapter # **clear-all-raid-config**	Clears all RAID configuration. At the confirmation prompts answer Yes. **Note** When RAID configuration is cleared, all existing data on th disk drive is lost.

This example shows how to delete RAID configuration.

```
Server# scope chassis
Server /chassis # show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ -------------- ------------------------ --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis # scope storageadapter SLOT-5
Server /chassis /storageadapter # clear-all-raid-config
This operation will clear all RAID configuration.
Warning: All data in the disks would be lost!!!
Are you sure you want to proceed? [Yes|No] Yes
Are you really sure you want to clear all RAID configuration and lose all data? [Yes|No]
Yes
```

Changing the Physical Drive State

Use this procedure to change the state of the physical drive. Options are: hotspare, jbod, or unconfigured good.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **show physical-drive**	Displays physical disk drives.
Step 5	Server /chassis/storageadapter # **scope physical-drive** *slot-number*	Enters command mode for the specified physical drive.
Step 6	Server /chassis/storageadapter /physical-drive # **show detail**	Displays information about the specified physical drive.
Step 7	Server /chassis/storageadapter /physical-drive # **set state {unconfiguredgood | jbod | hotspare}**	Changes the state of the physical drive. Options are: hotspare, jbod, or unconfigured good.
Step 8	Server /chassis/storageadapter /physical-drive* # **commit**	Commits the changes.
Step 9	Server /chassis/storageadapter /physical-drive # **show detail**	Displays information about the specified physical drive.

This example shows how to change the state of the physical drive.

```
Server# scope chassis
Server /chassis # show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
-------- ------------------------------ -------------- ------------------------ --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis# scope storageadapter SLOT-5
Server /chassis /storageadapter# show physical-drive

Slot Number  Controller Status               Manufacturer   Model        Drive  Firmware
Coerced Size   Type
-----------  ---------- ------------------------------------ -------------- --------------
-------------- -----
1            SLOT-5     system               TOSHIBA        MBF2600RC    5704   571250 MB
         HDD
2            SLOT-5     unconfigured good    ATA            ST9500620NS  SN01   475883 MB
```

```
         HDD

Server /chassis /storageadapter# scope physical-drive 1
Server /chassis /storageadapter/physical-drive# show detail

Slot Number 1:
    Controller: SLOT-5
    Status: system
    Manufacturer: TOSHIBA
    Model: MBF2600RC
    Drive Firmware: 5704
    Coerced Size: 571250 MB
    Type: HDD

Server /chassis /storageadapter/physical-drive# set state hotspare
Server /chassis /storageadapter/physical-drive*# commit
Server /chassis /storageadapter/physical-drive# show detail

Slot Number 1:
    Controller: SLOT-5
    Status: hotspare
    Manufacturer: TOSHIBA
    Model: MBF2600RC
    Drive Firmware: 5704
    Coerced Size: 571250 MB
    Type: HDD
```

Rebuilding the Physical Drive

Use this procedure to manually start the rebuild process on the physical drive.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope chassis**	Enters the chassis command mode.
Step 2	Server /chassis # **show storageadapter**	Displays information about installed storage cards. This information allows you to determine the slot in which the storage card is installed.
Step 3	Server /chassis # **scope storageadapter SLOT-***slot-number*	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # **show physical-drive**	Displays physical disk drives.
Step 5	Server /chassis/storageadapter # **scope physical-drive** *slot-number*	Enters command mode for the specified physical drive.
Step 6	Server /chassis/storageadapter /physical-drive # **rebuild**	Rebuilds the physical drive.

This example shows how to change the state of the physical drive.

```
Server# scope chassis
Server /chassis # show storageadapter

PCI Slot Product      Name    Serial Number  Firmware Package Build   Product ID Cache
Memory Size
```

```
-------- ------------------------------ -------------- ------------------------ --------------
 ---
SLOT-5   LSI MegaRAID SAS     2004 ROMB      20.10.1-0092             LSI Logic   0 MB

Server /chassis# scope storageadapter SLOT-5
Server /chassis /storageadapter# show physical-drive

Slot Number  Controller Status               Manufacturer   Model        Drive  Firmware
Coerced Size   Type
-----------  ----------  ------------------------------------ -------------- --------------
-------------- -----
1            SLOT-5     system               TOSHIBA        MBF2600RC    5704   571250 MB
         HDD
2            SLOT-5     unconfigured good    ATA            ST9500620NS  SN01   475883 MB
         HDD

Server /chassis /storageadapter# scope physical-drive 1
Server /chassis /storageadapter/physical-drive# rebuild
```

Configuring BIOS Settings

Viewing BIOS Status

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **show detail**	Displays details of the BIOS status.

