# EMC VNX


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# About Cisco UCS Director for EMC VNX

Cisco UCS Director supports EMC VNX block, file, and unified storage accounts. Block supports block data, file supports file data, and unified supports both block and file data. See the Compatibility Matrix for all supported EMC VNX versions.

For a VNX Block account, you can manage the following:

- Block Storage Pools
- Storage Groups
- RAID Groups
- Host Initiators
- Logical Unit Numbers (LUNs)

The reports for VNX Block accounts also include details on all of these items, and on storage processors, ports, meta LUNs, hosts, ports, and disk devices.

For a VNX File account, you can manage the following:

- Data Movers
- Storage Pools for File
- Volumes
- Filesystems

- Common Internet File Servers (CIFS) servers
- Common Internet File Servers (CIFS) shares
- Network File System (NFS) exports
- Data Mover Interfaces
- DNS Domains

The reports available for VNX File accounts include details on the above items, and system overview summaries.

For a VNX File new account, you create either Common Internet File Servers (CIFS) or Network File System (NFS) Export.

For NFS Export, you create the following:

- Storage pools for files
- File systems
- Interfaces
- Volumes
- Mounts

For a VNX unified account, which combines VNX block and VNX file accounts, you can perform all the steps needed for both VNX block and VNX file accounts.

# Installing EMC NaviSphere

To communicate with VNX, Cisco UCS Director supports Windows-based EMC NaviSphere and Linux-based EMC Navisphere.

Before using NaviSphere, you must install and configure a Secure Shell (SSH) server on it.

## Installing and Configuring Windows-Based Navisphere

### Installing a Cygwin Package

Ensure that you install the `openssh`, `openssl`, and `TCL` Cygwin packages on a Windows host.

#### Procedure

**Step 1** Download the Cygwin executable from http://www.cygwin.com/.

**Step 2** While installing the Cygwin package on the package selection screen, choose the following packages:

- openssh
- openssl
- TCL

## 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.

After you install the SSHD server on the Windows-based EMC NaviSphere, modify the Path variable under System Variables to include the NaviSphere `bin` folder. This update ensures that anyone who uses SSH to access Windows-based NaviSphere can execute VNX commands.

After you configure the SSHD server, set up new default paths to enable the user-installed software to override the system software.

## Configuring the SSHD Server

### Procedure

**Step 1** Navigate to the `C:\Cygwin-Install-Dir.` directory,

**Step 2** Open the `Cygwin.bat` file in edit mode, using any editor, and add the following line: set CYGWIN=binmode ntsec
The following example shows the contents of the `Cygwin.bat` file after adding the above line:

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

**Step 3** 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> | Yes |
| New local account 'sshd'? <yes/no> | Yes |
| Do you want to install sshd as a service? <yes/no> | No if SSHD is already installed as a service.<br>Yes if SSH has not yet been installed as a service. |
| 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) | Yes |

| Question | Recommended Response |
|---|---|
| Enter the new username: <new-username> | Enter the new username. |
| Reenter: <new-username> | Reenter the new username. |
| Replace cloupia with new-username? (yes/no) | Yes |
| Please enter the password: <password> | Enter the password for this account. |
| Reenter: <password> | Reenter the password for this account. |

## Configuring System Environment Variables

### Procedure

**Step 1** On the Windows host, right-click the **Computer** icon on the desktop and choose **Properties**.

**Step 2** If you don't have a computer icon on your desktop, do the following:

a) Click **Start**.
b) Right-click the **Computer** option in the Start menu.
c) Choose **Properties**.

**Step 3** Click **Advanced System Settings**.

**Step 4** On the **Advanced** tab, choose **Environment Variables**.

**Step 5** Under **System Variables** choose the **Path** variable and append the following two binary paths: `c:\Program Files (x86)\EMC\Navisphere CLI;c:\<Cygwin-Install-Dir>\bin.`
The following is an example of the path variable with the binary paths added:

```
Variable Name: Path
     Variable Value: <Existing Folders Path>;c:\Program Files(x86)\EMC\Navisphere
CLI;c:\cygwin 64\bin
```

**Step 6** Add the following new system variable:

- System Variable Name: `CYGWIN`
- System Variable Value: `binmode tty ntsec`

## Starting the Cygwin SSHD Service

### Procedure

**Step 1** Start the Cygwin SSHD service manually under Window Services.

**Step 2** Configure the Cygwin SSHD service to start automatically every time the computer is restarted.

## Verifying SSH Access

Ensure that you can run the `naviseccli` commands without providing the absolute path at the command prompt. You can use any SSH client to verify SSH access.

### Procedure

**Step 1** In your SSH client, access another machine that has the SSH client running and execute one of the following commands:

- `ssh USERNAME@host-ipaddress 'date'`
- `ssh -l USERNAME@host-ipaddress 'date'`

**Example:**
For example, `ssh -l user@host-ipaddress 'date'`

**Step 2** Enter the password for the account when prompted.
After you enter the correct password, the command returns the current date.

## Configuring the Navisphere Path for Windows

By default, Cisco UCS Director executes NavisecCLI commands with an explicit path that does not exist in Windows. You must create a softlink to that path through the Cygwin shell.

### Procedure

**Step 1** Open the Cygwin shell on the Windows server where Navisphere is installed.

**Step 2** In the Cygwin shell, create the following directory: `/opt/Navisphere`

**Step 3** Create a softlink for the Navisphere directory.

**Example:**

For example. if you installed Navisphere in the `C:\Program Files (x86)\EMC\NavisphereCLI` directory, execute the following command to create a softlink:

```
ln -s /cygdrive/c/Program\ Files\ \(x86\)/EMC/NavisphereCLI /opt/Navisphere/bin
cd /opt/Navisphere/bin
chmod 775 NaviSECCli.exe
```

# Installing and Configuring Linux Based NaviSphere

You must complete this step before you add a VNX Storage Array as an account in Cisco UCS Director.

