



Managing Storage Using RAID



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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RAID Options



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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:

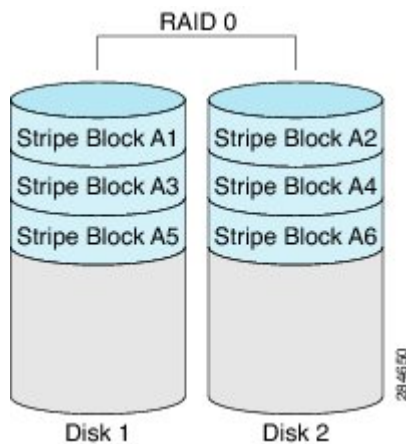
- The single-wide E-Series Server supports RAID 0 and RAID 1 levels.

- The double-wide E-Series Server supports RAID 0, RAID 1, and RAID 5 levels.
- The double-wide E-Series Server with the 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.

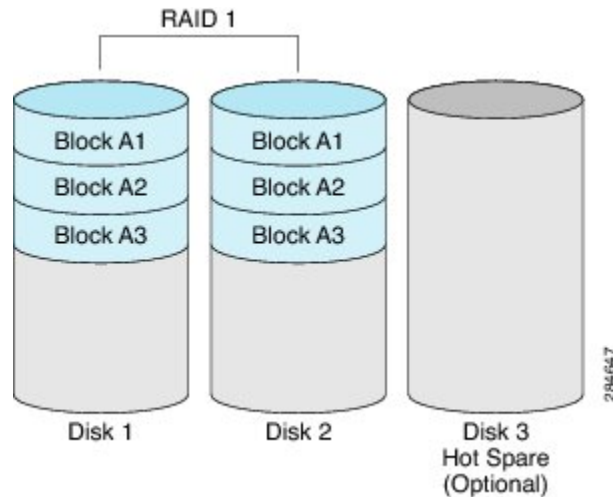
However, there is no fault tolerance, error checking, hot spare, or hot-swapping. If one disk drive fails, the data in the entire array is destroyed. Because there is no error checking or hot-swapping, the array is susceptible to unrecoverable errors.

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



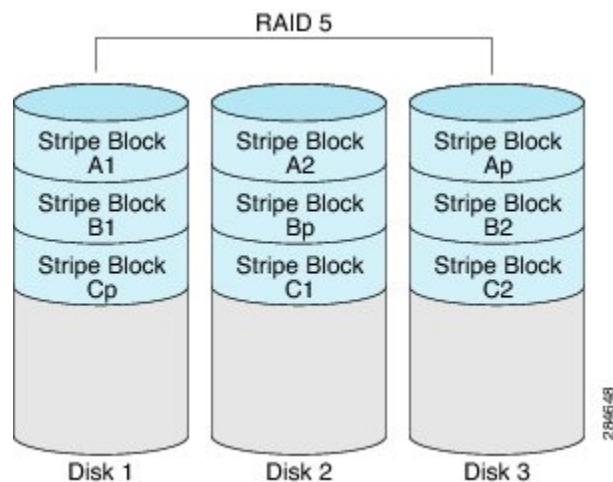
RAID 1 supports fault tolerance and hot-swapping. When one disk drive fails, you can remove the faulty disk drive and replace it with a new disk drive.

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 Option	Description	Advantages	Disadvantages
RAID 0	Data stored evenly in stripe blocks without redundancy	<ul style="list-style-type: none"> • Better storage • Improved performance 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • High availability • Fault tolerance • Hot spare • Hot-swapping 	<ul style="list-style-type: none"> • Less storage • Performance impact
RAID 5	Data stored in stripe blocks with parity data staggered across all disk drives	<ul style="list-style-type: none"> • Better storage efficiency than RAID 1 • Better fault tolerance than RAID 0 • Low cost of redundancy • Hot-swapping 	<ul style="list-style-type: none"> • Slow performance
Non-RAID	Disk drives not configured for RAID Also referred to as JBOD	<ul style="list-style-type: none"> • Portable 	<ul style="list-style-type: none"> • No error checking • No fault tolerance • No hot-swapping • No redundancy • No hot spare

Configuring RAID


Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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-5	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 <i>not</i> case sensitive. • (Optional) Initialization options: <ul style="list-style-type: none"> ◦ 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: <ul style="list-style-type: none"> ◦ RW—The host has full access to the drive. This is the default option.

	Command or Action	Purpose
		<ul style="list-style-type: none"> ◦ RO—The host can only read data from the drive. ◦ Blocked—The host cannot access the drive. • (Optional) Drive cache options: <ul style="list-style-type: none"> ◦ DriveCacheDisable—Caching is disabled on the physical drives. <p>Note This is the default and recommended option.</p> ◦ 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. • (Optional) Strip size options: <ul style="list-style-type: none"> ◦ -strpsz64—This is the default option. ◦ -strpsz32 ◦ -strpsz16 ◦ -strpsz8 <p>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.</p>
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](#)

Deleting the RAID Configuration



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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-5	Enters command mode for an installed storage card.
Step 4	Server /chassis /storageadapter # clear-all-raid-config	<p>Clears all RAID configuration. At the confirmation prompts answer Yes.</p> <p>Note When RAID configuration is cleared, all existing data on the disk drive is lost.</p>

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



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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-5	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



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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.

