



## EMC Symmetrix VMAX and VMAX3

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## Cisco UCS Director Support for EMC Symmetrix VMAX and VMAX3

Cisco UCS Director supports EMC Symmetrix VMAX and EMC Symmetrix VMAX3. Specific information on supported models, supported software, and supported management interfaces can be found in the [Cisco UCS Director Compatibility Matrix](#) for this release.

Cisco UCS Director connects to EMC VMAX using a supported EMC Solutions Enabler.

## VMAX and VMAX3 Reports

Cisco UCS Director provides you with a view into the managed VMAX and VMAX3 storage systems. Some of these reports do not update automatically. You must click **Refresh** to view updated information.

### VMAX Summary Reports

You can see at a glance the following VMAX summary reports:

- System capacity—Free vs. used (GB) pie chart
- System overview—Symmetrix version ID, Enginuity build version, model, Solutions Enabler IP address, and number of engines, directors, thin devices, data devices, director ports, and disks.
- Storage—Total capacity, used capacity, and free capacity

## VMAX Component and Feature Reports

You can access reports and create VMAX components, such as devices, views, pools, and groups. You can drill down to view details for each component and feature, including the following:

- **Thin Pools**—Name.
- **Data Devices**—Device count, capacity (GB), emulation, configuration, and disk group. **Note:** This device is not used in VMAX3.
- **Regular Devices**—Device count, disk group, emulation, configuration, capacity type, capacity. **Note:** This device is not used in VMAX3.
- **Thin Devices**—Device count, capacity (GB), emulation, bind to thin pool (on or off), and option to preallocate 100 percent.
- **Meta Devices**—Device type, select regular or thin device, meta type, select member device. **Note:** This device is not used in VMAX3.
- **Initiator Groups**—Group type (standard or cascaded), group name, type (iSCSI, FCP), and initiator name. Consistent logical unit number (LUN) can be set to on or off.
- **Storage Groups**—Storage group, storage group count, volume count, masking view, storage capacity, isparent/isceild, parent storage, child storage, masking view, FAST managed, SRP, SLO, workload type.
- **Port Groups**—Group name and director port selection (all, none, or selected).
- **Masking Views**—View name, storage group selection, host LUN ID (specified or autogenerated), initiator group selection, and port group selection.
- **Fast SRP**— Has Associated Disk Group, Storage Group Demand, and SLO Demand Report as drilldown reports.
- **Fast SLO**—This report contains a 'Rename' action that renames the SLO name. Has FAST SLO workload report as a drilldown report
- **Tiers**—Tier name, tier type, emulation, target protection, number of ports and directors, technology, disk location, and type.
- **FAST Policies**—Policy name, tiers, number of tiers, number of storage groups, and emulation. **Note:** This object is not used in VMAX3.

## VMAX Systems Reports

The read-only VMAX systems reports include the following information:

- **Front-End Directors**—Symmetrix ID, director module, status, type, identification, and number of ports, directors, mapped volumes, and engine ID.
- **Back-End Directors**—Symmetrix ID, director module, status, type, identification, and number of ports, directors, mapped volumes, and engine ID.
- **Director Ports**—Director module, type, port, port ID, maximum speed, node WWN, and ACLX option for each port.
- **Disk Groups**—Disk group name, technology, disk location, disks, total capacity, used capacity, free capacity, tags.

- **Features**—Name, type, capacity (GB), and Serial Advanced Technology Attachment (SATA) drive capacity (GB).
- **Licenses**—Feature name, license type, and capacity type.
- **Initiators**—Initiator group, Challenge Handshake Authentication Protocol (CHAP) enablement, user port name, user node name, initiator, type, iSCSI name, common serial number, SPC2 protocol, SCSI support, environment, volume set addressing, and other data.
- **Memory**—Slot number and capacity.

## EMC Solutions Enabler for VMAX Storage

To communicate with VMAX, Cisco UCS Director uses the EMC Solutions Enabler (SE). You must install a supported Windows-based or Linux-based EMC SE before you add your VMAX or VMAX3 storage system to Cisco UCS Director.

### Windows-Based Solutions Enabler

#### Guidelines for SSHD Server Configuration

To set up an SSHD server, we recommend that you install Cygwin version 1.7.27, and use the SSH daemon on the host. Cygwin provides a Linux-like environment on Microsoft Windows. See [Installing a Cygwin Package](#), on page 3 for information on downloading Cygwin and additional information about the SSHD server.

After you install the SSHD server on the Windows-based SE, modify the Path variable under System Variables to include the Solutions Enabler bin folder so that whoever uses SSH to get into the Windows SE can immediately run VMAX commands. After you install and configure the SSHD server, set up the new default paths to enable the user-installed software to override the system software.

#### Installing a Cygwin Package

Ensure that you install the packages for Cygwin version 1.7.27 on a Windows-based host.

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- Step 1** Download the Cygwin executable from <http://www.cygwin.com/>.
- Step 2** While installing the Cygwin package on the package selection screen, select the **openssh** and **openssl** packages to install.
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## Configuring the SSHD Server

- Step 1** Navigate to the C:\<Cygwin-Install-Dir> directory, open the Cygwin.bat in edit mode using any editor and add the following line: `set CYGWIN=binmode ntsec`  
The following example shows the Cygwin.bat file contents after adding the line above:

```
@echo off
C:
chdir C:\<Cygwin-Install-Dir>\bin
set CYGWIN=binmode ntsec
bash --login -i
```

- Step 2** Configure the SSHD service by running the C:\<Cygwin-Install-Dir>\Cygwin.bat file in a command prompt and enter the following command: `$ ssh-host-config`.

- a) Answer the following questions:

Question	Recommended Response
Should privilege separation be used? <yes/no>	Select yes.
New local account 'sshd'? <yes/no>	Select yes.
Do you want to install sshd as a service? <yes/no>	Select no if SSHD is already installed as a service, otherwise select yes.
Enter the value of CYGWIN for the daemon: [ ] binmode ntsec	Enter the value as binmode ntsec
Do you want to use a different name? (yes/no)	Select yes.
Enter the new username: <new-username>	Enter the new username.
Reenter: <new-username>	Reenter the new username.
Replace cloupia with new-username ? (yes/no)	Select yes.
Please enter the password: <password>	Enter the password for this account.
Reenter: <password>	Reenter the password for this account.

