



**EMC® VNX™ Series**  
Release 7.1

**Configuring Virtual Data Movers on VNX™**  
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<b>Preface</b> .....	<b>7</b>
<b>Chapter 1: Introduction</b> .....	<b>9</b>
System requirements.....	10
Restrictions.....	10
Replicating a VDM for NFS with ESX datastore.....	11
Cautions and warnings.....	12
User interface choices.....	12
Related information.....	13
<b>Chapter 2: Concepts</b> .....	<b>15</b>
Overview.....	16
CIFS servers in a VDM.....	20
VDM states.....	20
Create a VDM in the loaded state.....	21
Create a VDM in the mounted state.....	21
Summary of the loaded and mounted states.....	22
Changing the VDM state.....	22
Moving a VDM.....	22
Unloading a VDM.....	24
Planning considerations.....	25
VDM names.....	26
VDM root file system size, layout, and inode density.....	26
Internationalization modes.....	27
Name resolution when moving VDMs.....	27
Secure NFS for VDM.....	28

<b>Chapter 3: Configuring</b> .....	<b>31</b>
Create a VDM.....	32
Create a VDM by using default values.....	32
Create a slice for a VDM root file system.....	33
Create a stripe for a VDM root file system.....	34
Create a metavolume for a VDM root file system.....	34
Create the root file system for a VDM.....	35
Create a VDM in the loaded state from an existing file system.....	36
Verify the size of a root file system.....	37
Create a VDM in the loaded state that uses Automatic Volume Management.....	38
Create a VDM in the mounted state.....	39
Create a user file system.....	40
Create a mount point for a user file system.....	41
Mount a user file system.....	42
Configure an interface.....	43
Create a CIFS server in a VDM.....	44
Join the CIFS servers to a domain.....	45
Create shares for CIFS servers in a VDM.....	46
Verify the CIFS shares in a VDM.....	46
Convert a VDM from ASCII to Unicode mode.....	47
<b>Chapter 4: Managing</b> .....	<b>49</b>
Display the server table for a VDM.....	50
Display the attributes of a VDM.....	50
Display the CIFS protocol configuration.....	51
Display a list of mounted or temporarily unmounted file systems.....	52
Display the DNS configuration.....	53
Display the time services configuration.....	54
Display parameters for configured interfaces.....	54
Display the network connectivity for a Data Mover.....	55
Change the VDM state.....	56
Unload a VDM temporarily.....	57
Unload a VDM permanently.....	58
Rename a VDM.....	59
Move a VDM when using different IP addresses.....	60
Configure the target Data Mover.....	61
Configure DNS on the target Data Mover.....	62

Configure time services on the target Data Mover.....	63
Start the CIFS service.....	63
Move the VDM to the target Data Mover.....	65
Move a VDM when using the same IP address.....	67
Take down the interface on the source Data Mover.....	68
Delete the interface on the source Data Mover.....	69
Delete a VDM.....	70
Use VDMs and NDMP backup.....	71
<b>Chapter 5: VDM for NFS Multiple Domains Solution.....</b>	<b>73</b>
VDM for NFS Multiple Domains Solution.....	74
Configuring an NFS endpoint in a VDM.....	75
Configure the domain name resolution service on the Data Mover.....	76
LDAP domain configuration.....	76
NIS domain configuration.....	77
Assign an interface to a VDM.....	78
Attach one or more interfaces to a VDM.....	78
Edit the VDM STATD hostname file.....	79
Manage NFS exports on a VDM.....	81
Create NFS export on a VDM.....	82
Unexport an NFS export from a VDM.....	82
Query the NFS export list on a VDM.....	83
Manage the domain configuration for a VDM.....	83
Query the domain configuration for a VDM.....	84
Enable the domain configuration for a VDM.....	84
Configure the domain on a VDM.....	85
View the domain configuration for a VDM .....	86
Disable the domain configuration for a VDM.....	86
VDM local files setup.....	87
Windows-style credential for UNIX users.....	87
VDM resolution behavior.....	88
<b>Chapter 6: Troubleshooting.....</b>	<b>89</b>
EMC E-Lab Interoperability Navigator.....	90
VNX user customized documentation.....	90
Troubleshooting CIFS server accessibility errors.....	90
Troubleshooting VDM unloading errors.....	90
Error messages.....	90
EMC Training and Professional Services.....	91

Glossary.....	93
Index.....	95

## Preface

*As part of an effort to improve and enhance the performance and capabilities of its product lines, EMC periodically releases revisions of its hardware and software. Therefore, some functions described in this document may not be supported by all versions of the software or hardware currently in use. For the most up-to-date information on product features, refer to your product release notes.*

*If a product does not function properly or does not function as described in this document, please contact your EMC representative.*

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EMC uses the following conventions for special notices:


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Note: Emphasizes content that is of exceptional importance or interest but does not relate to personal injury or business/data loss.

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 Identifies content that warns of potential business or data loss.

 Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

 Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

 Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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## Where to get help

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Product information — For documentation, release notes, software updates, or for information about EMC products, licensing, and service, go to the EMC Online Support website (registration required) at <http://Support.EMC.com>.

Troubleshooting — Go to the [EMC Online Support](#) website. After logging in, locate the applicable Support by Product page.

Technical support — For technical support and service requests, go to EMC Customer Service on the [EMC Online Support](#) website. After logging in, locate the applicable Support by Product page, and choose either **Live Chat** or **Create a service request**. To open a service request through EMC Online Support, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

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Note: Do not request a specific support representative unless one has already been assigned to your particular system problem.