### Procedure

**Step 1** Search and download the `naviseccli` package for VNX from EMC Support for your specific platform. For example, the package may be named:

```
NaviCLI-Linux-64-x86-en_US-7.33.2.0.51-1.x86_64.rpm
```

**Step 2** If you are not logged in as root, enter the following command to switch to the root user: `su` *username*

**Step 3** Install the `naviseccli` package using the `rpm` command.
For example, enter the following command:

```
rpm -i NaviCLI-Linux-64-x86-en_US-7.33.2.0.51-1.x86_64.rpm
```

**Step 4** When you are prompted to enter a certificate verifying level, enter the verifying level as medium[m].

**Step 5** Add the `naviseccli` bin directory, which is typically `/opt/Navisphere/bin`, to your system PATH:

a) Add the following line to `~/.bash_profile & ~/.bashrc`

```
PATH=$PATH:/opt/Navisphere/bin
   export PATH
```

b) Execute this file to make the setting effective by running `source ~/.bash_profile` or `source ~/.bashrc`.

**Step 6** Configure this installation of `naviseccli` to work with each storage processor on each associated array.

a) For all storage processors run the following command:

```
naviseccli -user usename -password password -h sp_ip -scope 0 -np getagent
```

b) When you reach the security prompt, choose option 2 to save the certificate.

Repeat these steps for each of the storage processors. You can use a script, if desired. The security prompt should not display again.

**Step 7** With an SSH client, log in to Cisco UCS Director as the root user and run the following command against the Navisphere host where `naviseccli` is installed.

```
# ssh <navicli-user>@<navicli-host-ip> naviseccli -User sysadmin -Password <sysadmin-pass>

-Scope 0 -Address <SP-A-IP> port -list
```

**Step 8** Enter the password at the login prompt (after accepting the SSH certificate)

It should list VNX Storage Array port configuration. If it first asks to save the certificate, choose option 2

**Step 9** Run the same command against the SP-B IP Address to save the certificate.

```
# ssh <navicli-user>@<navicli-host-ip> naviseccli -User sysadmin -Password <sysadmin-pass>

-Scope 0 -Address <SP-B-IP> port -list
```

# VNX Accounts

In Cisco UCS Director you can add the following types of VNX accounts:

- VNX file account—X-Blade enclosure, two to eight blades, configurable failover options, and flexible I/O connectivity. You can have one data mover per license.
- VNX block account—Storage or data processor enclosure, dual active storage processors, automatic failover, and flexible I/O connectivity. You can have two service providers per license.
- VNX unified account—Single platform for VNX file and VNX block. You can have two service providers per license.

## Adding an EMC VNX File Account

### Before You Begin

- Configure a VM.
- Install the NaviSecCLI software so that all Navisphere features are supported (if it is not currently installed).
- Create a set of user credentials for the NaviCLI package with enough privileges to run NaviSecCLI commands to manage and configure VNX storage.

### Procedure

**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 the pod for this account. The pod can be one of the following types:<br>• **Default Pod**<br>• **Generic**<br>• **Vblock** |
| **Category** drop-down list | Choose **Storage**. |
| **Account Type** drop-down list | Choose **EMC VNX File**. |

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

**Step 6** On the second **Add Account** screen, complete the following fields:

| Name | Description |
|---|---|
| **Account Name** field | A unique name for this account. |
| **Description** field | A description of this account. |
| **Control Station IP Address** | The IP address of the VNX control station that manages the file-side blades. |
| **Use Credential Policy** check box | Check 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 **Use Credential Policy**, choose the credential policy that you want to use from this drop-down list.<br>This field is only displayed if you choose to use a credential policy. |
| **Control Station Username** | The username that this account uses to access the VNX control station. This username must be a valid account in the control station.<br>This field is not displayed if you chose to use a credential policy. |
| **Password** field | The password associated with the specified control station username.<br>This field is not displayed if you chose to use a credential policy. |

| Name | Description |
|---|---|
| **Transport Type** drop-down list | Choose one of the following transport types that you want to use for this account:<br>• **http**<br>• **https**<br>The default transport type protocol for this account is HTTPS.<br>This field is not displayed if you chose to use a credential policy. |
| **Port** field | The port used to access the VNX control station. The default port is 443 for HTTPS.<br>This field is not displayed if you chose to use a credential policy. |
| **Connection Timeout (Seconds)** field | The length of time in seconds that Cisco UCS Director will wait to establish a connection to the VNX control station before timing out.<br>The default value is 40 seconds. The valid values are from 0 to 1800. An empty field or a value of 0 is interpreted as an infinite timeout.<br>This field is not displayed if you chose to use a credential policy. |
| **Contact Email** field | The email address that you use to contact the administrator or other person responsible for this account. |
| **Location** field | The location of the contact. |

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

Cisco UCS Director tests the connection to the VNX control station. If that test is successful, it adds the VNX file 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.

The polling interval configured on the **System Tasks** screen on the **Administration** > **System** page specifies the frequency of inventory collection.

# Adding an EMC VNX Block Account

### Before You Begin

- Configure a VM.
- Install the NaviSecCLI software so that all Navisphere features are supported (if it is not currently installed).
- Create a set of user credentials for the NaviCLI package with enough privileges to run NaviSecCLI commands to manage and configure VNX storage.

### Procedure

**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 the pod for this account. The pod can be one of the following types:<br>• **Default Pod**<br>• **Generic**<br>• **Vblock** |
| **Category** drop-down list | Choose **Storage**. |
| **Account Type** drop-down list | Choose **EMC VNX Block**. |