## Configuring System Environment Variables

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- Step 1** Right-click the **Computer** icon and select **Properties**.
- Step 2** If you don't have a computer icon on your desktop:
- Click the **Start** button.
  - Right-click the **Computer** option in the Start menu.
  - Select **Properties**.
- Step 3** Click **Advanced System Settings**.
- Step 4** Under the **Advanced** tab, select **Environment Variables**.
- Step 5** Under **System Variables** select the **Path** variable and append the following two binary paths: `c:\Program Files\EMC\SYMCLI\bin;c:\<Cygwin-Install-Dir>\bin`  
Refer to the following example:
- ```
Variable Name: Path
Variable Value: <Existing Folders Path>;c:\Program Files\EMC\SYMCLI\bin;c:\cygwin
64\bin
```
- Step 6** Add the following new **System Variable** name: `CYGWIN` and the following **Variable Value**: `binmode tty ntsec`
- 

## Starting the Cygwin SSHD Service

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- Step 1** Start the Cygwin SSHD service manually under Window Services.
- Step 2** Configure the service to start automatically on every boot.
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## Verifying SSH Access

### Before You Begin

Ensure that you can run the SYMCLI commands without providing the absolute path at the command prompt. You can verify SSH access using any SSH client.

- Step 1** Access a different machine that has an SSH client running and execute the following command:  
`ssh<USERNAME>@<host-ipaddress> 'date'` or `ssh-l<USERNAME>@<host-ipaddress> 'date'`

### Example:

For example, execute `ssh -l pjohn@host-ipaddress 'date'`

- Step 2** When the command prompts you, enter the password.

After you enter the correct password, the command returns the accurate date.

## Installing and Configuring a Linux-Based Solutions Enabler



### Note

You can add libraries and legacy libraries, such as glibc, to the VM.

You need gatekeepers to serve as Raw Device Mappings (RDMs). Allow 6,000 to 8,000 mappings for each RDM.

### SUMMARY STEPS

1. Create the base Linux image for the VM you will use.
2. Assign a few gatekeepers as RDMs.
3. Reboot the Linux VM.
4. From the EMC Powerlink site, download the EMC Solutions Enabler package for Linux and the Services Management Application System (SMAS) package `se7310-Linux-i386-ni.tar.gz`.
5. Using SCP, transfer the tar file to your VM.
6. At a command prompt, enter the following command to decompress the tar file: `[root@smc ~]# tar xzvf se7310-Linux-i386-ni.tar.gz`
7. Install the EMC Solutions Enabler by entering the following command: `[root@smc ~]# ./se7310_install.sh -install]`
8. Verify that the `emc/symcli bin` folder is in the Linux path, with this directory structure: `<symcli path>/bin`. An example is: `/opt/emc/symcli/bin`.
9. To connect to the VMAX device from Cisco UCS Director, you must update the PATH variable with the SYMCLI binary dir by updating the `.bashrc` file for the user that logs in to VMAX.

### DETAILED STEPS

- Step 1** Create the base Linux image for the VM you will use.  
For the base Linux image, you can use an SMC or SPA servers that run CentOS, version 5.7 x86, or x86\_64. For an SMC server, allow 20 GB of space. For an SPA server, allow at least 120 GB.
- Step 2** Assign a few gatekeepers as RDMs.
- Step 3** Reboot the Linux VM.
- Step 4** From the EMC Powerlink site, download the EMC Solutions Enabler package for Linux and the Services Management Application System (SMAS) package `se7310-Linux-i386-ni.tar.gz`.
- Note** See the [Cisco UCS Director Compatibility Matrix](#) to identify which version to download and install.
- Use MD5 Checksum `9809ac14ed8bfcc19789d7d5671d6015`.

- Step 5** Using SCP, transfer the tar file to your VM.
- Step 6** At a command prompt, enter the following command to decompress the tar file: `[root@smc ~]# tar xzvf se7310-Linux-i386-ni.tar.gz`
- Step 7** Install the EMC Solutions Enabler by entering the following command: `[root@smc ~]# ./se7310_install.sh -install]`
- Step 8** Verify that the `emc/symcli bin` folder is in the Linux path, with this directory structure: `<symcli path>/bin`. An example is: `/opt/emc/symcli/bin`.
- Step 9** To connect to the VMAX device from Cisco UCS Director, you must update the PATH variable with the SYMCLI binary dir by updating the `.bashrc` file for the user that logs in to VMAX.
- Log in to the Solutions Enabler machine with the credentials that Cisco UCS Director will use.
  - Edit `.bashrc` using your editor of choice; for example, `vi .bashrc`
  - Add the following line to the `.bashrc` file:  

```
PATH=$PATH:$HOME/bin:<symcli binary path>/bin
```
  - Save the file and exit.

## Adding an EMC VMAX Account

### Before You Begin

You must install an EMC VMAX Solutions Enabler on a Linux or Windows Virtual Machine (VM).



#### Note

If you have Solutions Enabler 8.0 installed, when adding an EMC VMAX account, all Symmetrix device names are padded with a zero. This may cause issues with rollback operations for tasks that were executed against an older version of Solutions Enabler.

