# Managing Storage Adapters

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# Managing Storage Adapters

## Self Encrypting Drives (Full Disk Encryption)

Cisco IMC supports self encrypting drives (SED). A special hardware in the drives encrypts incoming data and decrypts outgoing data in real-time. This feature is also called Full Disk Encryption (FDE).

The data on the drive is encrypted on its way into the drive and decrypted on its way out. However, if you lock the drive, no security key is required to retrieve the data.

When a drive is locked, an encryption key is created and stored internally. All data stored on this drive is encrypted using that key, and stored in encrypted form. Once you store the data in this manner, a security key is required in order to un-encrypt and fetch the data from the drive. Unlocking a drive deletes that encryption key and renders the stored data unusable. This is called a Secure Erase. The FDE comprises a key ID and a security key.

The FDE feature supports the following operations:

- Enable and disable security on a controller
- Create a secure virtual drive
- Secure a non-secure drive group
- Unlock foreign configuration drives
- Enable security on a physical drive (JBOD)
- Clear secure SED drives
- Clear secure foreign configuration

### Scenarios to consider While Configuring Controller Security in a Dual or Multiple Controllers Environment

**Note** Dual or Multiple controllers connectivity is available only on some servers.

Controller security can be enabled, disabled, or modified independently. However, local and remote key management applies to all the controllers on the server. Therefore security action involving switching the key management modes must be performed with caution. In a scenario where both controllers are secure, and you decide to move one of the controllers to a different mode, you need to perform the same operation on the other controller as well.

Consider the following two scenarios:

- Scenario 1—Key management is set to remote; both controllers are secure and use remote key management. If you now wish to switch to local key management, switch the key management for each controller and disable remote key management.
- Scenario 2—Key management is set to local; both controllers are secure and use local key management. If you now wish to switch to remote key management, enable remote key management and switch the key management for each controller.

If you do not modify the controller security method on any one of the controllers, it renders the secure key management in an unsupported configuration state.

## Enabling Controller Security

This option is available only on some C-series servers.

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Controller Info** area, click **Enable Drive Security**.

**Step 4** In the **Enable Drive Security** dialog box, update the following fields:

| Name | Description |
|---|---|
| **Controller Security** field | Indicates that the controller is disabled. |

| Name | Description |
|---|---|
| **Key Management** field | Indicates whether the key is remotely managed or locally managed. This can be one of the following:<br>• **Remote Key Management** radio button— Controller security key is configured or managed using the remote KMIP server.<br>**Note** If you choose this option, you do not have to specify the existing security key but you have to provide the key ID and the security key for local management.<br>• **Local Key Management** radio button— Controller security is configured locally. |
| **Security Key Identifier** field | The current key ID. |
| **Security Key** field | Security key used to enable controller security. If you wish to change the current security key, enter the new key here.<br>**Note** Once you change the security key, a **Secure Key Verification** pop-up window appears where you need to enter the current security key to verify it. |
| **Confirm Security Key** field | Re-enter the security key. |
| **Suggest** button | Suggests the security key or key ID that can be assigned. |

**Step 5** Click **Save**.

This enables controller security.

## Modifying Controller Security

This option is available only on some C-series servers.

### Before you begin

- You must log in with admin privileges to perform this task.
- You must have first enabled controller security to modify it.

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Controller Info** area, click **Modify Drive Security**.

**Step 4** In the **Modify Drive Security** dialog box, update the following fields:

| Name | Description |
|---|---|
| **Controller Security** field | Indicates whether or not controller security is enabled. This can be one of the following:<br>• **Enabled**— Controller security is enabled.<br>• **Disabled**— Controller security is disabled. |
| **Security Key Identifier** field | The current key ID. |
| **Security Key** field | Security key used to enable controller security. If you wish to change the current security key, enter the new key here.<br>**Note** Once you change the security key, a **Secure Key Verification** pop-up window appears where you need to enter the current security key to verify it. |
| **Confirm Security Key** field | Re-enter the security key. |
| **Modify Security Key** check box | **Note** This option appears only for remote key management.<br>If you select this option the security key on the KMIP server is modified. |
| **Suggest** button | Suggests the security key or key ID that can be assigned. |
| **Save** button | Saves the data. |
| **Cancel** button | Cancels the action. |

**Step 5** Click **Save**.

This modifies the controller security settings.

## Disabling Controller Security

This option is available only on some C-series servers.

### Before you begin

- You must log in with admin privileges to perform this task.
- You must have first enabled controller security to disable it.

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Controller Info** area, click **Disable Drive Security**.

**Step 4** Click **OK** in the confirmation pop-up window.

This disables controller security.

## Switching Controller Security Between Local and Remote Key Management

This task allows you to switch controller security from local management to remote management, and from remote to local management.

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Controller Info** area, to switch the controller security from remote to local management, click **Switch to Local Key Management**.

**Note** When you switch from remote to local key management, ensure that you disable KMIP secure key management first.

**Step 4** (Optional) Similarly, if you want to switch the controller security from local to remote management, click **Switch to Remote Key Management**.

**Step 5** Click **OK** to confirm.

# Creating Virtual Drive from Unused Physical Drives

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Actions** area, click **Create Virtual Drive from Unused Physical Drives**.

The **Create Virtual Drive from Unused Physical Drives** dialog box displays.

**Step 4** In the **Create Virtual Drive from Unused Physical Drives** dialog box, select the RAID level for the new virtual drives:

This can be one of the following:

- **Raid 0**—Simple striping.

- **Raid 1**—Simple mirroring.
- **Raid 5**—Striping with parity.
- **Raid 6**—Striping with two parity drives.
- **Raid 10**—Spanned mirroring.
- **Raid 50**—Spanned striping with parity.
- **Raid 60**—Spanned striping with two parity drives.

**Step 5** In the **Create Drive Groups** area, choose one or more physical drives to include in the group.

Use the >> button to add the drives to the **Drive Groups** table. Use the << button to remove physical drives from the drive group.

**Note**
- The size of the smallest physical drive in the drive group defines the maximum size used for all the physical drives. To ensure maximum use of space for all physical drives, it is recommended that the size of all the drives in the drive group are similar.
- Cisco IMC manages only RAID controllers and not HBAs attached to the server.
- You must have multiple drive groups available to create virtual drives for certain RAID levels. While creating drives for these RAID levels, the create drive option is available only if the required number of drives are selected.

**Step 6** In the **Virtual Drive Properties** area, update the following properties:

| Name | Description |
|---|---|
| **Virtual Drive Name** field | The name of the new virtual drive you want to create. |
| **Read Policy** drop-down list | The read-ahead cache mode. |
| **Cache Policy** drop-down list | The cache policy used for buffering reads. |
| **Strip Size** drop-down list | The size of each strip, in KB. |
| **Write Policy** drop-down list | This can be one of the following<br>• **Write Through**— Data is written through the cache and to the physical drives. Performance is improved, because subsequent reads of that data can be satisfied from the cache.<br>• **Write Back**— Data is stored in the cache, and is only written to the physical drives when space in the cache is needed. Virtual drives requesting this policy fall back to **Write Through** caching when the BBU cannot guarantee the safety of the cache in the event of a power failure.<br>• **Write Back Bad BBU**—With this policy, write caching remains **Write Back** even if the battery backup unit is defective or discharged. |

| Name | Description |
|---|---|
| **Disk Cache Policy** drop-down list | This can be one of the following<br>• **Unchanged**— The disk cache policy is unchanged.<br>• **Enabled**— Allows IO caching on the disk.<br>• **Disabled**— Disallows disk caching. |
| **Access Policy** drop-down list | This can be one of the following<br>• **Read Write**— Enables host to perform read-write on the VD.<br>• **Read Only**— Host can only read from the VD.<br>• **Blocked**— Host can neither read nor write to the VD. |
| **Size** field | The size of the virtual drive you want to create. Enter a value and select one of the following units:<br>• MB<br>• GB<br>• TB |

**Step 7** Click the **Generate XML API Request** button to generate an API request.

**Step 8** Click **Close**.

**Step 9** Click **Create Virtual Drive**.

# Creating Virtual Drive from an Existing Drive Group

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Actions** area, click **Create Virtual Drive from an Existing Virtual Drive Group**.

The **Create Virtual Drive from an Existing Virtual Drive Group** dialog box displays.

**Step 4** In the **Create Virtual Drive from an Existing Virtual Drive Group** dialog box, select the virtual drive whose drive group you want to use to create a new virtual drive.