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

**Step 6** On the second **Add Account** screen, complete the following fields:

| Name | Description |
|---|---|
| **Account Name** field | A unique name for this account. |
| **Description** field | A description of this account. |
| **Storage Processor A IP Address** field | The IP address for Storage Processor A. |
| **Storage Processor B IP Address** field | The IP address for Storage Processor B. |
| **Use Credential Policy** check box | Check if you want to use a credential policy for block access rather than enter the username and password information manually. |
| **Credential Policy** drop-down list | If you checked **Use Credential Policy**, choose the credential policy that you want to use from this drop-down list.<br>This field is only displayed if you choose to use a credential policy. |
| **Block Access User Name** field | The username that this account uses to access the storage block. This username must be a valid account in the storage block.<br>This field is not displayed if you chose to use a credential policy. |

| Name | Description |
|---|---|
| **Block Access Password** field | The password associated with the specified storage block username.<br>This field is not displayed if you chose to use a credential policy. |
| **Protocol** drop-down list | The protocol must be **ssh**.<br>This field is not displayed if you chose to use a credential policy. |
| **NaviSecCLI Host IP Address** field | The IP address for the secure NaviSecCLI host. |
| **Use Credential Policy** check box | Check if you want to use a credential policy for NaviSec CLI access rather than enter the username and password information manually. |
| **Credential Policy** drop-down list | If you checked **Use Credential Policy**, choose the credential policy that you want to use from this drop-down list.<br>This field is only displayed if you choose to use a credential policy. |
| **NaviSecCLI Host User Name** field | The username that the account uses to access the specified secure NaviSecCLI host. This username must be a valid account in the host.<br>This field is not displayed if you chose to use a credential policy. |
| **NaviSecCLI Host User Password** field | The password for the specified secure NaviSecCLI host.<br>This field is not displayed if you chose to use a credential policy. |
| **Block Access Port** field | The port used to access the storage block.<br>This field is not displayed if you chose to use a credential policy. |
| **NaviSec CLI Path** field | The path to the NaviSec CLI. For example, `/opt/Navisphere/bin`. You can leave this field empty if the path is already configured in the server.<br>This field is not displayed if you chose to use a credential policy. |
| **Connection Timeout (Seconds)** field | The length of time in seconds that Cisco UCS Director will wait to establish a connection to the VNX block storage before timing out.<br>The default value is 30 seconds. The valid values are from 3 to 600.<br>This field is not displayed if you chose to use a credential policy. |

| Name | Description |
|---|---|
| **Scope** drop-down list | Choose one of the following scope options to limit the user access to the VNX block storage:<br>• **Global—**Provides access to all storage systems in the domain.<br>• **Local—**Provides access to only the storage system configured for this account.<br>• **LDAP—**Uses LDAP authentication and provides the access configured for the username in LDAP.<br>This field is not displayed if you chose to use a credential policy. |
| **Contact** field | The email address that you use to contact the administrator or other person responsible for this account. |
| **Location** field | The contact's location (user defined). |

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

Cisco UCS Director tests the connection to the VNX block storage. If that test is successful, it adds the VNX file 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.

The polling interval configured on the **System Tasks** screen on the **Administration** > **System** page specifies the frequency of inventory collection.

# Adding an EMC VNX Unified Account

### Before You Begin

- Install the secure NaviSecCLI software so that all Navisphere features are supported (if it is not currently installed).
- Create a set of user credentials for the NaviSecCLI package with enough privileges to run NaviSecCLI commands to manage and configure VNX storage.

### Procedure

**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 the pod for this account. The pod can be one of the following types:<br>• **Default Pod**<br>• **Generic**<br>• **Vblock** |
| **Category** drop-down list | Choose **Storage**. |
| **Account Type** drop-down list | Choose **EMC VNX Unified**. |

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

**Step 6** On the second **Add Account** screen, complete the following fields:

| Name | Description |
|---|---|
| **Account Name** field | A unique name for this account. |
| **Description** field | A description of this account. |
| **File Account** | |
| **Control Station IP Address** field | The IP address of the VNX control station that manages the file-side blades. |
| **Use Credential Policy** check box | Check 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 **Use Credential Policy**, choose the credential policy that you want to use from this drop-down list.<br>This field is only displayed if you choose to use a credential policy. |
| **Control Station Username** | The username that this account uses to access the VNX control station. This username must be a valid account in the control station.<br>This field is not displayed if you chose to use a credential policy. |
| **Password** field | The password associated with the specified control station username.<br>This field is not displayed if you chose to use a credential policy. |

| Name | Description |
|---|---|
| **File Access Protocol** drop-down list | Choose one of the following protocols that you want to use for this account:<br>• **http**<br>• **https**<br>The default protocol for this account is HTTPS.<br>This field is not displayed if you chose to use a credential policy. |
| **File Access Port** field | The port to be used to access the VNX control station. The default port is 443 for HTTPS.<br>This field is not displayed if you chose to use a credential policy. |
| **Connection Timeout (Seconds)** field | The length of time in seconds that Cisco UCS Director will wait to establish a connection to the VNX control station before timing out.<br>The default value is 40 seconds. The valid values are from 0 to 1800. An empty field or a value of 0 is interpreted as an infinite timeout.<br>This field is not displayed if you chose to use a credential policy. |
| **Block Account** | |
| **Storage Processor A IP Address** field | The IP address for Storage Processor A. |
| **Storage Processor B IP Address** field | The IP address for Storage Processor B. |
| **Use Credential Policy** checkbox | Check if you want to use a credential policy for block access rather than enter the username and password information manually. |
| **Credential Policy** drop-down list | If you checked **Use Credential Policy**, choose the credential policy that you want to use from this drop-down list.<br>This field is only displayed if you choose to use a credential policy. |
| **Block Access User Name** field | The username that this account uses to access the storage block. This username must be a valid account in the storage block.<br>This field is not displayed if you chose to use a credential policy. |
| **Block Access Password** field | The password associated with the specified storage block username.<br>This field is not displayed if you chose to use a credential policy. |
| **NaviSecCLI Host IP Address** field | The IP address for the secure NaviSecCLI host. |

| Name | Description |
|---|---|
| **Use Credential Policy** check box | Check if you want to use a credential policy for NaviSec CLI access rather than enter the username and password information manually. |
| **Credential Policy** drop-down list | If you checked **Use Credential Policy**, choose the credential policy that you want to use from this drop-down list.<br>This field is only displayed if you choose to use a credential policy. |
| **NaviSecCLI Host User Name** field | The username that the account uses to access the specified secure NaviSecCLI host. This username must be a valid account in the host.<br>This field is not displayed if you chose to use a credential policy. |
| **NaviSecCLI Host User Password** field | The password for the specified secure NaviSecCLI host.<br>This field is not displayed if you chose to use a credential policy. |
| **Block Access Port** field | The port used to access the storage block. The default port is 22.<br>This field is not displayed if you chose to use a credential policy. |
| **NaviSec CLI Path** field | The path to the NaviSec CLI. For example, `/opt/Navisphere/bin`. You can leave this field empty if the path is already configured in the server.<br>This field is not displayed if you chose to use a credential policy. |
| **Connection Timeout (Seconds)** field | The length of time in seconds that Cisco UCS Director will wait to establish a connection to the VNX block storage before timing out.<br>The default value is 30 seconds. The valid values are from 3 to 600.<br>This field is not displayed if you chose to use a credential policy. |
| **Scope** drop-down list | Choose one of the following scope options to limit the user access to the VNX block storage:<br>• **Global—**Provides access to all storage systems in the domain.<br>• **Local—**Provides access to only the storage system configured for this account.<br>• **LDAP—**Uses LDAP authentication and provides the access configured for the username in LDAP.<br>This field is not displayed if you chose to use a credential policy. |
| **Contact** field | The email address that you use to contact the administrator or other person responsible for this account. |
| **Location** field | The location of the contact. |