- Step 1** Choose **Administration > Physical Accounts**.
- Step 2** On the **Physical Accounts** page, click **Physical Accounts**.
- Step 3** Click **Add**.
- Step 4** On the **Add Account** screen, complete the following fields:

| Name                        | Description                    |
|-----------------------------|--------------------------------|
| Pod drop-down list          | Choose a Pod for this account. |
| Category drop-down list     | Choose <b>Storage</b> .        |
| Account Type drop-down list | Choose <b>EMC VMAX</b> .       |

**Step 5** Click **Submit**.

**Step 6** In the second **Add Account** dialog box, complete the following fields:

| Name                                | Description                                                                                                                                                                                                            |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Account Name field                  | A unique name for the account.                                                                                                                                                                                         |
| Description field                   | The account description.                                                                                                                                                                                               |
| Server Address field                | The Solution Enabler IP address for the VMAX device.                                                                                                                                                                   |
| Use Credential Policy check box     | Check this box if you want to use a credential policy for this account rather than enter the username and password information manually.                                                                               |
| Credential Policy drop-down list    | If you checked <b>Use Credential Policy</b> , choose the credential policy that you want to use from this drop-down list.<br><br>This field is only displayed if you choose to use a credential policy.                |
| User ID field                       | The user ID that this account uses to access the VMAX or VMAX3 storage system. This user ID must be a valid account in the storage system.<br><br>This field is not displayed if you chose to use a credential policy. |
| Password field                      | The password associated with the user ID.<br><br>This field is not displayed if you chose to use a credential policy.                                                                                                  |
| Transport Type drop-down list       | Choose <b>SSH</b> .                                                                                                                                                                                                    |
| Port field                          | The port number. The default port is 22.                                                                                                                                                                               |
| Symmetrix id field                  | The Symmetrix ID can be manually entered or selected from a drop-down box that is shown if the Discover Symmetrix Arrays check box is selected.                                                                        |
| Discover Symmetrix Arrays check box | If this box is checked, selection of the Symmetrix id can be done from the drop-down list that is shown.                                                                                                               |
| Symmetrix id field                  | The ID of the Symmetrix array.<br><br>If you checked <b>Discover Symmetrix Arrays</b> , this field becomes a drop-down list of the available arrays.                                                                   |
| Contact field                       | The contact's email address.                                                                                                                                                                                           |
| Location field                      | The location for this account.                                                                                                                                                                                         |



**Step 7** Click **Submit**.

Cisco UCS Director tests the connection to the EMC Symmetrix VMAX or VMAX3 storage system. If that test is successful, it adds the VMAX account and discovers all infrastructure elements in the storage system that are associated with that account. This discovery process and inventory collection cycle takes few minutes to complete.

## VMAX Management

In a Cisco UCS Director EMC VMAX account, you manage the following pools, groups, devices, and views:

- Thin pools—Create or delete, expand, bind or unbind, and view details
- Devices—data devices, thin devices, regular devices, BCV devices, and meta devices
- Initiator groups—Create or delete, rename, add or remove initiator, replace initiator, set override flags, and view details
- Storage groups—Create or delete, rename, add or remove device, associate/disassociate FAST policy, and view details
- Port groups—Create or delete, rename, add or remove port, and view details
- Masking views—Create or delete, rename, and view details

## Thin Devices

The maximum size of a VMAX thin device (TDEV) is approximately 240 GB.

**Note**

If you want to create a TDEV greater than this size, combine TDEVs to form a meta device. Each TDEV can be part of only one meta device.

There is no rename action for a TDEV. The device name is unique and remains the same even if the TDEV becomes a meta device and vice versa.

## Creating a Thin Device

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a thin device.
- Step 5** Click **View Details**.
- Step 6** Click **Thin Devices**.
- Step 7** Click **Create**.
- Step 8** On the **Create Thin Device** screen, complete the following fields:

| Name                     | Description                                    |
|--------------------------|------------------------------------------------|
| Device Count field       | The thin device count.                         |
| Emulation drop-down list | Choose the emulation type for the thin device. |
| Capacity Type field      | Select GB, MB, or Cylinder.                    |
| Capacity field           | Number of GB, MB, or Cylinders.                |

- Step 9** Click **Submit**.
- 

### What to Do Next

You can select a device and click **View Details** to see the drill-down report.

## Thin Pools

An EMC VMAX thin pool is a collection of data devices that provide storage capacity for thin devices. A new thin pool requires a unique name.

## Creating A Thin Pool

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to create the thin pool.
  - Step 5** Click **View Details**.
  - Step 6** Click **Thin Pools**.
  - Step 7** Click **Create**.
  - Step 8** On the **Create Thin Pool** screen, enter a name in the **Thin Pool Name** field and click **Submit**.
- 

## Binding Thin Devices to a Thin Pool

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account with the thin pool where you want to bind thin devices.
  - Step 5** Click **View Details**.
  - Step 6** Click **Thin Pools**.
  - Step 7** Click **Bind**.
  - Step 8** On the **Bind Symmetrix Device** screen, complete the following fields:

| Name                                   | Description                                                                                                                                                                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Select Thin Devices</b> select list | Check the box for the thin devices that you want to bind.                                                                                                                                                                                                       |
| <b>Pre Allocate All</b> check box      | Check this box if you want to pre-allocate all thin devices.                                                                                                                                                                                                    |
| <b>Capacity Type</b> field             | Select the capacity unit in GB, MB, or Cylinder.<br>This field is only available if you checked <b>Pre Allocate All</b> .                                                                                                                                       |
| <b>Pre Allocate Size</b> field         | The pre-allocation size in GB, MB, or Cylinders.<br><b>Note</b> The Pre Allocate Size option is not available for Symmetric CLI version 8.0, it is only available for version 7.6.1.0.<br>This field is only available if you checked <b>Pre Allocate All</b> . |

- Step 9** Click **Submit**.
-

## Unbinding a Thin Devices from a Thin Pool

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account with the thin pool where you want to unbind thin devices.
- Step 5** Click **View Details**.
- Step 6** Click **Thin Pools**.
- Step 7** Click **UnBind**.
- Step 8** On the **UnBind Thin Device from Thin Pool** screen, complete the following fields:

| Name                            | Description                                                 |
|---------------------------------|-------------------------------------------------------------|
| Select Thin Devices select list | Check the box for the thin devices that you want to unbind. |
| Force check box                 | Forces unbinding of the selected thin devices.              |

- Step 9** Click **Submit**.
- 

## BCV Devices

A business continuity volume (BCV) is a symmetrix device with special attributes. A BCV device can function either as an additional mirror or as a separate host addressable volume.

### Creating a BCV Device

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- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create the BCV device.
- Step 5** Click **View Details**.
- Step 6** Click **BCV Devices**.
- Step 7** Click **Create**.
- Step 8** On the **Create BCV Device** screen, complete the following fields:

| Name                         | Description                                   |
|------------------------------|-----------------------------------------------|
| Device Count field           | The BCV device count.                         |
| Emulation drop-down list     | Choose the emulation type for the BCV device. |
| Configuration drop-down list | Choose the configuration for the BCV device.  |
| Capacity Type field          | Select GB, MB, or Cylinder.                   |
| Capacity field               | Number of GB, MB, or Cylinders.               |

**Step 9** Click **Submit**.

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## Data Devices

Data devices provide the physical space that is used by thin pools on a VMAX system.