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## Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications.

Please send your opinion of this document to:

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A Virtual Data Mover (VDM) is a EMC VNX software feature that enables the grouping of file systems and CIFS servers into virtual containers. Each VDM contains all the data necessary to support one or more CIFS servers and their file systems. The servers in a VDM store their dynamic configuration information (such as local groups, shares, security credentials, audit logs, and so on) in a configuration file system. A VDM can then be loaded and unloaded, moved from Data Mover to Data Mover, or replicated to a remote Data Mover as an autonomous unit. The servers, their file systems, and configuration data are available in one virtual container.

This document is part of the VNX information set and is intended primarily for VNX for file administrators.

Topics included are:

- ◆ [System requirements on page 10](#)
- ◆ [Restrictions on page 10](#)
- ◆ [Replicating a VDM for NFS with ESX datastore on page 11](#)
- ◆ [Cautions and warnings on page 12](#)
- ◆ [User interface choices on page 12](#)
- ◆ [Related information on page 13](#)

## System requirements

Table 1 on page 10 describes the EMC® VNX™ software, hardware, network, and storage configurations required for using VDMs as described in this document.

**Table 1. System requirements**

Software	VNX version 7.1
Hardware	VNX
Network	IP network
Storage	<p>EMC Symmetrix® or EMC VNX for Block</p> <p>Sufficient disk space for VDM root file systems</p> <hr/> <p>Note: If there is not enough disk space to accommodate the VDM root file system, the command to create a VDM returns a no free disks available response.</p> <hr/>

## Restrictions

The following restrictions apply to VDMs:

- ◆ In addition to CIFS servers that are created within a VDM, a global CIFS server is required for antivirus functionality. A global CIFS server is a CIFS server that is created at the physical Data Mover level.
- ◆ A default CIFS server and CIFS servers within a VDM cannot coexist on the same Data Mover. A default CIFS server is a global CIFS server that is assigned to all interfaces, and CIFS servers within a VDM require specified interfaces. If a VDM exists on a Data Mover, a default CIFS server cannot be created.
- ◆ VDM supports CIFS and Security = NT mode only.
- ◆ The VDM feature does not support UNIX and SHARE mode, iSCSI, VNX Data Migration Service (migration file systems mounted within VDMs), or resource allocation (CPU, memory, and so on).
- ◆ A full path is required to back up VDM file systems with NDMP backup and the **server\_archive** command.

An Network Data Management Protocol (NDMP) example is:

```
/root_vdm1/ufs1
```

A server archive example is:

```
server_archive <movername> -w -f /dev/clt410/ -J /root_vdm1/ufs1
```

- ◆ IP replication failover support for local groups must include VDMs.

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### MPFS restrictions with VDM

The following restrictions apply to Multi-Path File System (MPFS):

- ◆ From an MPFS Windows client, you can map shares from only one CIFS server per Data Mover or VDM within the Data Mover. If you map shares from more than one CIFS server, the MPFS Windows client might be denied access or file data corruption might occur.
- ◆ MPFS does not allow duplicate NetBIOS names on the same physical Data Mover or VDMs within the Data Mover.

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### NFS restrictions with VDM

The following restrictions apply:

- ◆ The NFS endpoint on a VDM works for TCP only (NFSv3 and NFSv4). For NFSv2 and NFSv3 over UDP you cannot use a VDM.
- ◆ You can perform the NFS export of a file system mounted on the VDM by using the CLI `server_export` command and not by using EMC Unisphere™.

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### VDM replication restrictions

A file system replica for an NFS access should have the same file system ID as the source:

The NFS file handle exchanged across the wire includes the file system identifier.

The `nas_replicate -pool` option makes the best effort to satisfy this requirement, unless the source file system ID conflicts with an existing file system on the destination.

You can replicate a file system without having the same FSID. However, upon failover the clients will have to remount the Data Mover exports.

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## Replicating a VDM for NFS with ESX datastore

When replicating a VDM for NFS file systems that are used for ESX datastores you must follow the following procedure to ensure that the VMs do not go offline.

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Note: The ESX server will lose access to the datastore if these steps are not followed exactly in the given order.

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This procedure assumes that you have your NFS data store connecting to the VNX through an IP address.

- ◆ Failover the Production File System that is mounted on the VDM
- ◆ Down the Interface on the Source
- ◆ Failover the VDM

- ◆ Up the Interface on the Destination

If the VDM is failed over before the user file system, the ESX server receives an error NFS3ERR\_STALE(Invalid File Handle). The ESX client then considers the file system to be down.



To avoid this error, when the Production File System (PFS) that is mounted on a VDM is failed over, the VDM interface is set down using the `server_ifconfig` command on the source. The VDM is then failed over. As the VDM restarts on the replication site, the VDM interface can be set up using the `server_ifconfig` command.

---

## Cautions and warnings

If any of this information is unclear, contact your EMC Customer Support Representative for assistance:

- ◆ After a VDM is converted to Unicode mode, it cannot be converted to ASCII mode.
- ◆ Converting a VDM by using the `-ConvertI18N` option does not trigger the file or directory name conversion (from non-ASCII to Unicode) of user file systems mounted on the VDM. You might need to convert the file or directory names separately by using the `uc_config -convert` command if you have non-ASCII file or directory names in the user file systems. *Using International Character Sets on VNX for File* provides more information.
- ◆ The root file system of a Data Mover or a VDM does not support automatic file system extension.