The BIOS status information contains the following fields:

Name	Description
BIOS Version	The version string of the running BIOS.
Boot Order	The order of bootable target types that the server will attempt to use.
FW Update/Recovery Status	The status of any pending firmware update or recovery action.
FW Update/Recovery Progress	The percentage of completion of the most recent firmware update or recovery action.

This example displays the BIOS status:

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

```
Server /bios #
```

Installing BIOS Firmware from the TFTP Server

Before You Begin

Obtain the BIOS firmware from Cisco Systems and store the file on a local TFTP server. See Obtaining Software from Cisco Systems.

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **update** *tftp-ip-address path-and-filename*	Starts the BIOS firmware update. The server will obtain the update firmware at the specified path and file name from the TFTP server at the specified IP address.
Step 3	(Optional) Server /bios # **show detail**	Displays the progress of the BIOS firmware update.

This example updates the BIOS firmware:

```
Server# scope bios
Server /bios # update 10.20.34.56 //test/dnld-ucs-k9-bundle.1.0.2h.bin
  <CR>  Press Enter key
Firmware update has started.
Please check the status using "show detail"
Server /bios #
```

Configuring Advanced BIOS Settings

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

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **scope advanced**	Enters the advanced BIOS settings command mode.
Step 3	Configure the BIOS settings.	For the CLI commands, descriptions and information about the options for each BIOS setting, see the following topics: • Advanced: Processor BIOS Settings, on page 26 • Advanced: Memory BIOS Settings, on page 31 • Advanced: Serial Port BIOS Settings, on page 31 • Advanced: USB BIOS Settings, on page 31
Step 4	Server /bios/advanced # **commit**	Commits the transaction to the system configuration. Changes are applied on the next server reboot. If server power is on, you are prompted to choose whether to reboot now.

This example shows how to enable Intel virtualization technology:

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

Configuring Server Management BIOS Settings

Before You Begin

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

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **scope server-management**	Enters the server management BIOS settings command mode.
Step 3	Configure the BIOS settings.	For the CLI commands, descriptions and information about the options for each BIOS setting, see the following topic:

	Command or Action	Purpose
		• Server Management BIOS Settings, on page 32
Step 4	Server /bios/server-management # **commit**	Commits the transaction to the system configuration. Changes are applied on the next server reboot. If server power is on, you are prompted to choose whether to reboot now.

This example shows how to set the BAUD rate to 9.6k :

```
Server# scope bios
Server /bios # scope server-management
Server /bios/server-management # set BaudRate 9.6k
Server /bios/server-management *# commit
Changes to BIOS set-up parameters will require a reboot.
Do you want to reboot the system?[y|N] n
Changes will be applied on next reboot.
Server /bios/server-management #
```

Clearing the BIOS CMOS

On rare occasions, troubleshooting a server may require you to clear the server's BIOS CMOS memory. This procedure is not part of the normal maintenance of a server.

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **clear-cmos**	After a prompt to confirm, clears the CMOS memory.

This example clears the BIOS CMOS memory:

```
Server# scope bios
Server /bios # clear-cmos
This operation will clear the BIOS CMOS.
Note: Server should be in powered off state to clear CMOS.
Continue?[y|N] y
```

Clearing the BIOS Password

Procedure

	Command or Action	Purpose
Step 1	Server# **scope bios**	Enters the BIOS command mode.
Step 2	Server /bios # **clear-bios-password**	Clears the BIOS password. You must reboot the server for the clear password operation to take effect. You are prompted to create a new password when the server reboots.