### Creating a Data Device

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- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a data device.
- Step 5** Click **View Details**.
- Step 6** Click **Data Devices**.
- Step 7** Click **Create**.
- Step 8** On the **Create Data Device** screen, complete the following fields:

| Name                     | Description                                      |
|--------------------------|--------------------------------------------------|
| Device Count field       | The data device count.                           |
| Disk Group field         | The disk group name.                             |
| Emulation drop-down list | Choose the emulation type for the data device.   |
| Configuration field      | Choose the configuration for the data device.    |
| Capacity Type field      | Choose the capacity unit in GB, MB, or Cylinder. |

| Name           | Description                           |
|----------------|---------------------------------------|
| Capacity field | The capacity in GB, MB, or Cylinders. |

**Step 9** Click **Submit**.

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## Regular Devices

The maximum size of a VMAX regular device is approximately 240 GB.



**Note** If you want to create a regular device greater than this size, combine regular devices to form a meta device. Each regular device can be part of only one meta device.

There is no rename action for a regular device. The device name is unique and remains the same even if the regular device becomes a meta device and vice versa.

## Creating a Regular Device

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- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a regular device.
- Step 5** Click **View Details**.
- Step 6** Click **Regular Devices**.
- Step 7** Click **Create**.
- Step 8** On the **Create Regular Device** screen, complete the following fields:

| Name                     | Description                                       |
|--------------------------|---------------------------------------------------|
| Device Count field       | The regular device count.                         |
| Disk Group select button | Select the Disk Group                             |
| Emulation drop-down list | Choose the emulation type for the regular device. |
| Configuration drop-down  | Choose the configuration.                         |
| Capacity Type field      | Choose GB, MB, or Cylinder.                       |
| Capacity                 | Number of GB, MB, or Cylinders.                   |

**Step 9** Click **Submit**.

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## Meta Devices

A meta device enables you to aggregate thin devices or regular devices to increase the device size.

You can create a meta device with a thin device as the head and create other thin devices as members, or you can create a meta device with a regular device as the head and create other regular devices as members. The total meta device size is the combination of the head size and all the member device sizes.



**Note** There is no delete action for a meta device. Removing all of the members from a meta device results in a thin device.

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## Meta Member Devices

A meta member device (also referred to as a Meta LUN) is a LUN that is composed of several elements (LUNs). Meta member devices are similar to private LUNs. A meta member device is used by the system and is not available directly to any host. For example, you cannot place a meta member device into a storage group.

The following are the supported types of meta member devices:

- Concatenated Meta LUN—Creates a larger LUN from several smaller LUNs. This member device is recommended when performance is not a high priority.
- Striped Meta LUN—Creates a higher performance LUN. For example, you might want to use this type of LUN for a large file system or a database.

## Creating a Meta Device

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- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a meta device.
- Step 5** Click **View Details**.
- Step 6** Click **Meta Devices**.
- Step 7** Click **Create Meta**.
- Step 8** On the **Create Meta Devices** screen, complete the following fields:

| Name                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select Device Type drop-down list | <p>Choose the types of devices that you want to add to the meta device. These device combinations can include the following:</p> <ul style="list-style-type: none"> <li>• Thin devices only</li> <li>• Regular devices only</li> <li>• BCV devices and thin devices (BCV+TDEV)</li> <li>• BCV and regular devices (BCV+R)</li> </ul> <p>The other fields that display on this screen depend upon which types of devices you choose.</p> |
| Select Thin Device field          | If you chose to include thin devices only, choose the devices you want to add to the meta device.                                                                                                                                                                                                                                                                                                                                       |
| Select Regular Device field       | If you chose to include regular devices only, choose the devices you want to add to the meta device.                                                                                                                                                                                                                                                                                                                                    |
| Select BCV Thin Device field      | If you chose BCV+TDV, choose the devices you want to add to the meta device.                                                                                                                                                                                                                                                                                                                                                            |
| Select BCV Regular Device field   | If you chose BCV+R, choose the devices you want to add to the meta device.                                                                                                                                                                                                                                                                                                                                                              |
| Select Meta Type drop-down list   | Choose the type of meta device you want to create.                                                                                                                                                                                                                                                                                                                                                                                      |
| Select Member Device(s) field     | Choose the device or devices to include in the meta device.                                                                                                                                                                                                                                                                                                                                                                             |

**Step 9** Click **Submit**.

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## Adding a Member Device to a Meta Device

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- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a meta device.
  - Step 5** Click **View Details**.
  - Step 6** Click **Meta Devices**.
  - Step 7** Click the row with the meta device to which you want to add a member device.
  - Step 8** Click **Add Device to Meta**.
  - Step 9** On the **Add Device to Meta** screen, choose the device that you want to add and click **Submit**.
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## Removing a Member Device from a Meta Device

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- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a meta device.
  - Step 5** Click **View Details**.
  - Step 6** Click **Meta Devices**.
  - Step 7** Click the row with the meta device from which you want to remove a member device.
  - Step 8** Click **Remove Device from Meta**.
  - Step 9** On the **Remove Device from Meta** screen, choose the device that you want to remove from the meta device and click **Submit**.
-

## Dissolving a Meta Device

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- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a meta device.
  - Step 5** Click **View Details**.
  - Step 6** Click **Meta Devices**.
  - Step 7** Click the row with the meta device that you want to dissolve.
  - Step 8** Click **Dissolve**.
  - Step 9** Click **Submit**.
- 

## Adding a Member Device to a Meta Device (Striped Configuration)

If the meta device has a striped configuration, you need to complete two additional fields in the configuration.