---

## User interface choices

VNX offers flexibility in managing networked storage that is based on your support environment and interface preferences. This document describes how to configure a VDM by using the VNX command line interface (CLI). You can also perform all of these tasks by using the management applications, such as EMC Unisphere.

For additional information about managing VNX:

- ◆ EMC VNX Documentation on the EMC Online Support website
- ◆ EMC Unisphere online help
- ◆ Application's online help system VNX for File Documentation on the EMC Online Support website

*Installing Management Applications on VNX for File* includes instructions on launching Unisphere, and on installing the Microsoft Management Console (MMC) snap-ins and the Active Directory Users and Computers (ADUC) extensions.

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## Related information

For specific information related to the features and functionality described in this document, refer to:

- ◆ *VNX Glossary*
- ◆ *EMC VNX Command Line Interface Reference for File*
- ◆ *Celerra Network Server Error Messages Guide*
- ◆ *Configuring and Managing CIFS on VNX*
- ◆ *Configuring NDMP Backups to Disk on VNX*, and your specific backup software vendor's similar documentation
- ◆ *Managing Volumes and File Systems for VNX Manually*
- ◆ *Managing Volumes and File Systems with VNX Automatic Volume Management*
- ◆ *Problem Resolution Roadmap for VNX*
- ◆ *Using VNX Replicator*
- ◆ *Using International Character Sets on VNX for File*
- ◆ EMC Unisphere online help
- ◆ VNX for File man pages

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### EMC VNX documentation on the EMC Online Support website

The complete set of EMC VNX series customer publications is available on the EMC Online Support website. To search for technical documentation, go to <http://Support.EMC.com>. After logging in to the website, click the VNX Support by Product page to locate information for the specific feature required.

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### VNX wizards

Unisphere software provides wizards for performing setup and configuration tasks. The Unisphere online help provides more details on the wizards.



Topics included are:

- ◆ Overview on page 16
- ◆ CIFS servers in a VDM on page 20
- ◆ VDM states on page 20
- ◆ Changing the VDM state on page 22
- ◆ Moving a VDM on page 22
- ◆ Unloading a VDM on page 24
- ◆ Planning considerations on page 25
- ◆ Secure NFS for VDM on page 28

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## Overview

VDMs enable system administrators to group file systems and CIFS servers. Each VDM contains the necessary information to support one or more CIFS servers. Each VDM has access only to the file systems mounted to that VDM. This provides a logical isolation between the VDM and the CIFS servers it contains. A VDM can be moved from one physical Data Mover to another.

Each VDM stores its configuration information in a VDM root file system, which is a directory within the root file system of the physical Data Mover. No data file systems are stored within the VDM root file system. All user data is kept in user file systems.

Use VDMs for the following:

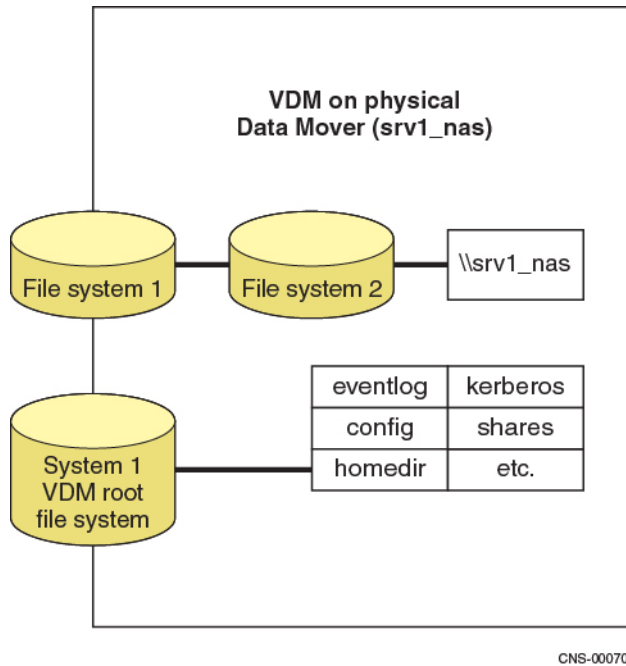
- ◆ To partition or group file systems and CIFS servers, users see only the file systems on the VDM
- ◆ As part of a replication data-recovery strategy

When you create a VDM, a root file system is created for the VDM. This file system stores the server configuration information for the CIFS servers created within the VDM. The VDM root file system stores the majority of the CIFS servers' dynamic data, which includes:

- ◆ Local group and share databases for servers in the VDM
- ◆ CIFS server configuration (computer names, interface names, and so on)
- ◆ VNX home directory information for servers in the VDM
- ◆ Auditing and Event Log information
- ◆ Kerberos information for servers in the VDM



Figure 1 on page 17 shows the VDM container.