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

Cisco UCS Director tests the connection to the VNX unified storage. If that test is successful, it adds the VNX unified 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.

The polling interval configured on the **System Tasks** screen on the **Administration** > **System** page specifies the frequency of inventory collection.

# VNX Block Storage Management

For VNX block (and VNX unified) accounts, you manage the following pools, groups, devices, and views:

- Storage pools—Name, description, RAID type (RAID 1/0, RAID-5, RAID-6), disks, and percentage of the full threshold
- RAID groups—RAID group ID, RAID Type (RAID 1, 0, 3, or 5, disk, hot spare), expansion, or defragmentation priority, disks. You have options to automatically destroy a RAID group after the last LUN is unbound, and for power saving.
- Host initiators—Add to new or existing host, hostname, WWN/IQN, SP port, initiator type (CLARiiON Open, HP Auto Trespass, HP No Auto Trespass, SGI, Fujitsu Siemens, Compaq Tru64), and failover mode (Active-Active mode -Failover Mode 4, Active-Passive mode (PNR)-Failover Mode 1, AIX Active-Passive mode (PAR)-Failover Mode 3, Legacy Failover Mode 2, Legacy Failover Mode 0). You add hosts to the storage groups.
- Storage groups—Name
- Logical unit numbers (LUNs)—Storage pool type (pool, RAID group), RAID type (1_0, 5), storage pool for new LUN (new or existing pool), user capacity, capacity units (MB, GB, TB, Blocks), alignment offset (LBA), default owner, initial tier placement (optimize for pool performance, highest available tier, lowest available tier), and options for automatically assigning LUN IDs as LUN names, LUN ID autogeneration, and Thin or Maximum provisioning. You mount LUNs as Datastores and also add them to the storage groups.

The read-only report detail includes the following information:

- **System Summary**—File system allocation and system overview summary graphs
- **Data Movers**—Unique ID, account name, server name, and role
- **Storage Processors**—SP name, serial number, IP address, and faults (on or off)
- **Disk Devices**—Unique ID, account name, name, disk type, state, capacity (GB), and other data
- **Hosts**—Account name, hostname, IP address, storage group, attached to host (on or off), number of HBA ports, log in status, and status
- **Initiators**—Account name, storage group, initiator name, log in status, SP port ID, SP port type, registered (y/n), hostname, and IP address
- **Ports**—SP port, port IP address, port WWN, port type, storage processor, and fabric WWN

- **More Reports—**Tabular report for RAID groups or hosts, and instant reports for file system allocation, as well as the top five storage capacity file systems, the top five file systems file count, and the top five storage capacity volumes

# Summary of Steps

**Procedure**

**Step 1** Add the VNX block account (s).

**Step 2** Create the pools, groups, hosts, and LUNs needed for block management:

a) Create the storage pools.
b) Create the RAID groups.
c) Create the host initiators.
d) Create the storage groups.
e) Create the LUNs and mount them as datastores.
f) Add hosts to the storage groups.
g) Add LUNs to the storage groups.

**Step 3** Review reports.

# Storage Pools

A storage pool requires the following parameters:

- Storage pool name
- Description
- RAID type—1/0, 5, or 6
- Disks
- Percent full threshold

## Creating a Storage Pool

### Procedure

**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 VNX pod on which you want to create a storage pool and click **View details**.
**Step 5** Click **Block Storage Pools**.
**Step 6** Click **Create**.
**Step 7** On the **Create Storage Pool** screen, complete the following fields:

| Name | Description |
|---|---|
| **Storage Pool Name** field | The storage pool name. |
| **Description** field | The description. |
| **RAID Type** drop-down list | Choose the **RAID Type**. This can be one of the following:<br>**1/0**<br>**5**<br>**8** |
| **Disks** field | Choose one or more disks to use. |
| **Percent Full Threshold** field | The percentage full threshold. |

**Step 8** Click **Select**.
**Step 9** Click **Submit**.

# RAID Groups

A RAID group has the following parameters:

- RAID Group ID—The system can specify or you can create a group ID
- RAID type—1/0, 5, or 6
- Option to automatically destroy after last LUN is unbound
- Expansion or defragmentation priority
- Option to allow power saving
- Disks

You can perform the following actions on the **RAID Groups** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates a new RAID group. |
| **Delete** | Deletes a selected RAID group. |
| **Assign to Group** | Assigns a selected RAID group to a group. |
| **View Details** | Views details about the selected RAID group. |

## Creating a RAID Group

### Procedure

**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 VNX data center where you want to create a RAID group and click **View Details**.

**Step 5** Click **RAID Groups**.

**Step 6** Click **Create**.

**Step 7** On the **Create RAID Group** screen, complete the following fields:

| Name | Description |
|---|---|
| **RAID Group ID** field | Enter the RAID group ID. This can be one of the following:<br>**1**<br>**0**<br>**3**<br>**5**<br>**disk**<br>**hot spare** |
| **RAID Type** drop-down list | Choose the RAID type. This can be one of the following:<br>**RAID0**<br>**RAID1**<br>**RAID1/0**<br>**RAID3**<br>**RAID5**<br>**RAID6**<br>**DISK** |

| Name | Description |
|---|---|
| **Allow Power Saving** check box | If checked, the system allows power saving for this RAID group. |
| **Disks** field | Choose one or more disks to use. |

**Step 8** Click **Submit**.

# Host Initiators

A host initiator requires the following parameters:

- Add initiator to—You can add an initiator to a new or existing host
- Host
- WWN/IQN
- SP port
- Initiator type
- Failover mode

You can perform the following actions on the **Initiators** screen:

| Button Name | Description |
|---|---|
| **Register** | Registers a new initiator. |
| **View Details** | Views details about the selected initiator. |
| **Deregister** | Deregisters a selected initiator. |

## Registering a Host Initiator

### Procedure

**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 VNX data center where you want to register a host initiator and click **View Details**.