This example clears the BIOS password:

```
Server# scope bios
Server /bios # clear-bios-password
This operation will clear the BIOS Password.
Note: Server should be rebooted to clear BIOS password.
Continue?[y|N]y
```

Restoring BIOS Defaults

Before You Begin

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

Procedure

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

This example restores BIOS default settings:

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

Server BIOS Settings

The tables in the following sections list the server BIOS settings that you can view and configure.

For each setting, the CLI **set** command appears below the setting name in the table, and the command options are listed in the setting description. To view the default for each setting, type the **set** command followed by a question mark. In the displayed option keywords, the default option is marked with an asterisk.

Note We recommend that you verify the support for BIOS settings in your server. Depending on your installed hardware, some settings may not be supported.

Advanced: Processor BIOS Settings

Name	Description
Intel Turbo Boost Technology **set IntelTurboBoostTech**	Whether the processor uses Intel Turbo Boost Technology, which allows the processor to automatically increase its frequency if it is running below power, temperature, or voltage specifications. This can be one of the following: • **Disabled**—The processor does not increase its frequency automatically. • **Enabled**—The processor utilizes Turbo Boost Technology if required.
Enhanced Intel Speedstep Technology **set EnhancedIntelSpeedStep**	Whether the processor uses Enhanced Intel SpeedStep Technology, which allows the system to dynamically adjust processor voltage and core frequency. This technology can result in decreased average power consumption and decreased average heat production. This can be one of the following: • **Disabled**—The processor never dynamically adjusts its voltage or frequency. • **Enabled**—The processor utilizes Enhanced Intel SpeedStep Technology and enables all supported processor sleep states to further conserve power. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Intel Hyper-Threading Technology **set IntelHyperThread**	Whether the processor uses Intel Hyper-Threading Technology, which allows multithreaded software applications to execute threads in parallel within each processor. This can be one of the following: • **Disabled**—The processor does not permit hyperthreading. • **Enabled**—The processor allows for the parallel execution of multiple threads. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.

Name	Description
Number of Enabled Cores **set CoreMultiProcessing**	Sets the state of logical processor cores in a package. If you disable this setting, Hyper Threading is also disabled. This can be one of the following: • **All**—Enables multi processing on all logical processor cores. • **1** through *n*—Specifies the number of logical processor cores that can run on the server. To disable multi processing and have only one logical processor core running on the server, select 1. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Execute Disable **set ExecuteDisable**	Classifies memory areas on the server to specify where application code can execute. As a result of this classification, the processor disables code execution if a malicious worm attempts to insert code in the buffer. This setting helps to prevent damage, worm propagation, and certain classes of malicious buffer overflow attacks. This can be one of the following: • **Disabled**—The processor does not classify memory areas. • **Enabled**—The processor classifies memory areas. We recommend that you contact your operating system vendor to make sure the operating system supports this feature.
Intel Virtualization Technology **set IntelVT**	Whether the processor uses Intel Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions. This can be one of the following: • **Disabled**—The processor does not permit virtualization. • **Enabled**—The processor allows multiple operating systems in independent partitions. **Note** If you change this option, you must power cycle the server before the setting takes effect.
Intel VT for Directed IO **set IntelVTD**	Whether the processor uses Intel Virtualization Technology for Directed I/O (VT-d). This can be one of the following: • **Disabled**—The processor does not use virtualization technology. • **Enabled**—The processor uses virtualization technology.