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- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a meta device.
  - Step 5** Click **View Details**.
  - Step 6** Click **Meta Devices**.
  - Step 7** Click the row with the striped meta device to which you want to add a member device.
  - Step 8** Click **Add Device to Meta**.
  - Step 9** On the **Add Device to Meta** screen, complete the following fields:

| Name                          | Description                                                          |
|-------------------------------|----------------------------------------------------------------------|
| Select Member Device(s) field | Choose the member device(s) that you want to add to the meta device. |
| Protect Data check box        | Check this box if you want to enable data protection on the devices. |
| Select BCV Meta Device field  | Choose a BCV meta device head node for the meta device.              |

- Step 10** Click **Submit**.
-

## Initiator Groups

A VMAX initiator group is a collection of host bus adapters (HBAs) that work together. Initiator groups that contain other initiator groups are known as cascaded initiator groups.

### Creating an Initiator Group

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to add an initiator group.
- Step 5** Click **View Details**.
- Step 6** Click **Initiator Group**.
- Step 7** Click **Create**.
- Step 8** On the **Create Initiator Group** screen, do the following:
- From the **Initiator Group Type** drop-down list, choose one of the following initiator group types:
    - **Standard**—if the initiator group will contain initiators. This is the default option.
    - **Cascaded**—if the initiator group will contain other initiator groups.
  - In the **Initiator Group Name** field, enter a unique name for the initiator group.
  - If you chose to create a standard initiator group, complete the following fields:

| Name                                 | Description                                                                                                                                                     |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Initiator Type</b> drop-down list | Choose one of the following: <ul style="list-style-type: none"> <li>• <b>iSCSI</b></li> <li>• <b>FCP</b></li> </ul> <b>iSCSI</b> is the default initiator type. |
| <b>Initiator Name</b> field          | A unique name for the initiator.                                                                                                                                |
| <b>Consistent LUN</b> check box      | Check this box if you want to use a consistent LUN. Unchecked is the default.                                                                                   |

- If you chose to create a cascaded initiator group, complete the following fields:

| Name                                       | Description                                      |
|--------------------------------------------|--------------------------------------------------|
| <b>Select Parent Initiator Group</b> field | Choose the parent initiator group from the list. |
| <b>Select Child Initiator Group</b> field  | Choose a child initiator group from the list.    |

e) Click **Submit**.

---

## Storage Tiers

Tiered storage allows you to assign different categories of data to different types of storage media to reduce your total storage cost and maintenance.

### Creating a Storage Tier

---

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a storage tier.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Tiers**.
- Step 7** Click **Create**.
- Step 8** On the **Create Storage Tier** screen, complete the following fields:

| Name                              | Description                                                                                                                                                                                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Tier Name field           | A unique name for the storage tier.                                                                                                                                                                                                           |
| Storage Tier Type drop-down list  | Choose one of the following tier types: <ul style="list-style-type: none"> <li>• <b>Disk Group Provisioned</b></li> <li>• <b>Virtual Provisioned</b></li> </ul>                                                                               |
| Include Type drop-down list       | Choose one of the following include types: <ul style="list-style-type: none"> <li>• <b>Static</b></li> <li>• <b>Dynamic</b></li> </ul>                                                                                                        |
| Configuration Type drop-down list | Choose one of the following configuration types: <ul style="list-style-type: none"> <li>• <b>RAID-1</b></li> <li>• <b>RAID-5 (3+1)</b></li> <li>• <b>RAID-5 (7+1)</b></li> <li>• <b>RAID-6(6+2)</b></li> <li>• <b>RAID-6(14+2)</b></li> </ul> |

| Name                             | Description                                                                                                                                                                        |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select Technology drop-down list | Choose one of the following: <ul style="list-style-type: none"> <li>• EFD</li> <li>• FC</li> <li>• SATA</li> </ul>                                                                 |
| Select Disk Group field          | Choose a disk group.                                                                                                                                                               |
| Bind to Thin Pool field          | Choose the thin pool where you want to bind the storage tier.<br>This option is only available if you chose <b>Virtual Provisioned</b> as the Storage Tier Type.                   |
| Externally Provisioned check box | Check this box if you want to be able to externally provision the storage tier.<br>This option is only available if you chose <b>Virtual Provisioned</b> as the Storage Tier Type. |

**Step 9** Click **Submit**.

---

## Adding a Thin Pool to a Storage Tier

---

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update the storage tier.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Tiers**.
- Step 7** Click the row with the storage tier that you want to update.
- Step 8** Click **Add Thin Pool**.
- Step 9** On the **Add Thin Pool to Storage Tier** screen, choose the thin pool that you want to add and click **Submit**.
-

## Removing a Thin Pool from a Storage Tier

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update the storage tier.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Tiers**.
  - Step 7** Click the row with the storage tier that you want to update.
  - Step 8** Click **Remove Thin Pool**.
  - Step 9** On the **Remove Thin Pool** screen, choose the thin pool that you want to remove and click **Submit**.
- 

## Adding a Disk Group to a Storage Tier

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update the storage tier.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Tiers**.
  - Step 7** Click the row with the storage tier that you want to update.
  - Step 8** Click **Add Disk Group**.
  - Step 9** On the **Add Disk Group** dialog box, complete the following fields:

| Name                    | Description                                          |
|-------------------------|------------------------------------------------------|
| Select Disk Group field | Choose a disk group to be added to the storage tier. |
| Propagate check box     | If checked, propagates changes to all storage tiers. |

- Step 10** Click **Submit**.
-

## Renaming a Storage Tier

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update the storage tier.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Tiers**.
  - Step 7** Click the row with the storage tier that you want to rename.
  - Step 8** Click **Rename**.
  - Step 9** On the **Rename Storage Tier** screen, enter the new name for the storage tier and click **Submit**.
- 

## Deleting a Storage Tier

You can force the deletion of a storage tier, even if that tier includes disk groups and thin pools.

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account that contains the storage tier you want to delete.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Tiers**.
  - Step 7** Click the row with the storage tier that you want to delete.
  - Step 8** Click **Delete**.
  - Step 9** On the **Delete Storage Tier** screen, check the **Force** box if you want to delete the storage tier even if it includes thin pools and disk groups, and then click **Submit**.
- 

## Storage Groups

A VMAX storage group is a collection of Symmetrix logical volumes that are used by an application, a server, or a collection of servers.

Storage groups present storage to hosts and are also used for FAST policies.