**Step 5** Click **Initiators**.

**Step 6** Click **Register**.

**Step 7** On the **Register Host Initiator** screen, complete the following fields:

| Name | Description |
|---|---|
| **Add Initiator to** drop-down list | Choose either **Existing Host** or **New Host**.<br>If you chose **New Host**, you can add the initiator to a new host by specifying a **Host Name**, **Host IP Address**, and **New Host WNN**. |
| **Host** field | If you chose **Existing Host**, choose one of the hosts to add the initiator to an existing hosts. |
| **WWN/IQN** | The WWN/IQN for the new or existing host. |
| **SP Port** field | Choose one of the SP ports in the list. |
| **Initiator Type** drop-down list | Choose the **Initiator Type**. This can be one of the following:<br>• CLARiiON Open<br>• HP Auto Trespass<br>• HP No Auto Trespass<br>• SGI<br>• Fujitsu Siemens<br>• Compaq Tru64 |
| **Failover Mode** drop-down list | Choose the **Failover Mode**. This can be one of the following:<br>• Active-Active mode-Failover Mode 4<br>• Active-Passive mode (PNR)-Failover Mode 1<br>• AIX Active-Passive mode (PAR)-Failover Mode 3<br>• Legacy Failover Mode 2<br>• Legacy Failover Mode 0 |

**Step 8** Click **Submit**.

# Storage Groups

A storage group requires a name as a parameter.

You can perform the following actions on the **Storage Groups** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates a new storage group. |
| **View Details** | Views details about the selected storage group. |
| **Delete** | Deletes a selected storage group. |
| **Add LUN** | Adds a LUN to a selected storage group. |
| **Remove LUN** | Removes a LUN from a selected storage group. |
| **Add Host** | Adds a host to a selected storage group. |
| **Remove Host** | Removes a host from a selected storage group. |

## Creating a Storage Group

### Procedure

**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 VNX data center where you want to create the storage group and click **View Details**.
**Step 5** Click **Storage Groups**.
**Step 6** Click **Create**.
**Step 7** On the **Create Storage Group** screen, enter the name for the storage group in the **Name** field.
**Step 8** Click **Submit**.

### What to Do Next

Add hosts and LUNs to the storage group on the **Storage Groups** screen.

# LUNs

A LUN has the following parameters:

- Option to automatically assign LUN IDs as LUN names
- Option to allow the system to specify the LUN ID
- Storage pool type
- RAID type
- Storage pool
- Thin or maximum provisioning
- User capacity (thin LUN only)
- Capacity units
- LUN ID
- Alignment offset (LBA)
- Default owner

You can perform the following actions on the **LUNs** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates a LUN. |
| **Delete** | Deletes a selected LUN. |
| **Expand** | Expands a selected LUN. |
| **Create Meta LUN** | Create a Meta LUN for a selected LUN. |
| **Associate LUN as Datastore** | Associates a LUN as a Datastore. |
| **Assign to Group** | Assigns a selected LUN to a group. |
| **View Details** | View details on a selected LUN. |

# Creating a LUN

## Procedure

**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 VNX pod where you want to create a LUN and click **View Details**.

**Step 5** Click **LUNs**.

**Step 6** Click **Create**.

**Step 7** On the **Create LUN** screen, complete the following fields:

| Name | Description |
|---|---|
| **Storage Pool Type** drop-down list | Choose the storage pool type.<br>**Restriction** If you choose **RAID Group**, the system automatically generates the LUN ID. Automatic LUN naming ensures that the LUN name conforms to a set of strict naming conventions. An incorrectly named LUN no longer functions properly.<br>If you choose **Pool**, the default path is set to automatically assign LUN IDs as LUN names. However, you have the option to uncheck this option (not recommended). |
| **Automatically assign LUN IDs as LUN Names** check box | If you chose **Pool** as the storage pool type, the default path is set to automatically assign LUN IDs as LUN names. However, you have the option to uncheck this option (not recommended).<br>If checked, LUN IDs are automatically assigned as LUN names.<br>Uncheck the check box if you do not want LUN IDs to be assigned as LUN names. |
| **Storage Pool for New LUN** drop-down list | Choose the storage pool for the new LUN. |
| **Thin** check box | Check if you want a thin LUN. |
| **Ignore Thresholds** check box | Check to ignore Storage Pool threshold limits. |
| **User Capacity** field | The user capacity (applies to **Thin LUN** only). |

| Name | Description |
|---|---|
| **Capacity Units** drop-down list | Choose the capacity units type. This can be one of the following:<br>• **GB**<br>• **MB**<br>• **TB**<br>• **Blocks** |
| **Alignment Offset (LBA)** field | The alignment offset (LBA) (0 to 9999). |
| **Default Owner** drop-down list | Choose the default owner from the drop down-list:<br>• **Auto**<br>• **SP A**<br>• **SP B** |
| **Initial Tier Placement** drop-down list | Choose one of the following from the drop-down list:<br>• **Optimize for Pool Performance**<br>• **Highest available tier**<br>• **Lowest available tier** |

**Step 8** Click **Submit**.

### What to Do Next

Mount the LUN as a Datastore.

# Adding a Host to a Storage Group

### Before You Begin

A host and a storage group must exist in the system.

### Procedure

**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 VNX data center where you want to add a host and click **View Details**.
**Step 5** Click **Storage Groups**.
**Step 6** Click **Add Host**.
**Step 7** On the **Add Host(s) to Storage Group** screen, complete the following fields:

| Name | Description |
|---|---|
| **Show Hosts** drop-down list | Choose **Include Connected** or **Not Connected**. |
| **Hosts** field | Click **Select** and choose a host. |

**Step 8** Click **Submit**.

# Adding a LUN to a Storage Group

### Before You Begin

A LUN and a storage group must exist in the system.