**Step 5** In the **Virtual Drive Properties** area, update the following properties:

| Name | Description |
|---|---|
| **Virtual Drive Name** field | The name of the new virtual drive you want to create. |
| **Read Policy** drop-down list | The read-ahead cache mode. |
| **Cache Policy** drop-down list | The cache policy used for buffering reads. |
| **Strip Size** drop-down list | The size of each strip, in KB. |
| **Write Policy** drop-down list | This can be one of the following<br>• **Write Through**— Data is written through the cache and to the physical drives. Performance is improved, because subsequent reads of that data can be satisfied from the cache.<br>• **Write Back**— Data is stored in the cache, and is only written to the physical drives when space in the cache is needed. Virtual drives requesting this policy fall back to **Write Through** caching when the BBU cannot guarantee the safety of the cache in the event of a power failure.<br>• **Write Back Bad BBU**—With this policy, write caching remains **Write Back** even if the battery backup unit is defective or discharged. |
| **Disk Cache Policy** drop-down list | This can be one of the following<br>• **Unchanged**— The disk cache policy is unchanged.<br>• **Enabled**— Allows IO caching on the disk.<br>• **Disabled**— Disallows disk caching. |
| **Access Policy** drop-down list | This can be one of the following<br>• **Read Write**— Enables host to perform read-write on the VD.<br>• **Read Only**— Host can only read from the VD.<br>• **Blocked**— Host can neither read nor write to the VD. |
| **Size** field | The size of the virtual drive you want to create. Enter a value and select one of the following units:<br>• MB<br>• GB<br>• TB |

**Step 6** Click the **Generate XML API Request** button to generate an API request.

**Step 7** Click **Close**.

**Step 8** Click **Create Virtual Drive**.

# Setting a Virtual Drive to Transport Ready State

You can move a virtual drive from one MegaRAID controller to another using the **Set Transport Ready** feature. This allows all the pending IOs of the virtual drive to complete their activities, hide the virtual drive from the operating system, flush cache, pause all the background operations, and save the current progress in disk data format, allowing you to move the drive. When you move a virtual drive, all other drives belonging to the same drive group inherit the same change as the moved drive.

When the last configured physical drive on the group is removed from the current controller, the drive group becomes foreign and all foreign configuration rules apply to the group. However, the Transport Ready feature does not change any foreign configuration behavior.

You can also clear a virtual drive from the Transport Ready state. This makes the virtual drive available to the operating systems.

Following restrictions apply to a transport ready virtual drive:

- Only a maximum of 16 transport ready drive groups are currently supported.
- This feature is not supported on high availability.
- A virtual drive cannot be set as transport ready under these conditions:
  - When a virtual drive of a drive group is being reconstructed
  - When a virtual drive of a drive group contains a pinned cache
  - When a virtual drive of a drive group is marked as cacheable or associated with a cachecade virtual drive
  - If a virtual drive is a cachecade virtual drive
  - If a virtual drive is offline
  - If a virtual drive is a bootable virtual drive

# Setting a Virtual Drive as Transport Ready

### Before you begin

- You must log in with admin privileges to perform this task.
- The virtual drive must be in optimal state to enable transport ready.

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA Controller.

**Step 3** On the **Work** pane, click the **Virtual Drive Info** tab.

**Step 4** In the **Virtual Drives** area, choose the drive that you want set as transport ready.

**Step 5** In the **Actions** area, click **Set Transport Ready**.

The **Set Transport Ready** dialog box displays.

**Step 6** Update the following properties in the dialog box:

| Name | Description |
|---|---|
| **Initialize Type** drop-down list | Allows you to select the initialization type using which you can set the selected virtual drive as transport ready. This can be one of the following:<br>• **Exlude All**— Excludes all the dedicated hot spare drives.<br>• **Include All**— Includes any exclusively available or shared dedicated hot spare drives.<br>• **Include Dedicated Hot Spare Drive**— Includes exclusive dedicated hot spare drives. |
| **Set Transport Ready** button | Sets the selected virtual drive as transport ready. |
| **Cancel** button | Cancels the action. |

**Note** When you set a virtual drive to transport ready all the physical drives associated with it are displayed as **Ready to Remove**.

# Clearing a Virtual Drive from Transport Ready State

### Before you begin

- You must log in with admin privileges to perform this task.
- The virtual drive must be transport ready.

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** On the **Work** pane, click the **Virtual Drive Info** tab.

**Step 4** In the **Virtual Drives** area, choose the drive to set as transport ready.

**Step 5** In the **Actions** area, click **Clear Transport Ready**.

This reverts the selected transport ready virtual drive to its original optimal state.

# Importing Foreign Configuration

When one or more physical drives that have previously been configured with a different controller are inserted into a server, they are identified as foreign configurations. You can import these foreign configurations to a controller.

**Important** You cannot import a foreign configuration in the following two scenarios:

1. When the secure virtual drive was created on server 1 (from which you want to import the configuration) using the remote key, and on server 2 (to which you want to import) using the local key.
2. When server 2 is configured with another KMIP server, which is not a part of the server 1 KMIP server cluster.

In order to import the foreign configuration in these scenarios, change the controller security on server 2 from local key management to remote key management, and use the same KMIP server from the same cluster where the server 1 KMIP is configured.

### Before you begin

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

### Procedure

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

**Step 2** In the **RAID controller** area, the **Controller Info** tab displays by default.

**Step 3** In the **Actions** area, click **Import Foreign Config**.

**Note** If KMIP is not enabled, a **Secure Key Verification** dialog box is displayed, prompting you to enter a security key to initiate the foreign configuration import process.

If KMIP is enabled, the **Secure Key Verification** dialog box is displayed with the following note: *"If drive security has been enabled via remote key management, specifying Security key is optional. Click on verify to start foreign configuration import."*

This allows you to click **Verify** without entering the Security Key, and initiate import.

**Step 4** Click **OK** to confirm.

# Clearing Foreign Configuration

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

### Before you begin

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

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
In the **RAID Controller** area, the **Controller Info** tab displays by default.

**Step 3** In the **Actions** area, click **Clear Foreign Config**.

**Step 4** Click **OK** to confirm.

# Clearing a Boot Drive

**Important** This task clears the boot drive configuration on the controller. This action cannot be reverted.

### Before you begin

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

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
In the **RAID Controller** area, the **Controller Info** tab displays by default.

**Step 3** In the **Actions** area, click **Clear Boot Drive**.

**Step 4** Click **OK** to confirm.

# Enabling JBOD Mode

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.

**Step 4** In the **Physical Drives** area, select an unconfigured good drive.

**Step 5** In the **Actions** area, click **Enable JBOD**.

**Step 6** Click **Ok** to confirm.

# Disabling a JBOD

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

### Before you begin

JBOD option must be enabled for the selected controller.

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select a JBOD drive.
**Step 5** In the **Actions** area, click **Disable JBOD**.
**Step 6** Click **Ok** to confirm.

# Retrieving Storage Firmware Logs for a Controller

This task retrieves the storage firmware logs for the controller and places it in the `/var/log` location. This ensures that this log data is available when Technical Support Data is requested.

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** In the working area, the **Controller Info** tab displays by default.
**Step 3** In the **Actions** area, click **Get Storage Firmware Log**.
**Step 4** Click **OK** to confirm.

**Important** Retrieving storage firmware logs for a controller could take up to 2-4 minutes. Until this process is complete, do not initiate exporting technical support data.

# Clearing Controller Configuration

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Controller Info** area, click **Clear All Configuration**.

**Step 4** Click **OK** to confirm.

This clears the existing controller configuration.

# Restoring Storage Controller to Factory Defaults

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **Controller Info** area, click **Set Factory Defaults**.

**Step 4** Click **OK** to confirm.

This restores the controller configuration to factory defaults.

# Preparing a Drive for Removal

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

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select the drive you want to remove.
**Step 5** In the **Actions** area, click **Prepare for Removal**.
**Step 6** Click **OK** to confirm.

# Undo Preparing a Drive for Removal

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** On the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select a drive with a status of **Ready to Remove**.
**Step 5** In the **Actions** area, click **Undo Prepare for Removal**.
**Step 6** Click **OK** to confirm.

# Making a Dedicated Hot Spare

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** tab.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** On the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select an unconfigured good drive you want to make a dedicated hot spare.
**Step 5** In the **Actions** area, click **Make Dedicated Hot Spare**.

The **Make Dedicated Hot Spare** dialog box displays.