In Cisco UCS Director, you can create VMAX storage groups that are either Empty or Cascaded. A cascaded group contains other storage groups. You can contain a cascaded storage group within a masking view to present storage resources to an entire cluster.

## Creating an Empty Storage Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a storage group.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Groups**.
- Step 7** Click **Create**.
- Step 8** On the **Create Storage Group** screen, complete the following fields:

| Name                              | Description                                                                                        |
|-----------------------------------|----------------------------------------------------------------------------------------------------|
| Storage Group Type drop-down list | Choose the default option <b>Empty Storage Group</b> .                                             |
| Storage Group Name field          | A unique name for the storage group.                                                               |
| Storage Resource Pool field       | Select FAST SRP to associate to storage group.<br>This field is required for VMAX3 storage groups. |
| Storage Level Objective field     | Select SLO to associate to storage group.<br>This field is required for VMAX3 storage groups.      |

- Step 9** Click **Submit**.
-



## Creating a Cascaded Storage Group

### Before You Begin

Create a parent storage group and one or more child storage groups.

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to create a storage group.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Groups**.
  - Step 7** Click **Create**.
  - Step 8** On the **Create Storage Group** screen, complete the following fields:

| Name                              | Description                            |
|-----------------------------------|----------------------------------------|
| Storage Group Type drop-down list | Choose <b>Cascaded Storage Group</b> . |
| Select Parent Storage Group field | The parent storage group.              |
| Child Storage Group field         | The child storage group.               |

- Step 9** Click **Submit**.
- 

### What to Do Next

Add devices and associate FAST policies with the storage group.

## Deleting a Storage Group

You can force the deletion of a storage group, even if that group includes devices.

- 
- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to delete a storage group.
  - Step 5** Click **Delete**.
  - Step 6** On the **Delete Storage Group** dialog box, check the **Force** box if you want to delete the storage tier even if it includes devices, and then click **Submit**.
-

## Renaming a Storage Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Groups**.
- Step 7** Click **Rename**.
- Step 8** In the **Rename Storage Group** dialog box, enter a unique name for the storage group and click **Submit**.
- 

## Adding a Device to a Storage Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Groups**.
- Step 7** Click the row with the storage group that you want to update.
- Step 8** Click **Add Device**.
- Step 9** On the **Add Devices to Storage Group** screen, complete the following fields:

| Name                       | Description                                                                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Device Type drop-down list | Choose one of the following options: <ul style="list-style-type: none"> <li>• <b>Thin Device</b></li> <li>• <b>Regular Device</b>—not available for VMAX3 storage groups</li> </ul> |
| Select Devices field       | Choose one or more devices to add to the storage group.                                                                                                                             |
| Host LUN ID field          | If you do not specify a host LUN ID, it is auto generated in HEXA.                                                                                                                  |

**Step 10** Click **Submit**.

---

## Removing a Device from a Storage Group

---

- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Groups**.
  - Step 7** Click the row with the storage group that you want to update.
  - Step 8** Click **Remove Device**.
  - Step 9** On the **Remove Device** screen, choose the device that you want to remove from the storage group and click **Submit**.
- 

## Removing a Child Storage Group from a Cascaded Storage Group

---

- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Groups**.
  - Step 7** Click the row with the cascaded storage group that you want to update.
  - Step 8** Click **Remove Storage Group**.
  - Step 9** On the **Remove Child Storage from Parent Storage** screen, choose the child storage group that you want to remove and click **Submit**.
-

## FAST Configuration for Storage Groups on VMAX3

### Associating a FAST Policy with a Storage Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Groups**.
- Step 7** Click the row with the storage group that you want to update.
- Step 8** Click **Associate FAST Policy**.
- Step 9** On the **Associate FAST Policy to Storage Group** screen, complete the following fields:

| Name                         | Description                                                                              |
|------------------------------|------------------------------------------------------------------------------------------|
| Select FAST Policy field     | Choose the FAST policy that you want to associate with the storage group.                |
| Storage Group Priority field | Set the priority for the storage group. The valid range for the priority is from 1 to 3. |

...

- Step 10** Click **Submit**.
- 

### Disassociating a FAST Policy from a Storage Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Groups**.
- Step 7** Click the row with the storage group that you want to update.
- Step 8** Click **Disassociate FAST Policy**.
- Step 9** Click **Submit**.
-

## Reassociating a FAST Policy with a Storage Group

---

- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Groups**.
  - Step 7** Click the row with the storage group that you want to update.
  - Step 8** Click **Reassociate FAST Policy**.
  - Step 9** On the **Reassociate FAST Policy to Storage Group** screen, choose the FAST policy that you want to reassociate with the storage group and click **Submit**.
- 

## Modifying the FAST Storage Group Priority

---

- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
  - Step 5** Click **View Details**.
  - Step 6** Click **Storage Groups**.
  - Step 7** Click the row with the storage group that you want to update.
  - Step 8** Click **Modify Fast Priority**.
  - Step 9** On the **Modify FAST Storage Group Priority** dialog box, choose the new FAST priority for the storage group and click **Submit**.  
The valid range for the priority is from 1 to 3.
-

## Modifying FAST Settings for a Storage Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a storage group.
- Step 5** Click **View Details**.
- Step 6** Click **Storage Groups**.
- Step 7** Click the row with the storage group that you want to update.
- Step 8** Click **Modify Fast Settings**.
- Step 9** On the **Modify FAST Settings** screen, complete the following fields:

| Name                    | Description                                                   |
|-------------------------|---------------------------------------------------------------|
| Storage Resource Pool   | Select a new storage resource pool for the storage group.     |
| Service Level Objective | Select the new service level objective for the storage group. |

- Step 10** Click **Submit**.
- 

## Fully Automated Storage Tiering

Fully Automated Storage Tiering (FAST) automatically moves data between storage tiers. For example, FAST can do the following:

- Move very active data to high-performance storage tiers
- Move inactive data to low-cost, high-capacity storage tiers

FAST policies dictate how the performance and cost are optimized for the associated storage tier while the automation of FAST means that your storage system has no added management constraints compared with slower and more expensive systems. A FAST system always monitors and identifies the current activity levels of your data and moves the active data and inactive data to the most appropriate storage tier (according to your policies).