	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-5	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.
Step 7	Server /chassis/storageadapter/physical-drive # rebuild abort	(Optional) Stops the rebuild process.

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
Server /chassis /storageadapter/physical-drive# rebuild abort

```

Erasing the Contents of a Physical Drive



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

Use this procedure to erase all of the contents of a physical drive and set it to zero.

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-5	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 # erase	Erases all of the contents of a physical drive and sets it to zero. Note The erase process takes a few hours to complete.
Step 7	Server /chassis/storageadapter /physical-drive # erase abort	(Optional) Stops the erase process.

This example shows how to erase the contents of a 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# erase
Server /chassis /storageadapter/physical-drive# erase abort

```

Enabling Auto Rebuild on the Storage Controller



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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.
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-5	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
```

Deleting a Virtual Drive



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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-5	Enters command mode for an installed storage card.
Step 4	Server /chassis/storageadapter # show virtual-drive	Displays virtual drive information that includes the virtual drive number, which you are required to delete the virtual drive.
Step 5	Server /chassis/storageadapter # delete virtual-drive drive-number	Deletes the specified virtual drive.
Step 6	Server /chassis/storageadapter* # commit	Commits the changes.

This example shows how to delete 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 # show virtual-drive
Virtual Drive  Status      Name      Size      RAID Level
-----
0              Optimal
571250 MB    RAID 0

Server /chassis /storageadapter # delete virtual-drive 0
Server /chassis /storageadapter *# commit

```

Performing a Consistency Check on a Virtual Drive

**Note**

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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-5	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. <ul style="list-style-type: none"> • 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 # verify abort	(Optional) Stops the verify process.
Step 7	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



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

To migrate (reconstruct) the virtual drive to a new RAID level, you might need to add or remove physical drives. When you add or remove 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 with RAID 1, a mirrored set of disk drives are created, which reduces the size of the virtual drive to half of what it was before, which is not supported.



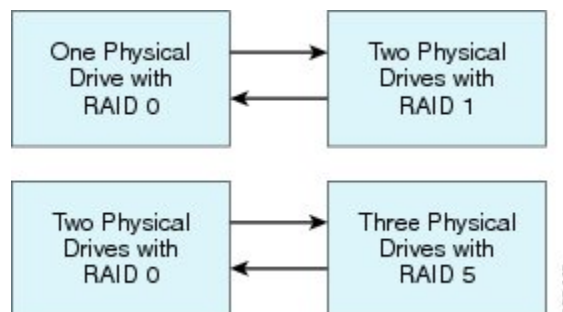
Note

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

Options for Retaining the Size of the Virtual Drive

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



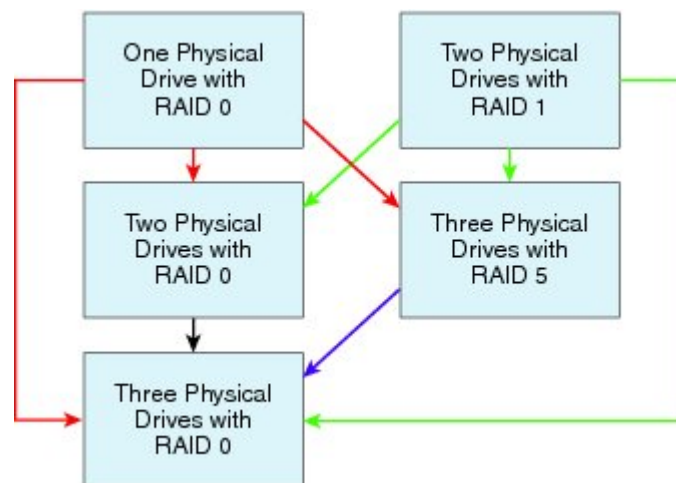
The following table lists the options that retain the size of the virtual drive and provides information about how many physical drives you must add or remove to migrate the virtual drive to a specific RAID level.

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.

Options for Increasing the Size of the Virtual Drive

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.

From:	Migrate to:	Add or Remove 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



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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](#), on page 15.

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-5	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)	<p>Adds or removes the physical drive to migrate the virtual drive to the new specified RAID level.</p> <ul style="list-style-type: none"> • -r0 -r1 -r5—Available RAID levels are: RAID 0, RAID 1, or RAID 5.

	Command or Action	Purpose
		• -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

```

Making the Disk Drive Bootable



Note

The RAID feature is applicable to E-Series Servers and the SM E-Series NCE. The RAID feature is not applicable to the EHWIC E-Series NCE and the NIM E-Series NCE.

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-5	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: <ul style="list-style-type: none"> • 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. 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

```