**Step 6** In the **Virtual Drive Details** area, update the following properties:

| Name | Description |
|---|---|
| **Virtual Drive Number** drop-down list | Select the virtual drive to which you want to dedicate the physical drive as hot spare. |
| **Virtual Drive Name** field | The name of the selected virtual drive. |
| **Make Dedicated Hot Spare** button | Creates the dedicated hot spare. |
| **Cancel** button | Closes the dialog box without saving any changes made while the dialog box was open. |

**Step 7** Click **Make Dedicated Hot Spare** to confirm.

# Making a Global Hot Spare

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** tab.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select an unconfigured good drive you want to make a global hot spare.
**Step 5** In the **Actions** area, click **Make Global Hot Spare**.

# Removing a Drive from Hot Spare Pools

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** tab, click the appropriate LSI MegaRAID controller.
**Step 3** On the **Work** pane, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select the global or dedicated hot spare you want to remove from the hot spare pools.

**Step 5** In the **Actions** area, click **Remove From Hot Spare Pools**.

# Toggling Physical Drive Status

### Before you begin

- You must log in with admin privileges to perform this task.
- The controller must support the JBOD mode and the JBOD mode must be enabled.

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** tab.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select the drive you want to set as unconfigured good.
**Step 5** In the **Actions** area, click **Set State as Unconfigured Good**.
**Step 6** Click **OK** to confirm that the JBOD mode be disabled.

The **Set State as JBOD** option is enabled.

**Step 7** To enable the JBOD mode for the physical drive, click **Set State as JBOD**.
**Step 8** Click **OK** to confirm.

The **Set State as Unconfigured Good** option is enabled.

# Setting a Physical Drive as a Controller Boot Drive

### Before you begin

- You must log in with admin privileges to perform this task.
- The controller must support the JBOD mode and the JBOD mode must be enabled.

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.
**Step 4** In the **Physical Drives** area, select the drive you want to set as boot drive for the controller.
**Step 5** In the **Actions** area, click **Set as Boot Drive**.

**Step 6** Click **OK** to confirm.

# Initializing a Virtual Drive

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

### Before you begin

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

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.

**Step 4** In the **Virtual Drives** area, choose the drive that you want to initialize.

**Step 5** In the **Actions** area, click **Initialize**.

The **Initialize Virtual Drive** dialog box displays.

**Step 6** Choose the type of initialization you want to use for the virtual drive.

This can be one of the following:

- **Fast Initialize**—This option allows you to start writing data to the virtual drive immediately.
- **Full Initialize**—A complete initialization is done on the new configuration. You cannot write data to the new virtual drive until the initialization is complete.

**Step 7** Click **Initialize VD** to initialize the drive, or **Cancel** to close the dialog box without making any changes.

**Step 8** To view the status of the task running on the drive, in the **Operations** area, click **Refresh**.

The following details are displayed:

| Name | Description |
|---|---|
| **Operation** | Name of the operation that is in progress on the drive. |
| **Progress in %** | Progress of the operation, in percentage complete. |
| **Elapsed Time in secs** | The number of seconds that have elapsed since the operation began. |

# Set as Boot Drive

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
**Step 4** In the **Virtual Drives** area, choose the drive from which the controller must boot.
**Step 5** In the **Actions** area, click **Set as Boot Drive**.
**Step 6** Click **OK** to confirm.

# Editing a Virtual Drive

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
**Step 4** In the **Virtual Drives** area, click **Edit Virtual Drive**.
**Step 5** Review the instructions, and then click **OK**.
The **Edit Virtual Drive** dialog box displays before prompting you to take a backup of your data.
**Step 6** From the **Select RAID Level to migrate** drop-down list, choose a RAID level.

See the following table for RAID migration criteria:

| Name | Description |
|---|---|
| **Select RAID Level to migrate** drop-down list | Select the RAID level to which you want to migrate. Migrations are allowed for the following RAID levels:<br>• **RAID 0** to **RAID 1**<br>• **RAID 0** to **RAID 5**<br>• **RAID 0** to **RAID 6**<br>• **RAID 1** to **RAID 0**<br>• **RAID 1** to **RAID 5**<br>• **RAID 1** to **RAID 6**<br>• **RAID 5** to **RAID 0**<br>• **RAID 6** to **RAID 0**<br>• **RAID 6** to **RAID 5**<br>When you are migrating from one raid level to another, the data arms of the new RAID level should be equal to or greater than the existing one.<br>In case of RAID 6, the data arms will be number of drives minus two, as RAID 6 has double distributed parity. For example, when you create RAID 6 with eight drives, the number of data arms will be 8 – 2 = 6. In this case, if you are migrating from RAID 6 to RAID 0, RAID 0 must have a minimum of six drives. If you select lesser number of drives then **Edit** or **Save** button will be disabled.<br>If you are adding, you can migrate to RAID 0 as you will not be deleting any drives.<br>**Note** RAID level migration is not supported in the following cases:<br>• When there are multiple virtual drives in a RAID group.<br>• With a combination of SSD/HDD RAID groups. |

**Step 7** From the **Write Policy** drop-down list in the **Virtual Drive Properties** area, choose one of the following:

- **Write Through**— Data is written through the cache and to the physical drives. Performance is improved, because subsequent reads of that data can be satisfied from the cache.
- **Write Back**— Data is stored in the cache, and is only written to the physical drives when space in the cache is needed. Virtual drives requesting this policy fall back to **Write Through** caching when the BBU cannot guarantee the safety of the cache in the event of a power failure.
- **Write Back Bad BBU**—With this policy, write caching remains **Write Back** even if the battery backup unit is defective or discharged.

**Step 8** Click **Save Changes**.

# Deleting a Virtual Drive

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

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** In the **RAID Controller** area, click the **Virtual Drive Info** tab.
**Step 4** In the **Virtual Drives** area, select the virtual drive you want to delete.
**Step 5** In the **Actions** area, click **Delete Virtual Drive**.
**Step 6** Click **OK** to confirm.

# Hiding a Virtual Drive

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.
**Step 3** On the **RAID Controller** area, click the **Virtual Drive Info** tab.
**Step 4** In the **Virtual Drives** area, select the virtual drive you want to hide.
**Step 5** In the **Actions** area, click **Hide Drive**.
**Step 6** Click **OK** to confirm.

# Starting Learn Cycles for a Battery Backup Unit

### Before you begin

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

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **RAID Controller** area, click the **Battery Backup Unit** tab.

**Step 4** From the **Actions** pane, click **Start Learn Cycle**.

A dialog prompts you to confirm the task.

**Step 5** Click **OK**.

# Viewing Storage Controller Logs

### Before you begin

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

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **RAID Controller** area, click **Storage Log** tab and review the following information:

| Name | Description |
|---|---|
| **Time** column | The date and time the event occurred. |

| Name | Description |
|---|---|
| **Severity** column | The event severity. This can be one of the following:<br>• Emergency<br>• Alert<br>• Critical<br>• Error<br>• Warning<br>• Notice<br>• Informational<br>• Debug |
| **Description** column | A description of the event. |

# Viewing SSD Smart Information for MegaRAID Controllers

You can view smart information for a solid state drive. Complete these steps:

### Procedure

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID Controller.

**Step 3** On the **Work** pane, click the **Physical Drive Info** tab.

**Step 4** In the **Smart Information** area, review the following information:

| Name | Description |
|---|---|
| **Power Cycle Count** field | Number of power cycles that the drive went through from the time it was manufactured. |
| **Power on Hours** field | Total number of hours that the drive is in the 'Power On' mode. |
| **Percentage Life Left** field | The number of write cycles remaining in a solid state drive (SSD). For instance, if an SSD is capable of 100 write cycles during its life time, and it has completed 15 writes, then the percentage of life left in the drive is 85%. Each percentage range is represented in a different color. For instance, green for 75% to 100% and red for 1 to 25%. |

| Name | Description |
|---|---|
| **Wear Status in Days** field | The number of days an SSD has gone through with the write cycles.<br>SSD vendors provide a finite number of writes per day on the SSD, based on which, you can calculate the total number of years the SSD would continue to work. |
| **Operating Temperature** field | The current temperature of the drive at which the selected SSD operates at the time of selection. |
| **Percentage Reserved Capacity Consumed** field | The total capacity (out of the percentage reserved for it) consumed by the SSD. |
| **Time of Last Refresh** field | Time period since the drive was last refreshed. |

# Viewing NVMe Controller Details

### Before you begin

- The server must be powered on.

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate NVMe controller.