Name	Description
Intel VT-d Interrupt Remapping **set InterruptRemap**	Whether the processor supports Intel VT-d Interrupt Remapping. This can be one of the following: • **Disabled**—The processor does not support remapping. • **Enabled**—The processor uses VT-d Interrupt Remapping as required.
Intel VT-d Coherency Support **set CoherencySupport**	Whether the processor supports Intel VT-d Coherency. This can be one of the following: • **Disabled**—The processor does not support coherency. • **Enabled**—The processor uses VT-d Coherency as required.
Intel VT-d Address Translation Services **set ATS**	Whether the processor supports Intel VT-d Address Translation Services (ATS). This can be one of the following: • **Disabled**—The processor does not support ATS. • **Enabled**—The processor uses VT-d ATS as required.
Intel VT-d PassThrough DMA **set PassThroughDMA**	Whether the processor supports Intel VT-d Pass-through DMA. This can be one of the following: • **Disabled**—The processor does not support pass-through DMA. • **Enabled**—The processor uses VT-d Pass-through DMA as required.
Direct Cache Access **set DirectCacheAccess**	Allows processors to increase I/O performance by placing data from I/O devices directly into the processor cache. This setting helps to reduce cache misses. This can be one of the following: • **Disabled**—Data from I/O devices is not placed directly into the processor cache. • **Enabled**—Data from I/O devices is placed directly into the processor cache.
Processor C3 Report **set ProcessorC3Report**	Whether the processor sends the C3 report to the operating system. This can be one of the following: • **Disabled**—The processor does not send the C3 report. • **ACPI_C2**—The processor sends the C3 report using the ACPI C2 format. • **ACPI_C3**—The processor sends the C3 report using the ACPI C3 format.

Name	Description
Processor C6 Report **set ProcessorC6Report**	Whether the processor sends the C6 report to the operating system. This can be one of the following: • **Disabled**—The processor does not send the C6 report. • **Enabled**—The processor sends the C6 report.
Hardware Prefetcher **set HardwarePrefetch**	Whether the processor allows the Intel hardware prefetcher to fetch streams of data and instruction from memory into the unified second-level cache when necessary. This can be one of the following: • **Disabled**—The hardware prefetcher is not used. • **Enabled**—The processor uses the hardware prefetcher when cache issues are detected. **Note** You must select **Custom** in the **CPU Performance** setting to specify this value. For any value other than **Custom**, this option is overridden by the setting in the selected CPU performance profile.
Package C State Limit **set PackageCstateLimit**	The amount of power available to the server components when they are idle. This can be one of the following: • **C0_state**—The server provides all server components with full power at all times. This option maintains the highest level of performance and requires the greatest amount of power. • **C2_state**— System level coordination is in progress resulting in high power consumption. There might be performance issues until the coordination is complete. • **C6_state**—When the CPU is idle, the system reduces the power consumption further than with the C3 option. This option saves more power than C0 or C2, but there might be performance issues until the server returns to full power. • **C7_state**—When the CPU is idle, the server makes a minimal amount of power available to the components. This option saves the maximum amount of power but it also requires the longest time for the server to return to high performance mode. • **No_Limit**—The server may enter any available C state. **Note** This option is used only if **CPU C State** is enabled.

Name	Description
Patrol Scrub **set PatrolScrub**	Whether the system actively searches for, and corrects, single bit memory errors even in unused portions of the memory on the server. This can be one of the following: • **Disabled**—The system checks for memory ECC errors only when the CPU reads or writes a memory address. • **Enabled**—The system periodically reads and writes memory searching for ECC errors. If any errors are found, the system attempts to fix them. This option may correct single bit errors before they become multi-bit errors, but it may adversely affect performance when the patrol scrub is running.
Demand Scrub **set DemandScrub**	Whether the system allows you to perform a memory scrub on demand. This can be one of the following: • **Disabled**—The system does not allow you to perform a memory scrub on demand. • **Enabled**—The system allows you to perform a memory scrub on demand. If errors are found, the system attempts to fix them or marks the location as unreadable. This process allows the system to run faster and with fewer data processing errors.
Device Tagging **set DeviceTagging**	Whether the system allows you to group devices and interfaces based on a variety of information, including descriptions, addresses, and names. This can be one of the following: • **Disabled**—The system does not allow you to group devices and interfaces. • **Enabled**—The system allows you to group devices and interfaces based on a variety of information, including descriptions, addresses, and names.

Advanced: Memory BIOS Settings

Name	Description
Select Memory RAS **set SelectMemoryRAS**	How the memory reliability, availability, and serviceability (RAS) is configured for the server. This can be one of the following: • **Maximum_Performance**—System performance is optimized. • **Mirroring**—System reliability is optimized by using half the system memory as backup. • **Sparing**—System reliability is enhanced with a degree of memory redundancy while making more memory available to the operating system than mirroring.