**Figure 1. The VDM container**

Having the file systems and the configuration information contained in a VDM:

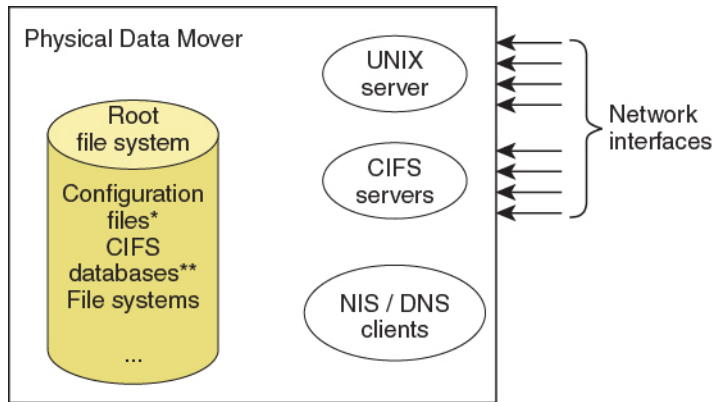
- ◆ Allows replication of the CIFS environment
- ◆ Enables system administrators to move CIFS servers within a VDM from one physical Data Mover to another

You can access the data on a VDM mounted file system from an NFS client by using `celerra:/root_vdm_X/fs_name`, where X is a consecutive number assigned by VNX when you create the VDM. When a user or system creates the root file system, the name of the root file system is `root_vdm_fs_<vdm name>`. A user can delete the VDM root file system only when the VDM is deleted and it is irretrievable. A user can export NFS through a Data Mover rather than a VDM because the VDM functionality does not support NFS. If a VDM is unmounted or moved to another Data Mover, NFS exports of the mounted file systems on that VDM will be invalid. A user must reconfigure NFS exports if a VDM is moved to another Data Mover. *Configuring NFS on VNX* provides details about NFS access to file systems mounted on a VDM.

In contrast, a physical Data Mover supports NFS servers and CIFS servers, where each server has the same view of all server resources. All configuration and control data is stored in the root file system of a physical Data Mover. All event logs are global to all servers and are stored in the root file system of the physical Data Mover. This reduces both the isolation and the ease of moving servers between Data Movers. While it is beneficial for some environments to consolidate multiple servers into one physical Data Mover, isolation between servers is required in others. For example, for Internet Service Providers (ISPs) or where

data from various departments must be hosted on the same physical Data Mover, VDMs can play an important role.

Figure 2 on page 18 shows a typical physical Data Mover without VDM implementation.



\* Physical Data Mover configuration files include passwd, group, viruschecker.conf, GPO Cache, and Kerberos files

\*\* Databases include localgroup.db and homedir files, shares and Registry directories

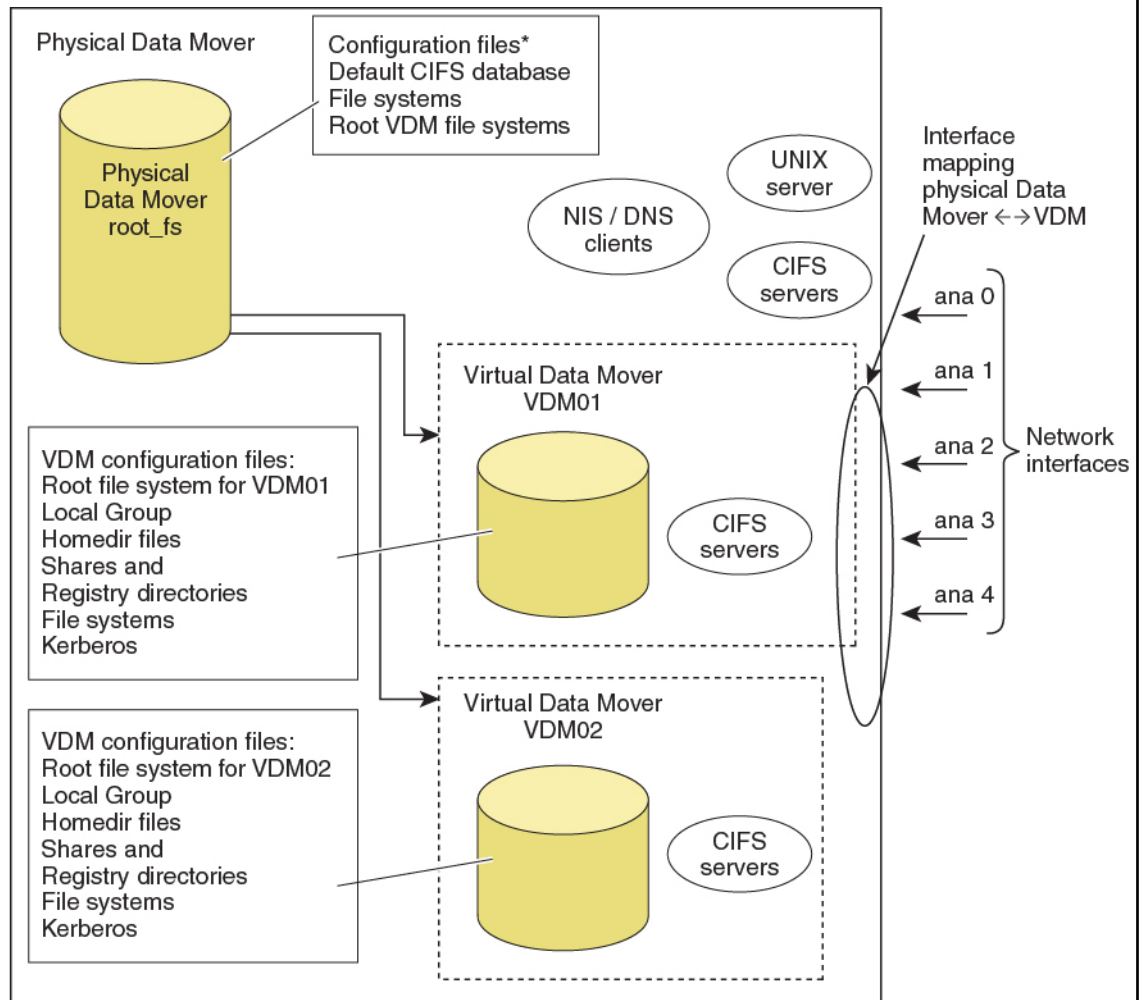
CNS-000702

**Figure 2. Physical Data Mover without VDM implementation**

In addition to passwd, group, viruschecker.conf, Group Policy Object (GPO) cache, and Kerberos files, the physical Data Mover contains all configuration files on the VDM. The VDM configuration file is a subset of the configuration files on the physical Data Mover.