**Step 3** In the **Controller** area, the **Controller Info** tab displays by default.

**Step 4** In the **Work** pane's **Health/Status** area, review the following information:

| Name | Description |
|---|---|
| **Composite Health** field | The health of the controller. This can be one of the following:<br>• **Good**- All the drives under the controller is in optimal state.<br>• **Severe Fault**- When one or more drives under the controller is in faulty state.<br>• **N/A** |
| **Drive Count** field | The number of drives configured on the controller. |

**Step 5** In the **Manufacturer Information** area, review the following information:

| Name | Description |
|---|---|
| **Vendor ID** field | The vendor ID of the NVMe controller. |
| **Product ID** field | The controller product ID. |
| **Component ID** field | The component ID of the NVMe controller. |
| **Product Revision** field | The board revision number, if any. |

**Step 6** In the **Group PCI Info** area, review the following information:

| Name | Description |
|---|---|
| **Vendor ID** field | The PCI vendor ID, in hexadecimal. |
| **Device ID** field | The PCI device ID, in hexadecimal. |

**Step 7** In the **Group Firmware Information** area, review the following information:

| Name | Description |
|---|---|
| **Running Firmware Images** field | NVMe drive fimware version. |

**Step 8** In the **Group Switch Information** area, review the following information:

| Name | Description |
|---|---|
| **Temperature** field | Temperature in degree centigrade of the switch. |
| **Switch Status** field | The current status of the switch. This can be one of the following:<br>• **Optimal** — The controller is functioning properly.<br>• **Failed** — The controller is not functioning.<br>• **Unresponsive** — The controller is down. |
| **Link Status** field | The current status of the link. This field indicates if any of the upstream or downstream links in the switch are down. Individual drive also has a link status that can then be used to identify which drive causes the switch link status to be Link Degraded. This can be one of the following:<br>• **Optimal** — The controller is functioning properly.<br>• **Failed** — The controller is not functioning.<br>• **Unresponsive** — The controller is down. |

| Name | Description |
|---|---|
| **Shutdown Temperature** field | This is the temperature beyond which the safe operation of switch is not guaranteed and recommends shutting down the system. |

# Viewing NVMe Physical Drive Details

### Before you begin

- The server must be powered on.

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate NVMe controller.

**Step 3** Click **Physical Drive** tab and review the following information:

| Name | Description |
|---|---|
| **Physical Drives** column | The list of available physical drives. |
| **PCI Slot** column | The PCI slot number in which the physical drive resides. |
| **Managed ID** column | Internal ID referenced in debug. |
| **Product Name** column | The name of the drive as assigned by the vendor. |
| **Firmware Version** column | The firmware version running on the drive. |
| **Vendor** column | The drive vendor name. |
| **Serial Number** column | Drive serial number. |

**Step 4** **Physical Drives** Details

**Note** These details of a physical drive are displayed when you expand one of the listed physical drives.

| Name | Description |
|---|---|
| **PCI Slot** field | The PCI slot number in which the physical drive resides. |
| **Managed ID** field | Internal ID referenced in debug. |
| **Throttle State** field | The state of the throttle. |

| Name | Description |
|---|---|
| **Serial Number** field | Controller serial number. |
| **Chip Temperature** field | Temperature of the drive in degree centigrade. This is the max temperature read from internal sensors in the drive. |
| **Percentage Drive Life Used** field | The percentage of the drive life that is used up. |
| **Device ID** field | The PCI device ID, in hexadecimal. |
| **Sub Device ID** field | The PCI subdevice ID, in hexadecimal. |
| **Drive Status** field | Status of the drive. |
| **Performance Level** field | Indicates the performance of the drive. |
| **Shutdown Temperature** field | Temperature at which the drive shuts down. |
| **Percentage of Total Power On Hours** field | The percentage of time the drive was powered on. |
| **Vendor ID** field | The PCI vendor ID, in hexadecimal. |
| **SubVendor ID** field | The PCI subvendor ID, in hexadecimal. |
| **LED Fault Status** field | The status of the LED fault. |
| **Controller Temperature** field | Temperature of the controller in degree centigrade. This is the overall composite temperature of the NVMe subsystem ID. |
| **Running Firmware Images** field | NVMe drive fimware version. |
| **Throttle Start Temperature** field | Temperature at which the drive starts to throttle. |

# Viewing PCI Switch Details

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate **PCI Switch** controller. Review the following information:

**Controller** Area

| Name | Description |
|---|---|
| **Composite Health** field | Indicates the overall health status of the PCI switch. Displays if there are any correctable or uncorrectable errors and also reflects the status of the upstream and downstream ports. |
| **PCI Slot** field | PCI slot in which the controller is installed. |
| **Controller Type** field | Type of PCI controller present in the slot. |
| **Product Name** column | Name of the PCI controller. |
| **Product Revision** column | Displays the controller configuration revision information. |

**Switch Information** Area

| Name | Description |
|---|---|
| **Temperature** field | Temperature of the switch in degree Celsius. |

**Manufacturer Information** Area

| Name | Description |
|---|---|
| **Manufacturer** column | Manufacture of the PCI switch. |
| **Vendor ID** column | The switch ID assigned by the vendor. |
| **Sub Vendor ID** column | The secondary switch ID assigned by the vendor. |
| **Device ID** column | The device ID assigned by the vendor. |
| **Sub Device ID** column | The secondary device ID assigned by the vendor. |

**GPU and PCI Adapters** Area

| Name | Description |
|---|---|
| **Slot** column | Slot IDs in which GPUs or PCI Adapters are present. |
| **Link Status** column | The current status of the link. This field indicates if any of the upstream or downstream links in the switch are down. |
| **Link Speed (GT/s)** column | Displays the speed of an adapter card installed in the PCI slot. |
| **Link Width** column | The number of data lanes of the link. |
| **Status** column | Status of the adapter. |

## Starting Copyback Operation

**Procedure**

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

**Step 2** On the **Storage** menu, click the appropriate LSI MegaRAID or HBA controller.

**Step 3** In the **RAID Controller** area, click the **Physical Drive Info** tab.

**Step 4** In the **Physical Drives** area, select a drive, which is in online state.

**Step 5** In the **Actions** area, click **Start Copyback**.

**Step 6** A **Start Copyback Operation** dialog box appears.

**Step 7** Select the **Destination Physical Drive** to which the copyback operation needs to be done.

**Step 8** Click **Start Copyback**.

**Step 9** You can also perform the following copyback operations:

- **Pause Copyback** - If the drive is in copyback state, you can pause the copyback operation.
- **Resume Copyback**- The paused copyback operation can be resumed.
- **Abort Copyback** - If the drive is in copyback state, you can abort the copyback operation.

# Managing the Flexible Flash Controller

## Cisco Flexible Flash

On the M5 servers, Flexible Flash Controller is inserted into the mini storage module socket. The mini storage socket is inserted into the M.2 slot on the motherboard. M.2 slot also supports SATA M.2 SSD slots.

**Note** M.2 slot does not support NVMe in this release.

Some C-Series Rack-Mount Servers support an internal Secure Digital (SD) memory card for storage of server software tools and utilities. The SD card is hosted by the Cisco Flexible Flash storage adapter.

The SD storage is available to Cisco IMC as a single hypervisor (HV) partition configuration. Prior versions had four virtual USB drives. Three were preloaded with Cisco UCS Server Configuration Utility, Cisco drivers and Cisco Host Upgrade Utility, and the fourth as user-installed hypervisor. A single HV partition configuration is also created when you upgrade to the latest version of Cisco IMC or downgrade to the prior version, and reset the configuration.