### FAST Policies

A FAST policy is a set of tier usage rules that you can apply to your storage groups. A FAST policy can include up to three tiers and assigns an upper usage limit for each tier. The usage limit specifies the maximum percentage of the storage group that the FAST controller can allocate to a particular tier. Policy settings allow you to control and manage automated activity.

## Creating a FAST Policy

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a FAST policy.
- Step 5** Click **View Details**.
- Step 6** Click **Fast Policies**.
- Step 7** Click **Create**.
- Step 8** On the **Create FAST Policy** screen, complete the following fields:

| Name                                                | Description                                                                                                                                                                                           |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fast Policy Name</b> field                       | A unique name for the FAST policy.                                                                                                                                                                    |
| <b>Storage Tier Name</b> field                      | Choose up to three storage tiers that you want to associate with this FAST policy.                                                                                                                    |
| <b>Max Storage Group Capacity of Tier (%)</b> field | Specify the maximum percentage of the storage group that the FAST controller can allocate to the storage tier. The valid range is from 1 to 100, as a percentage of the total storage group capacity. |

- Step 9** Click **Submit**.

## Adding Storage Tiers to a FAST Policy

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a FAST policy.
- Step 5** Click **View Details**.
- Step 6** Click **Fast Policies**.
- Step 7** Click the row with the FAST policy that you want to update.
- Step 8** Click **Add Storage Tiers**.
- Step 9** On the **Add Storage Tiers to Fast Policy** screen, complete the following fields:

| Name                             | Description                                                               |
|----------------------------------|---------------------------------------------------------------------------|
| <b>Select Storage Tier</b> field | Choose the storage tier that you want to associate with this FAST policy. |

| Name                                                | Description                                                                                                                                                                                           |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Max Storage Group Capacity of Tier (%)</b> field | Specify the maximum percentage of the storage group that the FAST controller can allocate to the storage tier. The valid range is from 1 to 100, as a percentage of the total storage group capacity. |

**Step 10** Click **Submit**.

---

### Removing Storage Tiers from a FAST Policy

---

- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update a FAST policy.
  - Step 5** Click **View Details**.
  - Step 6** Click **Fast Policies**.
  - Step 7** Click the row with the FAST policy that you want to update.
  - Step 8** Click **Remove Storage Tiers**.
  - Step 9** On the **Remove Storage Tiers From Fast Policy** screen, choose the storage tier that you want to remove and click **Submit**.
- 

### Modifying the Maximum Storage Group Capacity for a Storage Tier in a FAST Policy

---

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a FAST policy.
- Step 5** Click **View Details**.
- Step 6** Click **Fast Policies**.
- Step 7** Click the row with the FAST policy that you want to update.
- Step 8** Click **Modify Storage Tiers**.
- Step 9** On the **Modify Storage Tiers in a Fast Policy** screen, complete the following fields:



| Name                                         | Description                                                                                                                                                                                          |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select Storage Tier field                    | Choose the storage tier that you want to modify.                                                                                                                                                     |
| Max Storage Group Capacity of Tier (%) field | Change the maximum percentage of the storage group that the FAST controller can allocate to the storage tier. The valid range is from 1 to 100, as a percentage of the total storage group capacity. |

**Step 10** Click **Submit**.

---

### Renaming a FAST Policy

---

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to update a FAST policy.
- Step 5** Click **View Details**.
- Step 6** Click **Fast Policies**.
- Step 7** Click the row with the FAST policy that you want to rename.
- Step 8** Click **Rename**.
- Step 9** On the **Rename FAST Policy** screen, enter the new FAST policy name and click **Submit**.
- 

### FAST Controllers

FAST can be configured to operate in the following modes:

- **AUTO\_APPROVE** mode—Configuration change plans are generated and executed at the beginning of each inclusion device movement window based on the defined policy.
- **USER\_APPROVE** mode—Configuration change plans are generated but not executed until they have been approved by a user. All change plans and data movements must be explicitly approved prior to being executed.

## Modifying FAST Controller Settings

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to modify the FAST controller settings.
- Step 5** Click **View Details**.
- Step 6** Click **FAST Controller**.
- Step 7** Click **Modify FAST Controller Setting**.
- Step 8** On the **Modify FAST Controller Setting** screen, complete the following fields:

| Name                                                 | Description                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Data Movement Approval Mode</b><br>drop-down list | Choose one of the following to determine how data movements will be approved: <ul style="list-style-type: none"> <li>• <b>USER_APPROVE</b></li> <li>• <b>AUTO APPROVE</b></li> </ul> <p>USER APPROVE is the default setting.</p>                                                                                                                                      |
| <b>Max Simultaneous Device Moves</b><br>field        | The number of maximum simultaneous device moves permitted. The valid range is 2 to 32.                                                                                                                                                                                                                                                                                |
| <b>Max Devices Moves Per Day</b> field               | The number of maximum simultaneous device moves permitted per day. The valid range is 2 to 200.                                                                                                                                                                                                                                                                       |
| <b>Min Initial Workload Period (hrs)</b><br>field    | The minimum initial workload period (in hours). The valid range is 2 to the current value.                                                                                                                                                                                                                                                                            |
| <b>Workload Analysis Period (hrs)</b><br>field       | The workload analysis period (in hours). The valid range is 2 to 672.                                                                                                                                                                                                                                                                                                 |
| <b>Swap Not Visible Devices</b><br>drop-down list    | Choose one of the following: <ul style="list-style-type: none"> <li>• <b>Enable</b>—Permits the FAST controller to use configured but unmasked/unapped devices that are not visible to the host for FAST swaps.</li> <li>• <b>Disable</b>—FAST swaps can only happen between devices that belong to storage groups that are associated with a FAST policy.</li> </ul> |
| <b>Allow Only Swap</b> drop-down list                | Choose one of the following: <ul style="list-style-type: none"> <li>• <b>Enable</b> the ability to swap only devices.</li> <li>• <b>Disable</b></li> </ul>                                                                                                                                                                                                            |

| Name                                             | Description                                                                                         |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>FAST VP Data Movement Mode</b> drop-down list | Choose to enable or disable (None) the FAST VP Data Movement Mode. <b>Auto</b> is the default mode. |
| <b>FAST VP Data Relocation Rate</b> field        | The FAST VP Data Relocation Rate value. The valid range is 1 to 10.                                 |
| <b>Thin Pool Reserved Capacity (%)</b> field     | The Thin Pool Reserved Capacity (%) value. The valid range is 1 to 80.                              |
| <b>VP Allocation By FAST policy</b> field        | Choose the Thin Pool Reserved Capacity (%) value. The default value is Enabled.                     |
| <b>FAST VP Time to Compress (Days)</b> field     | The FAST VP Time to Compress (Days) value. The valid range is from 40 to 400 days or never.         |
| <b>FAST VP Compression Rate</b> field            | The FAST VP Time to Compress (Days) value. The valid range is from 1 to 10.                         |