### Procedure

**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 VNX data center where you want to add a LUN and click **View Details**.
**Step 5** Click **Storage Groups**.
**Step 6** Click **Add LUN**.
**Step 7** On the **Add LUN to Storage Group** screen, complete the following fields:

| Name | Description |
|---|---|
| **LUN** field | If you want to choose the LUN manually, click **Select**. |
| **Let System Specify HLU** check box | If checked, the system autogenerates the Host LUN ID (HLU). |

**Step 8** In the **Host LUN ID** field, enter the **Host LUN ID**.

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

# Creating a Meta LUN

### Before You Begin

Create a LUN.

### Procedure

**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 VNX Pod where you want to create a Meta LUN, and click **View Details**.

**Step 5** Click **Meta LUNs**.

**Step 6** Click **Create Meta LUN**.

**Step 7** On the **Create Meta LUN** screen, complete the following fields:

| Name | Description |
|---|---|
| **Expansion Type** drop-down list | Choose an expansion type. This can be one of the following:<br>• **Stripe Expansion**<br>• **Concatenate Expansion** |
| **Flare LUNs** drop-down list | Choose a Flare LUN that is added to the base LUN. |
| **Meta LUN Name** field | The LUN name. |
| **MAX** check box | If checked, the system creates a MAX LUN size. |
| **User Capacity** field | The LUN capacity units (applies to **Thin LUN** only). |
| **Capacity Units** drop-down list | Choose a capacity unit. |
| **Default Owner** drop-down list | Choose the default owner. |
| **Element size Multiplier** field | The element size multiplier. This field displays the strip element size multiplier for the meta LUN. The default value is 4. |
| **Alignment Offset** field | The alignment offset (LBA) value. The value range is from 0 to 9999. |

| Name | Description |
|---|---|
| **Enable Auto-assign** check box | If checked, the system enables **Auto-assign**. This option enables or disables Auto-assign only to a storage system that has two service providers and a LUN that is not a hot spare. |
| **Expansion Rate** drop-down list | Choose an expansion rate for making additional LUN capacity available to the host. |

**Step 8** Click **Submit**.

### What to Do Next

Associate a LUN as a Datastore.

# Associating a LUN as a Datastore

### Before You Begin

Create a LUN.

### Procedure

**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 VNX Pod where you want to associate a LUN as a Datastore, and click **View Details**.
**Step 5** Click **LUNs**.
**Step 6** Click the row with the LUN to associate as a Datastore
**Step 7** Click **Associate LUN As Datastore**.
**Step 8** On the **Associate LUN As Datastore** screen, complete the following fields:

| Name | Description |
|---|---|
| **Data store Name** field | The Datastore. |
| **Select Host Node** field | The host node. |
| **Initiator Type** drop-down list | Choose the initiator type. |
| **LUN Name** field | The LUN name. |
| **VDC Name** drop-down list | Choose the VDC name. |

| Name | Description |
|---|---|
| **Success Criteria** drop-down list | Choose how to measure the association as successful from the drop-down. |

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

### What to Do Next

Verify that the Datastore is associated to the LUN. For example, you can choose **Virtual > Storage** and click **vCenter** to view the related data stores.

# About VNX File Storage Management

For VNX File (and VNX Unified) accounts, you can use either Common Internet File System (CIFS) or Network File System (NFS) Export.

For CIFS, you create and manage the following:

- CIFS servers—Server type, computer, NetBIOS name, aliases, and domain. You can choose to join a domain, enable local users, and select interfaces.
- CIFS shares—CIFS share name, file systems, path, CIFS server, user limit, and comments.
- DNS domains—Name, DNS servers, and protocol (UDP or TCP).

For NFS Export, you create and manage the following:

- Storage pools for files—Name, description, and subnet mask for the interface. You can create from a metavolume or a storage pool. Optionally, you can slice pool volumes by default.
- Volumes—Name, type (stripe, meta, slice), stripe size (32, 64, 256), and which volumes to select. You can mount volumes to the Datastore.
- File systems—Name, storage pool, storage capacity, capacity units (GB, MB, TB). You can optionally create a file system from a storage pool or volume to contain slices. You can mount file systems to the data store.
- Data mover interfaces—Name, device name, address, subnet mask, maximum transmission unit (MTU), and VLAN ID
- NFS export—File systems, read/write hosts, root hosts, and an option to host access read-only export
- Mounts—Path, file system name, server, read-only or read/write, and access-checking policy (NT, UNIX, Secure, Native, Mixed, or Mixed and Compatible). You can choose to enable virus checking, enable CIFS oplocks, and set advanced options.

The read-only report includes the following information:

- System overview summary—Data center, account, host, role, and mode
- CIFS server and shares detail

- DNS domain detail
- For NFS, storage pool for files, file system, NFS export, and data mover detail

# Summary of Steps

**Procedure**

**Step 1** Add the VNX file account(s).

**Step 2** Choose either **CIFS** or **NFS Export**.

- For CIFS, create the CIFS servers, CIFS shares, and DNS domains.
- For NFS Export, create the following:

a) Storage pools for files
b) Volumes
c) File systems
d) Interfaces
e) NFS export information
f) Mounts

**Step 3** Review reports.

# Using CIFS

In Cisco UCS Director, you can use CIFS to export files or directories. A client can mount any server-exported directory.

To use CIFS, you create the CIFS servers, CIFS shares, and DNS domains.

## CIFS Servers

A CIFS server requires the following parameters:

- Server type
- Computer name
- NetBIOS name
- Aliases
- Domain
- Option to join a domain
- Option to enable local users
- Interfaces

You can perform the following actions on the **CIFS Server** screen:

| Button Name | Description |
|---|---|
| **Add** | Creates a new CIFS server. |
| **Delete** | Deletes a selected CIFS server. |
| **Modify** | Modifies attributes of a selected CIFS server. |

## Creating a CIFS Server

### Procedure

**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 VNX data center where you want to create a CIFS server and click **View Details**.