For more information about installing and configuring the M.2 drives, see the **Storage Controller Considerations (Embbeded SATA RAID Requirements)** and **Replacing an M.2 SSD in a Mini-Storage Carrier For M.2** sections in the Cisco UCS Server Installation and Service Guide for the C240 M5 servers at this URL:

https://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-c-series-rack-servers/products-installation-guides-list.html

For information about the Cisco software utilities and packages, see the *Cisco UCS C-Series Servers Documentation Roadmap* at this URL:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

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

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

**Note**

- If you want to upgrade from version 1.4(5e) to 1.5(4) or higher versions, you must first upgrade to version1.5(2) and then upgrade to a higher version of Cisco IMC.
- Reset the Cisco Flexible Flash controller to load the latest Flex Flash firmware after every Cisco IMC firmware upgrade.

| Action | Description |
|---|---|
| **Reset Cisco Flex Flash** | Allows you to reset the controller. |
| **Reset Partition Defaults** | Allows you to reset the configuration in the selected slot to the default configuration. |
| **Synchronize Card Configuration** | Allows you to retain the configuration for an SD card that supports firmware version 253 and later. |
| **Configure Operational Profile** | Allows you to configure the SD cards on the selected Cisco Flexible Flash controller. |

### RAID Partition Enumeration

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

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

| Scenario | Behavior |
|---|---|
| Single card | RAID partitions are enumerated if the card is healthy, and if the mode is either **Primary** or **Secondary-active**. |
| Dual paired cards | RAID partitions are enumerated if one of the cards is healthy.<br>When only one card is healthy, all read/write operations occur on this healthy card. You must use UCS SCU to synchronize the two RAID partitions. |

| Scenario | Behavior |
|---|---|
| Dual unpaired cards | If this scenario is detected when the server is restarting, then neither one of the RAID partitions is enumerated.<br><br>If this scenario is detected when the server is running, when a user connects a new SD card, then the cards are not managed by the Cisco Flexible Flash controller. This does not affect the host enumeration. You must pair the cards to manage them. You can pair the cards using the **Reset Partition Defaults** or **Synchronize Card Configuration** options. |

# Upgrading from Single Card to Dual Card Mirroring with FlexFlash

You can upgrade from a single card mirroring to dual card mirroring with FlexFlash in one of the following methods:

- Add an empty FlexFlash card to the server, and then upgrade its firmware to the latest version.
- Upgrade the FlexFlash firmware to the latest version and then add an empty card to the server.

Prior to using either of these methods, you must keep in mind the following guidelines:

- To create RAID1 mirroring, the empty card that you want to add to the server must be of the exact size of the card that is already in the server. Identical card size is a must to set up RAID1 mirroring.
- Ensure that the card with valid data in the Hypervisor partition is marked as the primary healthy card. You can determine this state either in the Cisco IMC GUI or from the Cisco IMC CLI. To mark the state of the card as primary healthy, you can either use the **Reset Configuration** option in the Cisco IMC GUI or run the **reset-config** command in the Cisco IMC CLI. When you reset the configuration of a particular card, the secondary card is marked as secondary active unhealthy.
- In a Degraded RAID health state all read-write transactions are done on the healthy card. In this scenario, data mirroring does not occur. Data mirroring occurs only in the Healthy RAID state.
- Data mirroring is only applicable to RAID partitions. In the C-series servers, only Hypervisor partitions operate in the RAID mode.
- If you have not configured SD cards for use with prior versions, then upgrading to the latest version loads the latest 253 firmware and enumerates all four partitions to the host.

While upgrading versions of the FlexFlash, you may see the following error message:

```
Unable to communicate with Flexible Flash controller: operation ffCardsGet, status
CY_AS_ERROR_INVALID_RESPONSE”
```

In addition, the card status may be shown as **missing**. This error occurs because you accidently switched to an alternate release or a prior version, such as 1.4(x). In this scenario, you can either revert to the latest version, or you can switch back to the FlexFlash 1.4(x) configuration. If you choose to revert to the latest Cisco IMC version, then the Cisco FlexFlash configuration remains intact. If you choose to switch back to the prior version configuration, you must reset the Flexflash configuration. In this scenario, you must be aware of the following:

- If multiple cards are present, and you revert to a prior version, then the second card cannot be discovered or managed.
- If the card type is SD253, then you must run the **reset-config** command twice from the Cisco IMC CLI - once to reload the old firmware on the controller and to migrate SD253 to SD247 type, and the second time to start the enumeration.

# Configuring the Flexible Flash Controller Properties

After you upgrade to the latest verison of Cisco IMC or downgrade to a prior version, and reset the configuration, the server will access HV partition only.

### Before you begin

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

**Note** This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives, or power down the host prior to starting this task

### Procedure

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

**Step 2** On the **Storage** tab, click **Cisco FlexFlash**.

**Step 3** In the **Controller Info** tab, click **Configure Operational Profile**.

**Step 4** In the Operational Profile dialog box, update the following fields:

*Table 1: Operational Profile Fields for M5 Servers*

| Name | Description |
|---|---|
| **Controller** field | The system-defined name of the selected Cisco Flexible Flash controller.<br>This name cannot be changed. |
| **Firmware Operating Mode** field | System displayed message. Displays the firmware operating mode as Mirror. |
| **SLOT-1 Read Error Threshold** field | The number of read errors that are permitted while accessing Slot 1 of the Cisco Flexible Flash card. If the number of read errors exceeds this threshold on a card, the card is marked unhealthy.<br>To specify a read error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter `0` (zero). |

| Name | Description |
|---|---|
| **SLOT-1 Write Error Threshold** field | The number of write errors that are permitted while accessing Slot 1 of the Cisco Flexible Flash card. If the number of write errors exceeds this threshold on a card, the card is marked unhealthy.<br>To specify a write error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter `0` (zero). |

**Step 5** Click **Save**.

# Configuring the Flexible Flash Controller Cards

### Before you begin

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

**Note** This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives, or power down the host prior to starting this task.

### Procedure

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

**Step 2** On the **Storage** tab, click **Cisco FlexFlash**.

**Step 3** In the **Actions** area, click **Configure Cards**.
**Configure Cards** dialog box appears.

**Step 4** In the **Configure Cards** dialog box, update the following fields:

| Name | Description |
|---|---|
| **Mode** field | Displays the mode type as Mirror. |
| **Mirror Partition Name** field | The name that you want to assign to the partition. |

| Name | Description |
|---|---|
| **Auto Sync** checkbox | If selected, data from the selected primary card syncs automatically with the secondary card.<br>**Note**<br>• There must be two cards for you to choose this option.<br>• If this option is selected, data on the secondary card is erased and overwritten by the data on the primary card.<br>• The status of this is displayed under the **Virtual Drive** tab. |
| **Select Primary Card** drop-down | Slot that you want to set as the primary card. This can be one of the following:<br>• **Slot1**<br>• **Slot2** |
| **Virtual Drive** drop-down | The virtual drive type. This can be one of the following:<br>• **Removable**<br>• **Non Removable** |

**Step 5** Click **Save**.

The cards are configured in the chosen mode.

# Resetting the Flexible Flash Controller

In normal operation, it should not be necessary to reset the Cisco Flexible Flash. We recommend that you perform this procedure only when explicitly directed to do so by a technical support representative.

**Note** This operation will disrupt traffic to the virtual drives on the Cisco Flexible Flash controller.

### Before you begin

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

### Procedure

**Step 1** On the **Storage Adapters** pane, click **Cisco FlexFlash**.

**Step 2** In the **Cisco FlexFlash** pane, click the **Controller Info** tab.

**Step 3** In the **Actions** area, click **Reset FlexFlash Controller**.

**Step 4** Click **OK** to confirm.

# Enabling Virtual Drives

### Before you begin

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

**Note** This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives.

### Procedure

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

**Step 2** On the **Storage** tab, click **Cisco FlexFlash**.

**Step 3** Click the **Virtual Drive Info** tab.

**Step 4** In the **Virtual Drive Info** tab, click **Enable/Disable Virtual Drive(s)**.

**Step 5** In the **Enable/Disable VD(s)** dialog box, select the virtual drives that you want to enable.

**Step 6** Click **Save**.
The selected virtual drives are enabled to the host.

# Erasing Virtual Drives

### Before you begin

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

**Note** This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives.

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** tab.
**Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
**Step 3** Click the **Virtual Drive Info** tab.
**Step 4** In the **Virtual Drive Info** tab, click **Erase Virtual Drive(s)**.
**Step 5** In the **Erase Virtual Drive(s)** dialog box, select the virtual drives that you want to erase.
**Step 6** Click **Save**.
Data on the selected virtual drives is erased.

# Syncing Virtual Drives

### Before you begin

- You must log in with admin privileges to perform this task.
- Cisco Flexible Flash must be supported by your platform.
- Cards must be in mirror mode.

**Note** This task results in the host re-scanning all the virtual drives, and a loss of virtual drive connectivity. We recommend that you configure the Cisco Flexible Flash controller properties before using any virtual drives.

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** tab.
**Step 2** On the **Storage** tab, click **Cisco FlexFlash**.
**Step 3** Click the **Virtual Drive Info** tab.
**Step 4** In the **Virtual Drive Info** tab, click **Sync Virtual Drive**.
**Step 5** Click **OK** in the confirmation dialog box.
Syncs the virtual drive hypervisor with the primary card.

# Viewing FlexFlash Log Details

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** In the **Storage** menu, click the Cisco Flexible Flash Controller.