Figure 3 on page 19 shows a physical Data Mover with the VDM implementation. A VDM is an independent CIFS subset of a physical Data Mover. The physical Data Mover contains the GPO information (in GPO cache) for all CIFS servers on the physical Data Mover, but the GPO configuration that the CIFS servers follow is downloaded from the Active Directory.

GPO policies work the same for CIFS servers created at the physical Data Mover or the VDM level.



\* Configuration files for the physical Data Mover are listed in the physical Data Mover without VDM Implementation figure. VDM configuration files are a subset of the configuration files of the physical Data Mover.

CNS-000703

**Figure 3. Physical Data Mover with VDM implementation**

You can configure the following at the physical Data Mover level, but not at the VDM level:

- ◆ Usermapper
- ◆ passwd/group file
- ◆ User mappings in Active Directory (VNX UNIX Users and Groups Property Page Extension)

- ◆ NIS
- ◆ DNS
- ◆ NTP
- ◆ Internationalization (I18N) mode: Unicode or ASCII
- ◆ Virus Checker
- ◆ CIFS stop/start/delete operation for CIFS service
- ◆ Routing
- ◆ Network interface
- ◆ Parameters
- ◆ Standby Data Mover assignment and failover policy

Operations at the Data Mover level that affect all VDMs on the physical Data Mover:

- ◆ Stop, Start, Delete (CIFS, MPFS, viruschk, rip)
- ◆ Data Mover failover

---

## CIFS servers in a VDM

Users with rights to the C\$ share of a global CIFS server can see all the file systems mounted to the physical Data Mover as well as the VDMs within it.

Users with rights to the C\$ share of a specific VDM can see only the file systems mounted on that VDM.

The local administrator group controls the rights to C\$ on a CIFS server.

Access to the files and directories within the file systems is determined by access control entries within the access control levels. [Create a CIFS server in a VDM on page 44](#) describes the procedure to create a CIFS server in a VDM.

*Configuring and Managing CIFS on VNX* provides more information.

You can create a CIFS server in a VDM in a mixed environment. This requires both CIFS and NFS access to the VDM user file systems. The *EMX VNX Command Line Interface for File* provides more information about this.

---

## VDM states

You can create VDMs in one of two states:

- ◆ Loaded
- ◆ Mounted

---

## Create a VDM in the loaded state

In the loaded state, a VDM is fully functional and active. The CIFS servers in a loaded VDM are running and serving data. A VDM must be in the loaded state to allow configuration changes, such as the addition of CIFS servers or exports.

You can load a VDM on only one physical Data Mover at a time. If you need to move the VDM, the network interfaces used by its CIFS servers must be available on the destination Data Mover. You cannot load a VDM within a VDM.

When creating a loaded VDM, consider the following:

- ◆ If no state is specified, the VDM is created in the loaded (default) state.
- ◆ If a name is not specified for the VDM or its root file system, a default name is assigned, as described in [VDM names on page 26](#).
- ◆ The root file system is created from an existing storage pool. The selection of the storage pool is based on whether the physical Data Mover is in a mirrored configuration. In a mirrored configuration, a mirrored storage pool is selected. Otherwise, a nonmirrored storage pool is selected.
- ◆ The default size of the root file system is 128 MB.

[Create a VDM by using default values on page 32](#) describes the procedure to create a VDM by using only default values.

---

## Create a VDM in the mounted state

You can create a VDM in the mounted state to use it as the destination in a replication relationship. A mounted VDM is inactive and the associated CIFS servers are unavailable. You cannot make data changes except those replicated from the source. After you create the mounted VDM, a VDM root file system exists on the destination. You can replicate data from the root file system on the source side to the root file system on the destination side.

In the event of failover, when using the EMC VNX Replicator™, the destination side might be called on to act as the source. The VDM file systems on the destination side include the configuration data necessary to change the VDM state to loaded.

*Using VNX Replicator* provides more information on using mounted VDMs and VNX Replicator.

## Summary of the loaded and mounted states

[Table 2 on page 22](#) summarizes the loaded and mounted states for VDMs.

**Table 2. Summary of the loaded and mounted states**

VDM state	CIFS active	User file systems	VDM reloaded at boot
Loaded	Yes	Accessible	Yes
Mounted	No	Inaccessible	No

## Changing the VDM state

CIFS servers in a VDM run only while the VDM is in the loaded state. A loaded state is also required to allow VDM configuration changes, such as adding new CIFS servers or new shares.

You can change a VDM from the loaded state to any of the following states:

- ◆ Mounted
- ◆ Temporarily unloaded (tempunloaded)
- ◆ Permanently unloaded (permunloaded)

Changing the state to mounted, tempunloaded, or permunloaded shuts down the CIFS servers in the VDM, by making the file systems inaccessible to the clients through the VDM.