Advanced: Serial Port BIOS Settings

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

Advanced: USB BIOS Settings

Name	Description
USB Port 0 **set USBPort0**	Whether the processor uses USB port 0. This can be one of the following: • **Disabled**—The server does not use the USB port 0. • **Enabled**—The processor uses the USB port 0.
USB Port 1 **set USBPort1**	Whether the processor uses USB port 1. This can be one of the following: • **Disabled**—The server does not use the USB port 1. • **Enabled**—The processor uses the USB port 1.

Server Management BIOS Settings

Name	Description
Assert NMI on SERR **set AssertNMIOnSERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a SERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a SERR occurs. You must enable this setting if you want to enable **Assert NMI on PERR**.
Assert NMI on PERR **set AssertNMIOnPERR**	Whether the BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. This can be one of the following: • **Disabled**—The BIOS does not generate an NMI or log an error when a PERR occurs. • **Enabled**—The BIOS generates an NMI and logs an error when a PERR occurs. You must enable **Assert NMI on SERR** to use this setting.
FRB2 Enable **set FRB-2**	Whether the FRB2 timer is used by CIMC to recover the system if it hangs during POST. This can be one of the following: • **Disabled**—The FRB2 timer is not used. • **Enabled**—The FRB2 timer is started during POST and used to recover the system if necessary.
Console Redirection **set ConsoleRedir**	Allows a serial port to be used for console redirection during POST and BIOS booting. After the BIOS has booted and the operating system is responsible for the server, console redirection is irrelevant and has no effect. This can be one of the following: • **Disabled**—No console redirection occurs during POST. • **Serial_Port_A**—Enables serial port A for console redirection during POST. This option is valid for blade servers and rack-mount servers. **Note** If you enable this option, you also disable the display of the Quiet Boot logo screen during POST.

Name	Description
Flow Control **set FlowCtrl**	Whether a handshake protocol is used for flow control. Request to Send/Clear to Send (RTS/CTS) helps to reduce frame collisions that can be introduced by a hidden terminal problem. This can be one of the following: • **None**—No flow control is used. • **RTS-CTS**—RTS/CTS is used for flow control. **Note** This setting must match the setting on the remote terminal application.
Baud Rate **set BaudRate**	What BAUD rate is used for the serial port transmission speed. If you disable Console Redirection, this option is not available. This can be one of the following: • **9.6k**—A 9600 BAUD rate is used. • **19.2k**—A 19200 BAUD rate is used. • **38.4k**—A 38400 BAUD rate is used. • **57.6k**—A 57600 BAUD rate is used. • **115.2k**—A 115200 BAUD rate is used. **Note** This setting must match the setting on the remote terminal application.
Terminal Type **set TerminalType**	What type of character formatting is used for console redirection. This can be one of the following: • **PC-ANSI**—The PC-ANSI terminal font is used. • **VT100**—A supported vt100 video terminal and its character set are used. • **VT100-PLUS**—A supported vt100-plus video terminal and its character set are used. • **VT-UTF8**—A video terminal with the UTF-8 character set is used. **Note** This setting must match the setting on the remote terminal application.

Name	Description
OS Boot Watchdog Timer **set OSBootWatchdogTimer**	Whether the BIOS programs the watchdog timer with a specified timeout value. If the operating system does not complete booting before the timer expires, the CIMC resets the system and an error is logged. This can be one of the following: • **Disabled**—The watchdog timer is not used to track how long the server takes to boot. • **Enabled**—The watchdog timer tracks how long the server takes to boot. If the server does not boot within the length of time specified by the **set OSBootWatchdogTimerTimeout** command, the CIMC logs an error and takes the action specified by the **set OSBootWatchdogTimerPolicy** command.
OS Boot Watchdog Timer Policy **set OSBootWatchdogTimerPolicy**	The action the system takes when the watchdog timer expires. This can be one of the following: • **Do Nothing**—The state of the server power does not change when the watchdog timer expires during OS boot. • **Power Down**—The server is powered off if the watchdog timer expires during OS boot. • **Reset**—The server is reset if the watchdog timer expires during OS boot. **Note** This option is only applicable if you enable the OS Boot Watchdog Timer.
set ResumeOnACPowerLoss	