**Step 3** In the **FlexFlash Logs** tab's **FlexFlash LogTable** area, review the following fields:

| Name | Description |
|---|---|
| **Time** column | The date and time the event occurred. |
| **Severity** column | The event severity. This can be one of the following:<br>• Emergency<br>• Alert<br>• Critical<br>• Error<br>• Warning<br>• Info<br>• Notice<br>• Debug |
| **Description** column | A description of the event. |

**Step 4** In the **FlexFlash Logs** tab's **Actions** area, review the following fields:

| Name | Description |
|---|---|
| **Show** drop-down list | Customize the way you want to view Cisco IMC log entries using filters. These can be:<br>• **Quick Filter**— Default view<br>• **Advanced Filter**— Filter options to display the log entries based on one or more criteria. Using the matching rule, you can view entries matching all the rules or any one combination of rules you specified in the Filter fields.<br>Click + to add new filtering criteria.<br>Click **Go** to view the entries matching the filter criteria that you set.<br>Click the **Save** icon to save the filter criteria that you set. This becomes a user-defined filter which you can use later.<br>**Note** The user-defined filter appears in the **Manage Preset Filters** dialog box.<br>• **All**—Displays all entries<br>• **Manage Preset Filters**—Displays user-defined filters. You can edit or remove the user-defined filter from this dialog box.<br>• **List of pre-defined filters**— Displays the system-defined filters. |
| **Filter** icon | Displays or hides the quick filter fields. |
| **Column** drop-down list | Allows you to choose the columns you want to view. |

**Step 5** In the **FlexFlash Logs** tab's **Log Navigation Toolbar** area, review the following fields:

| Name | Description |
|---|---|
| **<<Newest** | If there are more events than can fit on a single page, click this link to view the newest entries.<br>The total number of entries displayed depends on the setting in the **Entries per Page** drop-down list. |
| **<Newer** | If there are more events than can fit on a single page, click this link to view the next page of entries that are newer than the set you are currently viewing. |
| **Log Entries** field | This field displays which log entries are currently being shown in the table. |

| Name | Description |
|---|---|
| **Older>** | If there are more events than can fit on a single page, click this link to view the next page of entries that are older than the set you are currently viewing. |
| **Oldest>>** | If there are more events than can fit on a single page, click this link to view the oldest entries. |
| **Page Number** drop-down list | Allows you to navigate to a specific page. Select the page number from the drop-down list. |
| **Number of Rows** field | Displays the rows displayed in the current page. |

# Managing the FlexUtil Controller

The C-Series M5 Rack-Mount servers support microSD memory card for storage of server software tools and utilities. Riser 1 has this microSD memory card slot. Cisco FlexUtil supports only 32GB microSD card.

The following user visible partitions are present on the microSD card:

- Server Configuration Utility (SCU) – 1.25 GB
- Diagnostics – 0.25 GB
- Host Update Utility (HUU) – 1.5 GB
- Drivers – 8 GB
- User

**Note** The number of partitions and size of each partition on microSD is fixed.

At any time, two partitions can be mapped onto the host. These partitions (except the user partition ) can also be updated through a CIFS or NFS share. A second level BIOS boot order support is also available for all the bootable partitions.

**Note** User partition must be used only for storage. This partition does not support OS installations.

## Configuring FlexUtil Controller Properties

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.

**Step 3** In the **General** tab's **Actions** area, click **Configure Operational Profile**.

**Step 4** In the **Operational Profile** dialog box, update the following fields.

| Name | Description |
|---|---|
| **Controller** field | The system-defined name of the selected Flex Util controller.<br>This name cannot be changed. |
| **Read Error Threshold** field | The number of read errors that are permitted while accessing the Flex Util card. If the number of read errors exceeds this threshold on a card, the card is marked unhealthy.<br>To specify a read error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter `0` (zero). |
| **Write Error Threshold** field | The number of write errors that are permitted while accessing the Flex Util card. If the number of write errors exceeds this threshold on a card, the card is marked unhealthy.<br>To specify a write error threshold, enter an integer between 1 and 255. To specify that the card should never be disabled regardless of the number of errors encountered, enter `0` (zero). |

# Resetting FlexUtil Card Configuration

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.

**Step 3** In the **General** tab's **Actions** area, click **Reset Card Configuration**.

This action resets the FlexUtil card configuration to its default settings.

# Viewing Cisco FlexUtil Controller Properties

### Procedure

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

**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.

**Step 3** In the **General** tab's **General** area, review the following fields:

| Name | Description |
|---|---|
| **Product Name** field | The name of the product. |
| **Controller Name** field | The name for the controller. |
| **Controller Status** field | The current status of the FlexUtil card. This can be one of the following:<br>• **Card is absent**<br>• **Card is Unhealthy**<br>• **Metadata Read Error**<br>• **Card access error**<br>• **Invalid Card size**<br>• **Metadata is in failed state**<br>• **No partition, reset required**<br>• **Invalid partition, reset required**<br>• **Card is write protected** |

| Name | Description |
|---|---|
| **Internal State** field | The internal state of the controller. This can be one of the following:<br>• **Uninitialized**—FlexUtil monitoring is not initialized.<br>• **Initializing**—FlexUtil monitoring is initializing.<br>• **Configuring**—The controller is determining the FlexUtil card configuration.<br>• **OK**—The FlexUtil card is not connected to the host.<br>• **Connecting**—The controller is connecting to the host.<br>• **Connected**—The controller is connected to the host.<br>• **Failed**—The controller has failed. See the **Controller Status** field for more details.<br>• **Erasing**—The FlexUtil card is being erased.<br>• **Updating**—The FlexUtil card is being updated.<br>• **Resetting**—The configuration on the card is reset. |

**Step 4** In the **General** tab's **Physical Drive Count** area, review the following fields:

| Name | Description |
|---|---|
| **Physical Drive Count** field | The number of FlexUtil cards detected in the server. |

**Step 5** In the **General** tab's **Virtual Drive Count** area, review the following fields:

| Name | Description |
|---|---|
| **Virtual Drive Count** field | The number of virtual drives configured on the FlexUtil cards installed in the server. |

# Viewing Physical Drive Properties

### Procedure

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

**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.

**Step 3** In the **Physical Drive** tab's **General** area, review the following fields:

| Name | Description |
|---|---|
| **Drive** | Name of the drive. |
| **Drive Status** | Indicates whether the drive is present. |
| **Serial Number** field | The serial number for the FlexUtil card. |
| **Manufacturer ID** field | The manufacturer ID for the FlexUtil card. |
| **OEM ID** field | The OEM ID for the FlexUtil card, if any. |
| **Product Name** field | The name of the FlexUtil card. |
| **Product Revision** field | The revision number for the FlexUtil card. |
| **Manufacturing Date** field | The date the FlexUtil card was manufactured, in the format mm/yy. |
| **Write Enabled** field | If this field displays **true**, the FlexUtil card accepts writes. |
| **Block Size** field | The block size on the FlexUtil card, in bytes. |
| **Capacity** field | The capacity of the FlexUtil card, in megabytes. |
| **Health** | This can be one of the following:<br>• **Healthy**<br>• **Unhealthy** |

**Step 4** In the **Physical Drive** tab's **Error Counters** area, review the following fields.

| Name | Description |
|---|---|
| **Read Error Threshold** field | The number of read errors that are permitted while accessing the FlexUtil card. |
| **Read Error Count** field | The number of read errors encountered while handling I/O traffic since the FlexUtil card was first installed. |
| **Write Error Threshold** field | The number of write errors that are permitted while accessing the FlexUtil card. |
| **Write Error Count** field | The number of write errors encountered while handling I/O traffic since the FlexUtil card was first installed. |

**Step 5** In the **Physical Drive** tab's **Partition** area, review the following fields.

| Name | Description |
|---|---|
| **Partition Count** field | The number of partitions on the FlexUtil card. |
| **Drives Enabled** field | The virtual drives enabled for access on the FlexUtil card. |