[Unloading a VDM on page 24](#) explains the tempunloaded and permunloaded states. [Change the VDM state on page 56](#) provides the procedure for changing the VDM state.

## Moving a VDM

When moving a VDM from one physical Data Mover to another, the Control Station performs the following operations:

- ◆ Unmounts all file systems on that VDM
- ◆ Unloads the VDM from the source Data Mover
- ◆ Loads the VDM and mounts all file systems on the target Data Mover

For every CIFS server in a VDM, you must have that CIFS server's interfaces available and identically named on the physical Data Mover to which you are moving the VDM. *Configuring and Managing CIFS on VNX* describes setting up CIFS servers and their interfaces.

You must consider the update time of either of these static files: Domain Name System (DNS) or Windows Internet Naming Service (WINS), when you try to access the VDM after

moving it to a physical Data Mover with a different IP address. [Name resolution when moving VDMs on page 27](#) provides more information.

[Move a VDM when using different IP addresses on page 60](#) and [Move a VDM when using the same IP address on page 67](#) provide the procedures for moving a VDM to another physical Data Mover.

### Internationalization modes

When moving a VDM, the `-ConvertI18N` option is needed only when the VDM is moved from an ASCII Data Mover to a Unicode Data Mover. If you attempt to move an ASCII Data Mover to a Unicode Data Mover without specifying this option, the operation fails with the error message: Incompatible I18N mode.

## Unloading a VDM

Unlike a state change from loaded to mounted, a state change from loaded to unloaded requires the VDM to have no mounted file systems. The VDM root file system is not deleted and is available to load. You might use the unloaded state when you want to stop all activity on the VDM, but do not want to delete the VDM root file system with its configuration data.

When unloading a VDM from a physical Data Mover, you must specify whether to do so permanently or temporarily:

- ◆ In the permanently unloaded (permunloaded) state, the VDM file system is not mounted on the physical Data Mover, and is not remounted or reloaded on restart.
- ◆ In the temporarily unloaded (temunloaded) state, the VDM root file system is not mounted on the physical Data Mover, but is remounted or reloaded on restart.

[Unload a VDM temporarily on page 57](#) and [Unload a VDM permanently on page 58](#) describe the related procedures.

[Table 3 on page 24](#) summarizes the unloaded states.

**Table 3. Summary of the unloaded states**

VDM state	CIFS running	User file systems	VDM reloaded at boot
Permanently unloaded	No	Inaccessible	No
Temporarily unloaded	No	Inaccessible	Yes



---

## Planning considerations

Consider the following guidelines before creating, configuring, or managing VDMs:

- ♦ [VDM names on page 26](#)
- ♦ [Internationalization modes on page 27](#)
- ♦ [Name resolution when moving VDMs on page 27](#)

---

## VDM names

By naming a VDM, you can indicate its function and easily identify the VDM and its root file system. For example, if you group the Marketing CIFS servers together into a VDM named Marketing, you can easily identify the VDM.

When you create a VDM, you must specify a name that is unique to VNX. If you do not specify the VDM name, a default name is assigned in the form `vdm_<x>`, where `<x>` is a unique integer. The system assigns the root file system a name in the form `root_fs_<vdm_x>`, where `<vdm_x>` is the name of the VDM.

For example, the root file system for a VDM named Marketing is named `root_fs_vdm_Marketing`. If you name a VDM `vdm_Marketing`, the system does not duplicate the `vdm` part of the name. The root file system is still named `root_fs_vdm_Marketing`.

If you rename a VDM, its root file system is renamed accordingly. Renaming a VDM to HR causes its root file system name to change to `root_fs_vdm_HR`. You cannot manually change a VDM root file system name.

---

## VDM root file system size, layout, and inode density

A root file system of the default size 128 MB is assigned to a VDM when it is created. In an environment with a large number of users or shares, you might need to increase the size of the root file system. You cannot extend the root file system automatically. EMC E-Lab™ Interoperability Navigator on the [EMC Online Support](#) website provides information about the size of root file systems.

There are three ways to create a VDM and allocate the appropriate space for its configuration file systems:

- ◆ If you do not specify the file system or size, the Control Station makes a 128 MB file system from available space. [Create a VDM by using default values on page 32](#) describes this procedure.
- ◆ You can specify an existing file system as the VDM root file system. This method provides the greatest administrative control. You may choose the volume layout and the size and inode density of the VDM root file system. The following procedures describe this method:
  - [Create a slice for a VDM root file system on page 33](#)
  - [Create a stripe for a VDM root file system on page 34](#)
  - [Create a metavolume for a VDM root file system on page 34](#)
  - [Create the root file system for a VDM on page 35](#)
  - [Create a VDM in the loaded state from an existing file system on page 36](#)
  - [Verify the size of a root file system on page 37](#)

- ◆ If you specify a storage pool when using Automatic Volume Manager (AVM), the Control Station uses AVM to find the storage pool and create the file system. *Managing Volumes and File Systems with VNX Automatic Volume Management* and EMC Unisphere online help provide more information about AVM. Also, consult [Create a VDM in the loaded state that uses Automatic Volume Management on page 38](#)

In addition, consider the volume layout and the physical Data Movers you will use.


Consider the inode density required for the VDM root file system. The caching of user and group mappings requires the use of inodes from the root file system.