**Step 9** Click **Submit**.

---

## FAST Status

The FAST Status allows to you modify the FAST state of your storage tiers. You can choose one of the following types:

- Disk Group Provisioned
- Virtual Group Provisioned

## Modifying the FAST State

---

- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to modify the FAST state.
- Step 5** Click **View Details**.
- Step 6** Click **FAST Status**.
- Step 7** Click **Modify FAST State**.
- Step 8** On the **Modify VMAX FAST State** screen, complete the following fields:

| Name                     | Description                                       |
|--------------------------|---------------------------------------------------|
| FAST Type drop-down list | Choose the desired FAST Type to change the state. |
| Enable check box         | If checked, enables the FAST state.               |

**Step 9** Click **Submit**.

---

### Renaming the FAST Service Level Objective

---

- Step 1** Choose **Physical > Storage**.
  - Step 2** On the **Storage** page, choose the pod.
  - Step 3** On the **Storage** page, click **Storage Accounts**.
  - Step 4** Click the row with the EMC VMAX account where you want to update the FAST SLO.
  - Step 5** Click **View Details**.
  - Step 6** Click **Fast Policies**.
  - Step 7** Click **FAST SLO**.
  - Step 8** Click **Rename**.
  - Step 9** On the **Rename FAST SLO Name** screen, enter a new SLO name and click **Submit**.
- 

## Port Groups

A VMAX port group is a collection of front-end ports.

## Creating a Port Group

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a port group.
- Step 5** Click **View Details**.
- Step 6** Click **Port Groups**.
- Step 7** Click **Create**.
- Step 8** On the **Create Port Group** screen, complete the following fields:

| Name                          | Description                                               |
|-------------------------------|-----------------------------------------------------------|
| Port Group Name field         | The port group name.                                      |
| Select Port Group Name pop-up | Select the port(s) you want to include in the port group. |
| Select Items field            | Chose the director port for the port group.               |

- Step 9** Click **Submit**.
- 

## Masking Views

VMAX designates three types of auto-provisioning groups: storage groups, port groups, and initiator groups. These three groups work together as a masking view.

The masking view ensures that the target initiators in an initiator group can access the target storage resources in a storage group by means of the target ports in a port group.

Masking views are also useful for making changes to how the storage is presented. Changes to groups that belong to a masking view, such as adding a device or port, are automatically reflected in the masking view.

### Creating a Masking View

#### Before You Begin

You must create a storage group, initiator group, host LUN, and port group.

You must also attach devices to the storage group.

- 
- Step 1** Choose **Physical > Storage**.
- Step 2** On the **Storage** page, choose the pod.
- Step 3** On the **Storage** page, click **Storage Accounts**.
- Step 4** Click the row with the EMC VMAX account where you want to create a port group.
- Step 5** Click **View Details**.
- Step 6** Click **Masking Views**.
- Step 7** Click **Create**.
- Step 8** On the **Create Masking Views** screen, complete the following fields:

| Name                              | Description                                                                                                                    |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Masking View Name field           | A unique name for the masking view.                                                                                            |
| Select Storage Group Name field   | Choose the storage group you want to include in the masking view.                                                              |
| Host LUN ID field                 | The host LUN ID for the storage group.<br><b>Note</b> If you do not specify a LUN ID, the <b>Host LUN ID</b> is autogenerated. |
| Select Initiator Group Name field | Choose the initiator group you want to include in the masking view.                                                            |
| Select Port Group Name field      | Choose the port group you want to include in the masking view.                                                                 |

- Step 9** Click **Submit**.
- 

## VMAX Properties File

You can configure certain parameters in the VMAX properties file (`vmax.properties`), which is located in the `/opt/infra/inframgr` folder.

### Action or Task Retry Parameters

By default, the VMAX properties file is configured to automatically resubmit a service request or action if a workflow fails because too many tasks or actions are being executed simultaneously. This configuration reduces the level of user intervention required in this scenario.

| Parameter                  | Description                                                                                                                                                                                                                        | Default Value                                                                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| emc.vmax.retryMessages     | The error message that displays if a workflow fails because too many tasks or actions are being executed simultaneously. If this error message is captured for a task or action, that task or action is automatically re-executed. | Default Error Message:<br>The SYMAPI database file is already locked by another process<br><b>Note</b> To include more than one message, enter comma-separated messages. |
| emc.vmax.maxIterationCount | The maximum number of attempts to be made if the VMAX response contains the message specified in the retryMessages property.                                                                                                       | Default value: 20                                                                                                                                                        |
| emc.vmax.sleepTime         | The time (in ms) that the retry operation waits before it connects to the VMAX device to execute the command.                                                                                                                      | Default value: 30000 ms (30 sec)                                                                                                                                         |

### VMAX Sym Device Inventory Collection

By default, Cisco UCS Director collects the sym device inventory for every 500 devices. You can change this default in the VMAX properties file.

| Parameter                       | Description                                                                                                                                                                           | Default Value      |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| emc.vmax.inventory.symdev.count | The number of VMAX devices for which inventory is collected. This parameter can be useful to reduce the inventory time required if the VMAX system has a large number of sym devices. | Default value: 500 |

## Editing the VMAX Properties File

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- Step 1** In a terminal, log in to Cisco UCS Director with root credentials.
  - Step 2** Type `cd /opt/infra/inframgr` and press Enter.
  - Step 3** Type `vi vmax.properties` and press Enter.
  - Step 4** Change the desired property and save the file.  
Your configuration changes are applied immediately.
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