# Viewing Virtual Drive Properties

### Procedure

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

**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.

**Step 3** In the **Virtual Drive** tab's **Virtual Drives** area, review the following fields.

| Name | Description |
|---|---|
| **Virtual Drive** column | The name of the virtual drive. |
| **ID** column | Virtual drive ID. |
| **LUN ID** | The LUN ID, if available. |
| **Drive Scope** column | How the virtual drive is configured. This will always be **NON RAID**. |
| **Size** column | The size of the virtual drive in megabytes. |
| **Drive Status** column | Status of the drive. This can be one of the following:<br>• **Healthy**<br>• **Unhealthy** |
| **Host Accessible** column | Indicates whether the virtual drive is mapped to the host. This can be one of the following:<br>• **Connected**<br>• **Not-Connected**<br>If this field displays **connected**, it means the virtual drive is mapped to the host. |
| **Drive Type** column | Type of the drive. This will always be **Removable**. |

| Name | Description |
|---|---|
| **Operation in Progress** column | Operation that is in progress. This can be one of the following:<br>• **Erasing**<br>• **Erase-Pending**<br>• **Updating**<br>• **Update-Pending**<br>• **NA**<br>**Note** If your reboot Cisco IMC while any operation is running, the operation will be aborted and after the reboot the state of the operation will be set to NA. |
| **Last Operation Status** column | Status of the last operation. This can be one of the following:<br>• **Erase-Success**<br>• **Erase-Failed**<br>• **Update-Success**<br>• **Update-Failed** |
| **Resident Image** | Displays the name of the image file present in the virtual drive. |

**Step 4** In the **Virtual Drive** tab's **Actions** area, review the following fields.

| Name | Description |
|---|---|
| **Enable/Disable Virtual Drive(s)** | Allows you to enable or disable a virtual drive. |
| **Erase Virtual Drive(s)** | Allows you to format the virtual drives to FAT 32 format.<br>**Note** You cannot cancel an erase operation in progress or a pending erase operation. |
| **Add Image** | Allows you to add an ISO image configuration for the SCU, HUU, Diagnostics, and Drivers. |

| Name | Description |
|---|---|
| **Update Image** | Allows you to update virtual drive with the ISO image.<br>**Note**<br>• When erase or update is in progress or pending on any virtual drive, you cannot perform any actions available on the **Virtual** tab.<br>• Use the **Cancel Update** button to cancel an ongoing update operation. |
| **Cancel Update** | Cancels any ongoing update operation. |
| **Unmap Image** | Allows you to delete the ISO image configuration. |

# Mapping an Image to a Virtual Drive

### Before you begin

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

### Procedure

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

**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.

**Step 3** Click the **Virtual Drives** tab.

**Step 4** In the **Virtual Drives** area, select the virtual drive, and click **Add Image**.

**Step 5** In the **Add New Image** dialog box, update the following fields:

| Name | Description |
|---|---|
| **Volume** field | The identity of the image mounted for mapping. This can be one of the following:<br>• **SCU**<br>• **Diagnostics**<br>• **HUU**<br>• **Drivers** |

| Name | Description |
|---|---|
| **Mount Type** drop-down list | The type of mapping. This can be one of the following:<br>• **NFS**—Network File System.<br>• **CIFS**—Common Internet File System.<br>• **WWW(HTTP/HTTPS)**—HTTP-based or HTTPS-based system. |
| **Remote Share** field | The URL of the image to be mapped. The format depends on the selected **Mount Type**:<br>• **NFS**—Use **`serverip:/share path`**.<br>• **CIFS**—Use **`//serverip/share path`**.<br>• **WWW(HTTP/HTTPS)**—Use http[s]://serverip/share. |
| **Remote File** field | The name and location of the .iso file in the remote share. Following are the example of remote share files:<br>• **NFS** — **`/softwares/ucs-cxx-scu-3.1.9.iso`**<br>• **CIFS** — **`/softwares/ucs-cxx-scu-3.1.9.iso`**<br>• **WWW(HTTP/HTTPS)** — **`http[s]://softwares/ucs-cxx-scu-3.1.9.iso`** |

| Name | Description |
|---|---|
| **Mount Options** field | Industry-standard mount options entered in a comma separated list. The options vary depending on the selected **Mount Type**.<br>If you are using **NFS**, leave the field blank or enter one or more of the following:<br>• **ro**<br>• **rw**<br>• **nolock**<br>• **noexec**<br>• **soft**<br>• **port=VALUE**<br>• **timeo=VALUE**<br>• **retry=VALUE**<br>If you are using **CIFS**, leave the field blank or enter one or more of the following:<br>• **soft**<br>• **nounix**<br>• **noserverino**<br>If you are using **WWW(HTTP/HTTPS)**, leave the field blank or enter the following:<br>• **noauto**<br>**Note** Before mounting the image, Cisco IMC tries to verify reachability to the end server by pinging the server.<br>• **username=VALUE**<br>• **password=VALUE** |

**Step 6** Optional: The **Add Image** button is a toggle button. After you map an image, if you want to unmap the same image from the drive, select the virtual drive, and click **Unmap Image**.

# Updating an Image on the Virtual Drive

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
**Step 3** Click the **Virtual Drives** tab.
**Step 4** In the **Virtual Drives** area, select the virtual drive for which you want to update an image and click **Update Image**.
**Step 5** Optional: If you want to cancel an ongoing update operation, click **Cancel Update**.

# Unmapping an Image From a Virtual Drive

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
**Step 3** Click the **Virtual Drives** tab.
**Step 4** In the **Virtual Drives** area, select the virtual drive for which you want to delete the image and click **Unmap Image**.

# Erasing a Virtual Drive

### Before you begin

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

### Procedure

**Step 1** In the **Navigation** pane, click the **Storage** menu.
**Step 2** In the **Storage** menu, click the Cisco FlexUtil Controller.
**Step 3** Click the **Virtual Drives** tab.
**Step 4** In the **Virtual Drives** area, select the virtual drive you want to erase, and click **Erase Virtual Drive**.

# Cisco Boot Optimized M.2 Raid Controller

## Viewing Cisco Boot Optimized M.2 Raid Controller Details

### Before you begin

The server must be powered on.

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate M.2 Raid controller.

**Step 3** In the **Controller** area, the **Controller Info** tab displays by default.

**Step 4** In the Work pane's **Health/Status** area, review the following information:

| Name | Description |
|---|---|
| **Composite Health** field | The combined health of the controller, the attached drives, and the battery backup unit. This can be one of the following:<br>• **Good**<br>• **Moderate Fault**<br>• **Severe Fault**<br>• **N/A** |
| **Controller Status** field | The current status of the controller. This can be one of the following:<br>• **Optimal** — The controller is functioning properly.<br>• **Failed** — The controller is not functioning. |

**Step 5** In the **Firmware Versions** area, review the following information:

| Name | Description |
|---|---|
| **Product Name** field | The name of the Cisco Boot optimized M.2 Raid controller. |
| **Product PID** field | The product PID of the Cisco Boot optimized M.2 Raid controller. |
| **Serial Number** field | The serial number of the Cisco Boot optimized M.2 Raid controller. |

| Name | Description |
|---|---|
| **Firmware Package Build** field | The active firmware package version number.<br>For the firmware component version numbers, see the **Running Firmware Images** area. |

**Step 6** In the **PCI Info** area, review the following information:

| Name | Description |
|---|---|
| **PCI Slot** field | The name of the PCIe slot in which the controller is located. |
| **Vendor ID** field | The PCI vendor ID, in hexadecimal. |
| **Device ID** field | The PCI device ID, in hexadecimal. |
| **SubVendor ID** field | The PCI subvendor ID, in hexadecimal. |
| **SubDevice ID** field | The PCI subdevice ID, in hexadecimal. |

**Step 7** In the **Manufacturing Data** area, review the following information:

| Name | Description |
|---|---|
| **Manufactured Date** field | The manufacturing date of the Cisco Boot optimized M.2 Raid controller, in the format yyyy-mm-dd. |
| **Revision No** field | The board revision number, if any. |

**Step 8** In the **Next Patrol Read Schedule** area, review the following information:

| Name | Description |
|---|---|
| **PR State** field | The patrol read state of the M.2 Raid controllers. It can be one of the following:<br>• **ready**<br>• **stopped**<br>• **active**<br>Default state: **N/A**. |
| **PR Schedule Mode** field | The patrol read schedule mode of the M.2 Raid controllers.<br>The **PR Schedule Mode** is **manual** by default. |

**Step 9** In the **Running Firmware Images** area, review the following information:

| Name | Description |
|---|---|
| **BIOS Version** field | The BIOS option PROM version number. |
| **Firmware Version** field | The active firmware version number. |
| **Boot Block Version** field | The boot block version number. |

**Step 10** In the **Virtual Drive Count** area, review the following information:

| Name | Description |
|---|---|
| **Virtual Drive Count** field | The number of virtual drives configured on the controller. |
| **Degraded Drive Count** field | The number of virtual drives in a degraded state on the controller. |
| **Offline Drive Count** field | The number of virtual drives that have failed on the controller. |

**Step 11** In the **Physical Drive Count** area, review the following information:

| Name | Description |
|---|---|
| **Disk Present Count** field | The number of physical drives present on the controller. |
| **Critical Disk Count** field | The number of physical drives in a critical state on the controller. |
| **Failed Disk Count** field | The number of physical drives that have failed on the controller. |

**Step 12** In the **Capabilities** area, review the following information:

| Name | Description |
|---|---|
| **RAID Levels Supported** field | The RAID levels supported by the controller.<br>**Raid 1**—Simple mirroring. |

**Step 13** In the **HW Configuration** area, review the following information:

| Name | Description |
|---|---|
| **Number of Backend Ports** field | The number of SATA ports on the controller. |

# Viewing Physical Drive Info for Cisco Boot Optimized M.2 Raid Controller

### Before you begin

The server must be powered on.