---

## Internationalization modes

When a VDM is created, its internationalization mode is set to the same mode as the Data Mover in which it resides. When the VDM is unloaded, its mode matches the last physical Data Mover on which it was loaded.

When loading a VDM onto a Data Mover, the modes of the VDM and the target Data Mover are compared. If the modes do not match, the system does not allow the operation. You can convert an ASCII mode VDM to Unicode mode, as described in [Convert a VDM from ASCII to Unicode mode on page 47](#).

 **CAUTION** The convert operation is ASCII to Unicode only, and irreversible. A Unicode mode VDM cannot be converted to ASCII mode.

---

## Name resolution when moving VDMs

The examples in this document use DNS for name resolution. Whether the environment uses DNS, WINS, or a static file, consider the following information when moving a VDM to another physical Data Mover and using different IP addresses. Read the appropriate section for the name resolution method used in the environment.

### DNS

When moving VDMs and using DNS, consider the following:

- ◆ The VDM load operation updates the DNS servers configured on the physical Data Mover.
- ◆ The update time between DNS servers depends on the configuration.
- ◆ The system administrator can force DNS database updates to all DNS servers to which the clients might be pointing.
- ◆ When you move the VDM to the destination Data Mover, the DNS server is automatically updated and displays the correct entry.

The DNS client considerations when moving VDMs are:

- ◆ The mapped drive is not immediately accessible.

- ◆ The client has the old DNS information in memory.
- ◆ To clear the client cache and view updated information, use one of the following methods:
  - Restart the client computer.
  - Wait until the cache clears and updates. This might take as long as 60 minutes because of the Time to Live (TTL) default.
  - Restart DNS client service.
  - From the DOS prompt, run the command `ipconfig/flushdns`.

## WINS

When moving VDMs and using WINS, consider the following:

- ◆ The VDM load updates WINS servers configured on the VDM.
- ◆ The update time between WINS servers depends on the configuration.
- ◆ System administrators can force WINS database updates to all WINS servers to which the clients might be pointing.
- ◆ To clear and update the WINS cache for clients, use one of the following methods:
  - Restart the computer.
  - Wait until the cache is cleared (TTL 10 minutes).
  - From the DOS prompt, run the command `nbstat -R`.

## Static file (LMHOSTS/Host)

The static file (LMHOSTS/Host) used by clients must be updated with the IP address of each new CIFS server.

---

## Secure NFS for VDM

You can configure and manage secure NFS for VDM. You can use the `server_nfs` command and specify the VDM name as the mover name for the NFS protocol. The tasks to configure and manage the secure NFS service are the same as those for the physical Data Mover.

The secure NFS service is started by default when a VDM is created and whenever the Data Mover is rebooted. However, if the service has been disabled through the CLI, it does not restart after the reboot.

Stopping the secure NFS service will do the following:

- ◆ Existing client secure connections will be terminated on the next incoming request or when they idle timeout, whichever is sooner.
- ◆ No new secure client connections will be allowed.

- ♦ If the secure NFS service is stopped and restarted, existing client secure connections will not resume, but will be terminated on the next incoming request or when they idle timeout, whichever is sooner.
- ♦ If the secure NFS service is stopped and the Data Mover is rebooted or the VDM is reloaded after a move or replication failover, the service will not be (re)started.

*EMC Command Line Interface Reference for File* describes the options for the `server_nfs` command. *Configuring NFS on VNX* provides more information about secure NFS.



Topics included are:

- ◆ Create a VDM on page 32
- ◆ Create a user file system on page 40
- ◆ Create a mount point for a user file system on page 41
- ◆ Mount a user file system on page 42
- ◆ Configure an interface on page 43
- ◆ Create a CIFS server in a VDM on page 44
- ◆ Join the CIFS servers to a domain on page 45
- ◆ Create shares for CIFS servers in a VDM on page 46
- ◆ Convert a VDM from ASCII to Unicode mode on page 47

## Create a VDM

The tasks to create a VDM are:

- ◆ [Create a VDM by using default values on page 32](#)
- ◆ [Create a slice for a VDM root file system on page 33](#)
- ◆ [Create a stripe for a VDM root file system on page 34](#)
- ◆ [Create a metavolume for a VDM root file system on page 34](#)
- ◆ [Create the root file system for a VDM on page 35](#)
- ◆ [Create a VDM in the loaded state from an existing file system on page 36](#)
- ◆ [Verify the size of a root file system on page 37](#)
- ◆ [Create a VDM in the loaded state that uses Automatic Volume Management on page 38](#)
- ◆ [Create a VDM in the mounted state on page 39](#)

---

**Note:** You must be `nasadmin` or `root` to create a VDM. A local user with assigned `nasadmin` or `root` privileges cannot create a VDM.

---

## Create a VDM by using default values

When using default values, the VDM is created in a loaded state, and assigned a default name.

---

**Note:** The system assigns default names for the VDM and its root file system.

---

Action
<p>To create a VDM by using default values, use this command syntax:</p> <pre>\$ nas_server -type vdm -create &lt;movename&gt;</pre> <p>where:</p> <p>&lt;movename&gt; = name of the physical Data Mover</p> <p>Example:</p> <p>To create a VDM on <code>server_2</code>, type:</p> <pre>\$ nas_server -type vdm -create server_2</pre>



## Output

```

id = 4
name = vdm_4
acl = 0
type = vdm
server = server_2
rootfs = root_fs_vdm_4
I18N mode = UNICODE
mountedfs = Admin_user
member_of =
standby =
status :
defined = enabled
actual = loaded, active
Interfaces to services mapping:

```

## Create a slice for a VDM root file system

Perform this task as often as necessary to specify the size required for creating a slice for a VDM root file system. *Managing Volumes and File Systems for VNX Manually* describes slice volumes in detail.