**Step 5** Click **Data Movers**.

**Step 6** Click the row with the server and click **View Details**.

**Step 7** Click **CIFS Servers**.

**Step 8** Click **Add**.

**Step 9** On the **Create CIFS Server** screen, complete the following fields:

| Name | Description |
|---|---|
| **Server Type** drop-down list | Choose the server type. |
| **Computer Name** field | The computer name. |
| **NetBIOS Name** field | The NetBIOS name for this server. |
| **Aliases** field | The alias names for this server. |
| **Domain** field | The server domain name. |
| **Join Domain** check box | Check to enable the server to join another domain. |
| **Enable Local Users** check box | Check to enable local users on this server.<br>If you checked this check box, go to Step 10. |
| **Interfaces** field | Click **Select** to choose an interface(s).<br>Go to Step 11. |

**Step 10** If you checked **Join Domain**, complete the following additional fields:

| Name | Description |
|---|---|
| **Domain Admin** field | The domain administrator username for this server. |
| **Domain Password** field | The server domain password. |
| **Organizational Unit** field | The server's organizational unit. |

**Step 11** If you checked **Enable Local Users**, complete the following additional fields:

| Name | Description |
|---|---|
| **Set Local Admin Password** field | The local administrator password for this server. |
| **Confirm Local Admin Password** field | The confirmation of the local administrator password. |

**Step 12** Click **Submit**.

## CIFS Shares

A CIFS share requires the following parameters:

- CIFS share name
- File system
- Path
- CIFS server
- User limit
- Comments

You can perform the following actions on the **CIFS Share** screen:

| Button Name | Description |
|---|---|
| **Add** | Adds a new CIFS share. |
| **Delete** | Deletes a selected CIFS share. |

### Creating CIFS Shares

#### Before You Begin

A CIFS server must exist in the system.

#### Procedure

**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 VNX data center where you want to create the CIFS shares and click **View Details**.

**Step 5** Click **Data Movers**.

**Step 6** Click the row with the server and click **View Details**.

**Step 7** Click **CIFS Shares**.

**Step 8** Click **Add**.

**Step 9** In the **Create CIFS Shares** dialog box, complete the following fields:

| Name | Description |
|---|---|
| **File Systems** drop-down list | Choose the **File Systems** type. |
| **CIFS Share Name** field | The CIFS share name. |
| **Path** field | The path. |
| **CIFS Server** field | **Click Select.**<br>Choose one or more CIFS shares. |
| **User Limit** field | The alias names for this server. |
| **Comments** field | Any comments regarding CIFS shares. |

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

## DNS Domains

A DNS domain requires the following parameters:

- Name
- DNS servers
- Protocol

You can perform the following actions on the **DNS Domains** screen:

| Button Name | Description |
|---|---|
| **Add** | Adds a new DNS domain. |
| **Delete** | Deletes a selected DNS domain. |

### Creating a DNS Domain

#### Procedure

**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 VNX data center where you want to create a DNS Domain and click **View Details**.
**Step 5** Click **Data Movers**.
**Step 6** Click the row with the server and click **View Details**.
**Step 7** Click **DNS Domain**.
**Step 8** Click **Add**.
**Step 9** On the **Add DNS Domain** screen, complete the following fields:

| Name | Description |
|---|---|
| **Name** field | The DNS domain name. |
| **DNS Servers** field | The DNS server names. |
| **Protocol** drop-down list | Choose the protocol. |

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

# Using NFS Export

In Cisco UCS Director, you can use NFS to export files or directories. A client can mount any server-exported directory.

To use NFS Export, you create the storage pools for files, volumes, file systems, interfaces, NFS export information, and add the mounts.

## Storage Pools for Files

An NFS storage pool for files requires the following parameters:

- Name
- Create from—Metavolume or storage pool
- Description
- Volumes—Subnet mask
- Slice pool volumes by default—Checked or unchecked

You can perform the following actions on the **Storage Pools for Files** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates a new NFS storage pool for files. |
| **View Details** | Views details about the selected NFS storage pool for files. |
| **Delete** | Deletes a selected storage pool for files. |

## Creating a Storage Pool for Files

### Procedure

**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 VNX data center where you want to create a storage pool for files and click **View Details**.

**Step 5** Click **Data Movers**.

**Step 6** Click the row with the server and click **View Details**.

**Step 7** Click **View Details**.

**Step 8** Click **Storage Pools for File**.

**Step 9** Click **Create**.

**Step 10** On the **Create Storage Pool** screen, complete the following fields:

| Name | Description |
|---|---|
| **Name** field | The storage pool name. |
| **Create from** drop-down list | Choose **Meta Volume** or **Storage Pool**. |
| **Description** field | The description for this storage pool. |
| **Volumes** drop-down list | The volumes for this storage pool. |
| **Slice Pool Volumes by Default** check box | Check to slice pool volumes by default. |

**Step 11** If you chose **Storage Pool**, complete the following additional fields to create this storage pool from another storage pool:

| Name | Description |
|---|---|
| **Template Pool** drop-down list | Choose the template pool. |
| **Minimum Pool Size (MB)** field | The minimum pool size (MB). |
| **Stripe Size (KB)** field | The stripe size (KB). |

**Step 12** Click **Submit**.

## Volumes

An NFS volume requires the following parameters:

- Name
- Type
- Volumes
- Stripe size—32, 64, 256

You can perform the following actions on the **Volumes** screen:

| Button Name | Description |
|---|---|
| **Delete** | Deletes a selected volume. |

### Creating a Volume

#### Procedure

**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 VNX data center where you want to create a volume and click **View Details**.
**Step 5** Click **Volumes**.
**Step 6** Click **Create**.
**Step 7** On the **Create Volume** screen, complete the following fields:

| Name | Description |
|---|---|
| **Name** field | The NFS volume name. |
| **Type** drop-down list | Choose one of the following volume types for this volume:<br>• **Stripe**<br>• **Meta**<br>• **Slice** |
| **Volumes** field | Choose to use one or more volumes from the list of available volumes. |
| **Stripe Size (KB)** drop-down list | Choose the **Stripe Size** from the list (256, 32, or 64 KB). |

**Step 8** Click **Submit**.

## File Systems

An NFS file system has the following parameters:

- Name
- Create from a volume or storage pool
- Storage pool
- Storage capacity
- Capacity units
- Option to contain slices

You can perform the following actions on the **File Systems** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates a new file system. |
| **Extend** | Extends a file system. |
| **View Details** | Views details about the selected file system. |
| **Delete** | Deletes a selected file system. |

### Creating an NFS File System

#### Procedure

**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 VNX pod where you want to create an NFS File System and click **View Details**.