### Procedure

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

**Step 2** In the **Storage** menu, click the appropriate M.2 raid controller.

**Step 3** Click **Physical Drive Info** tab and in the **Physical Drives** area, review the following information:

| Name | Description |
|---|---|
| **Controller** column | The name of the PCIe slot in which the controller drive is located. |
| **Physical Drive Number** column | The physical drive number. |
| **Status** column | The physical drive status. This can be one of the following:<br>• **JBOD**—The drive is in JBOD mode.<br>• **Failed**—The drive was in use, but it has failed.<br>• **Offline**—The drive is offline and cannot be accessed.<br>• **Online**—The drive is in use as part of a drive group.<br>• **Predicted Failure**—The drive is marked as due to fail soon by the controller.<br>• **Rebuild**—The drive is currently being rebuilt.<br>• **Unknown**—The drive status is unknown. |
| **State** column | The state of the physical drive. This can be one of the following:<br>• **JBOD**— The physical drive is in JBOD state.<br>• **Online**— The physical drive is in use as part of a drive group.<br>• **Failed**— The physical drive is in failed state.<br>• **Rebuild**— The physical drive is in rebuild state. |

| Name | Description |
|---|---|
| **Health** column | The health of the physical drive. This can be one of the following:<br>• **Good**<br>• **Moderate Fault**<br>• **Severe Fault**<br>The health field includes both text and a color-coded icon. If the color-coded icon is:<br>• Green — It indicates normal operation.<br>• Yellow — It is an informational message.<br>• Red — It indicates warning, critical, and non-recoverable errors. |
| **Drive Firmware** column | The firmware version running on the drive. |
| **Model** column | The drive vendor name. |
| **Type** column | Whether the drive is a hard drive (HDD) or a solid state drive (SSD). |

**Step 4** In the **Health/Status** area, review the following information:

| Name | Description |
|---|---|
| **Health** | The health of the physical drive. This can be one of the following:<br>• **Good**<br>• **Moderate Fault**<br>• **Severe Fault** |
| **State** | The state of the physical drive. This can be one of the following:<br>• **JBOD**— The physical drive is in JBOD state.<br>• **Online**— The physical drive is in use as part of a drive group.<br>• **Failed**— The physical drive is in failed state.<br>• **Rebuild**— The physical drive is in rebuild state. |

| Name | Description |
|---|---|
| **Status** | The physical drive status. This can be one of the following:<br>• **JBOD**—The drive is in JBOD mode.<br>• **Failed**—The drive was in use, but it has failed.<br>• **Offline**—The drive is offline and cannot be accessed.<br>• **Online**—The drive is in use as part of a drive group.<br>• **Predicted Failure**—The drive is marked as due to fail soon by the controller.<br>• **Rebuild**—The drive is currently being rebuilt.<br>• **Unknown**—The drive status is unknown. |
| **Fault** | If this field displays **true**, the drive is in the **failed** state. |
| **Online** | If this field displays **true**, the drive is in the **online** state. |

**Step 5** In the **Smart Information** area, review the following information:

| Name | Description |
|---|---|
| **Power Cycle Count** | Number of power cycles that were performed on the drive from the time it was manufactured. Power Cycle Count this field. |
| **Power On Hours** | Total number of hours that the drive is in the 'Power On' mode. |
| **Percentage Life Left** | The number of write cycles remaining in a M.2 drive. For instance, if an M.2 drive is capable of 100 write cycles during its life time, and it has completed 15 writes, then the percentage of life left in the drive is 85%. Each percentage range is represented in a different color. For instance, green for 75% to 100% and red for 1 to 25%. |
| **Wear Status in Days** | The number of days an M.2 drive has gone through with the write cycles. |
| **Operating Temperature (°C)** | The current temperature of the drive at which the selected M.2 drive operates at the time of selection. |
| **Percentage Reserved Capacity Consumed** | The total capacity (out of the percentage reserved for it) consumed by the M.2 drive. |

| Name | Description |
|---|---|
| **Time of Last Refresh** | Time period since the drive was last refreshed. |

**Step 6** In the **Operation Status** area, review the following information:

| Name | Description |
|---|---|
| **Operation** | The current operation that is in progress on the drive. This can be one of the following:<br>• **Rebuild in progress**<br>• **Patrol read in progress** |
| **Progress in %** | The progress of the operation, in percentage. |

**Step 7** In the **Inquiry Data** area, review the following information:

| Name | Description |
|---|---|
| **Product ID** | The drive product ID. This field generally displays the drive model number. |
| **Vendor** | The vendor for the drive. |
| **Drive Firmware** | The active firmware version on the drive. |
| **Drive Serial Number** | The serial number for the drive. |

**Step 8** In the **General** area, review the following information:

| Name | Description |
|---|---|
| **Slot Number** | The slot number in which the physical drive resides. |
| **Raw Size** | The capacity of drive in megabytes, including the space used for formatting. |
| **Negotiated Link Speed** | The speed of the link between the drive and the controller. |
| **Media Type** | The drive type is a solid state drive (SSD). |
| **Interface Type** | The drive interface type. |
| **Enclosure Association** | Indicates whether the drives are associated to the controller directly or not. This can be:<br>**Direct attached**—drives are directly attached to the controller. |

# Viewing the Virtual Drive Info for Cisco Boot Optimized M.2 Raid Controller

### Procedure

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

**Step 2** In the **Storage** menu, click the M.2 Raid Controller.

**Step 3** Select the **Virtual Drive Info** tab and in the **Virtual Drives** area, review the following information:

| Name | Description |
|---|---|
| **Virtual Drive Number** column | The number of the virtual drive. |
| **Name** column | The name of the virtual drive. |
| **Status** column | The virtual drive state. This can be one of the following:<br>• **Partially Degraded**—Virtual drive or physical drive rebuild is in progress.<br>• **Degraded**—One or more spans of the drive has no redundancy.<br>• **Off Line**—The drive is not visible to the host.<br>• **Unknown**—The virtual drive state is unknown.<br>• **Optimal**—The drive has full redundancy. |
| **Health** column | The health of the virtual drive. This can be one of the following:<br>• **Good**<br>• **Moderate Fault**<br>• **Severe Fault**<br>The health field includes both text and a color-coded icon. If the color-coded icon is:<br>• Green — It indicates normal operation.<br>• Yellow — It is an informational message.<br>• Red — It indicates warning, critical, and non-recoverable errors. |
| **Size** column | The capacity of the drive in megabytes. |
| **RAID Level** column | The RAID level on the virtual drive.<br>**Raid 1**—Simple mirroring. |

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

| Name | Description |
|---|---|
| **Name** | The name of the virtual drive. |
| **Strip Size** | The size of each strip, in KB. |

**Step 5** In the **Physical Drives** area, review the following information:

| Name | Description |
|---|---|
| **Physical Drive Number** | The physical drive number. |
| **State** | The state of the physical drive. This can be one of the following:<br>• **JBOD**— The physical drive is in JBOD state.<br>• **Online**— The physical drive is in use as part of a drive group.<br>• **Failed**— The physical drive is in failed state.<br>• **Rebuild**— The physical drive is in rebuild state. |
| **Status** | The physical drive status. This can be one of the following:<br>• **JBOD**—The drive is in JBOD mode.<br>• **Failed**—The drive was in use, but it has failed.<br>• **Offline**—The drive is offline and cannot be accessed.<br>• **Online**—The drive is in use as part of a drive group.<br>• **Predicted Failure**—The drive is marked as due to fail soon by the controller.<br>• **Rebuild**—The drive is currently being rebuilt.<br>• **Unknown**—The drive status is unknown. |

**Step 6** In the **Operation Status** area, review the following information:

| Name | Description |
|---|---|
| **Operation** | The current operation that is in progress on the drive. This can be:<br>**Rebuild in progress** |

| Name | Description |
|---|---|
| **Progress in %** | The progress of the operation, in percentage. |