**Step 5** Click **File Systems**.

**Step 6** Click **Create**.

**Step 7** On the **Create File System** screen, complete the following fields:

| Name | Description |
|---|---|
| **Name** field | The NFS file system name. |
| **Create from** drop-down list | Choose either **Storage Pool** or **Volume** as the source for the file system. |
| **Storage Pool** field | Choose the storage pool for this file system. |
| **Storage Capacity** field | The storage capacity to allocate for this file system. |
| **Capacity Units** drop-down list | Choose the capacity units type. This can be one of the following:<br>• **GB**<br>• **MB**<br>• **TB** |
| **Contain Slices** check box | Check this check box to enable the file system to contain slices. |
| **Data Mover** field | Choose the data mover account for the file system. |

**Step 8** Click **Submit**.

#### What to Do Next

You can mount the file system as a Datastore.

## Data Mover Interfaces

An NFS data mover interface requires the following parameters:

- Name
- Device name

- Address
- Subnet mask
- MTU
- VLAN ID

You can perform the following actions on the **Interfaces** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates a data mover interface. |
| **View Details** | Views details about the selected interface. |
| **Delete** | Deletes a selected data mover interface. |

## Adding a Data Mover Interface

### Procedure

**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 VNX pod where you want to create a Data Mover Interface and click **View Details**.
**Step 5** Click **Data Movers**.
**Step 6** Click the row with the server and click **View Details**.
**Step 7** Click **Mover Interfaces**.
**Step 8** Click **Add**.
**Step 9** On the **Add Data Mover Interface** screen, complete the following fields:

| Name | Description |
|---|---|
| **Name** field | The interface name. |
| **Device Name** drop-down list | Choose the device name for this interface. |
| **Address** field | The interface address. |
| **Subnet Mask** field | The subnet mask for this interface. |
| **MTU** field | The maximum transmission unit (MTU) for this interface. |
| **VLAN ID** field | The VLAN ID for this interface. |

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

## NFS Export

NFS Export requires the following parameters:

- File system
- Read/write hosts
- Root hosts
- Option to host access read-only export

You can perform the following actions on the **NFS Export** screen:

| Button Name | Description |
|---|---|
| **Create** | Creates an NFS export. |
| **Edit** | Edits an NFS export. |
| **View Details** | Views details about the selected NFS export. |
| **Delete** | Deletes a selected NFS export. |

### Exporting an NFS File System

#### Procedure

**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 VNX pod where you want to add an NFS File System and click **View Details**.
**Step 5** Click **Data Movers**.
**Step 6** Click the row with the server and click **View Details**.
**Step 7** Click **NFS Exports**.
**Step 8** Click **Add**.
**Step 9** On the **Add NFS Export** screen, complete the following fields:

| Name | Description |
|---|---|
| **File Systems** drop-down list | Choose the **File Systems** type for NFS Export. |
| **Read/Write Hosts** field | The read/write hosts for NFS Export. |

| Name | Description |
|---|---|
| **Root Hosts** field | The root hosts for NFS Export. |
| **Host Access Read-only Export** check box | Check if you want host access read-only export. |

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

## Mounts

An NFS mount requires the following parameters:

- Path
- File system name
- Mount server
- Read-only or read and write
- Access checking policy
- Option to enable virus checking
- Option to enable CIFS oplocks
- Option to enable advanced options

You can perform the following actions on the **Mounts** screen:

| Button Name | Description |
|---|---|
| **Modify** | Modifies the attributes of a selected mount. |
| **Delete** | Deletes a selected mount. |

## Modify a File System

### Procedure

**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 VNX pod where the file system is located and click **View Details**.

**Step 5** Click **Data Movers**.

**Step 6** Click the row with the server and click **View Details**.

**Step 7** Click **Mounts**.

**Step 8** Click the row with file system and click **Modify**.

**Step 9** On the **Modify Mount** screen, complete the following fields:

| Name | Description |
|---|---|
| **Path** field | The path for this mount. |
| **File System Name** drop-down list | Choose the file system name for this mount. |
| **Mount On** drop-down list | Choose the server for this mount. |
| **Read Only** drop-down list | Choose the Read Only or Read and Write option for this mount. |
| **Access-Checking Policy** drop-down list | Choose the access-checking policy for this mount. |
| **Virus Checking Enabled** check box | Check if you want virus checking enabled. |
| **CIFS Oplocks Enabled** check box | Check if you want CIFS Oplocks enabled. |
| **Set Advanced Options** check box | Check if you want to set advanced options. |

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

### Deleting a File System

#### Procedure

**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 VNX pod containing the file system you want to delete and click **View Details**.
**Step 5** Click **Data Movers**.
**Step 6** Click the row with the server and click **View Details**.
**Step 7** Click **Mounts**.
**Step 8** Click the row with the file system and click **Delete**.

# VNX Unified Storage Management

VNX unified storage combines VNX block storage with VNX file storage.

## Summary of Steps

#### Procedure

**Step 1** Add the VNX block account(s).
**Step 2** Create the pools, groups, hosts, and logical unit numbers (LUNs) needed for block management:
a) Create the storage pools.
b) Create the RAID groups.
c) Create the host initiators.
d) Create the storage groups.
e) Create the LUNs and mount them as datastores.
f) Add hosts to the storage groups.
g) Add LUNs to the storage groups.
**Step 3** Review VNX block storage reports.
**Step 4** Add the VNX file account(s).
**Step 5** Choose either **CIFS** or **NFS Export**.

- For CIFS, create the CIFS servers, CIFS shares, and DNS domains.
- For NFS Export, create the following:

a) Storage pools for files
b) Volumes

c) File systems
d) Interfaces
e) NFS export information
f) Mounts

**Step 6** Review VNX file storage reports.

### What to Do Next

See the previous chapters on how to manage VNX block storage and VNX file storage for more details.