## Action

To create a slice, use this command syntax:

```
$ nas_slice -name <name> -create <volume_name> <size> [<offset>]
```

where:

<name> = name of the slice

<volume\_name> = volume for the file system

<size> = size of the slice in megabytes

<offset> = distance in megabytes from beginning of the volume to the start of the slice, and if omitted, the system determines the best fit

Example:

To create a slice volume named s11\_mkt from the volume named d374 with a size of 128 MB, type:

```
$ nas_slice -name s11_mkt -create d374 128
```

## Output

```

id      = 118
name    = s11_mkt
acl     = 0
in_use  = False
slice_of = d374
offset(MB) = 0
size (MB) = 128
volume_name = s11_mkt

```

## Create a stripe for a VDM root file system

Action
<p>To create a stripe for the VDM root file system, use this command syntax:</p> <pre>\$ nas_volume -name &lt;name&gt; -create -Stripe [&lt;stripe_size&gt;]</pre> <p>where:</p> <p>&lt;name&gt; = name for the volume</p> <p>&lt;stripe_size&gt; = size of the stripe in multiples of 8192 bytes, and if omitted, 32768 is used</p> <p>Example:</p> <p>To create a stripe volume, stv1_mkt, for the VDM root file system with a stripe size of 32768, type:</p> <pre>\$ nas_volume -name stv1_mkt -create -Stripe 32768 s11_mkt,s12_mkt,s13_mkt,s14_mkt</pre>
Output
<pre>id          = 612 name        = stv1_mkt acl         = 0 in_use      = False type        = stripe stripe_size = 32768 volume_set  = s11_mkt,s12_mkt,s13_mkt,s14_mkt disks       = d374,d375,d376,d377</pre>

## Create a metavolume for a VDM root file system

Action
<p>To create a metavolume, use this command syntax:</p> <pre>\$ nas_volume -name &lt;name&gt; -create -Meta &lt;volume_name&gt;</pre> <p>where:</p> <p>&lt;name&gt; = name for the metavolume</p> <p>&lt;volume_name&gt; = name for the volume</p> <p>Example:</p> <p>To create a metavolume named mtv_mkt, type:</p> <pre>\$ nas_volume -name mtv_mkt -create -Meta stv1_mkt</pre>

## Output

```

id          = 613
name        = mtv_mkt
acl         = 0
in_use     = False
type       = meta
volume_set = stvl_mkt
disks      = d374,d375,d376,d377

```

## Create the root file system for a VDM

The option `nbpi=1024` sets the inode density to one inode per 1KB.

## Action

To create the root file system for a VDM, use this command syntax:

```
$ nas_fs -name <name> -create <volume_name> -option nbpi=1024
```

where:

`<name>` = name of the VDM, and the prefix `root_fs` is attached to this name

`<volume_name>` = name of the volume

Example:

To create the root file system for the VDM named `vdm_mkt`, type:

```
$ nas_fs -name vdm_mkt -create mtv_mkt -option nbpi=1024
```

## Output

```

id          = 112
name        = vdm_mkt
acl         = 0
in_use     = False
type       = uxfs
volume     = mtv_mkt
pool       =
rw_servers =
ro_servers =
rw_vdms   =
ro_vdms   =
stor devs = 000187940268-0179,000187940268-017A,000187940268-017B,
000187940268-017C
disks      = d374,d375,d376,d377

```

## Create a VDM in the loaded state from an existing file system

Perform the following tasks, as appropriate, to prepare the root file system for a VDM:

- ◆ [Create a slice for a VDM root file system on page 33](#)
- ◆ [Create a stripe for a VDM root file system on page 34](#)
- ◆ [Create a metavolume for a VDM root file system on page 34](#)
- ◆ [Create the root file system for a VDM on page 35](#)

Note: The root file system is renamed in the format `root_fs_<vdm_name>`.

Action
<p>To create a VDM in the loaded state and use an existing file system, use this command syntax:</p> <pre>\$ nas_server [-name &lt;name&gt;] -type vdm -create &lt;moveiname&gt; -fs &lt;fs_name&gt;</pre> <p>where:</p> <p><code>&lt;name&gt;</code> = name for the VDM, and if specified, it must be unique to the entire system</p> <p><code>&lt;moveiname&gt;</code> = name of the physical Data Mover</p> <p><code>&lt;fs_name&gt;</code> = name of the existing file system. For a loaded state VDM, the file system type must be uxfs. For a mounted state VDM, the type can be either uxfs or rawfs</p> <p>Example:</p> <p>To create a loaded VDM named Marketing on server_2, type:</p> <pre>\$ nas_server -name Marketing -type vdm -create server_2 -fs vdm_mkt</pre>
Output
<pre>id          = 1 name        = Marketing acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_vdm_Marketing I18N mode   = UNICODE mountedfs   = member_of   = status      : defined     = enabled actual      = loaded, ready Interfaces to services mapping:</pre>

## Verify the size of a root file system

Note: The size of this root file system is 512 MB. The default size is 128 MB.

Action
<p>To verify the size of a root file system, use this command syntax:</p> <pre>\$ /nas/sbin/rootnas_fs -size &lt;fs_name&gt;</pre> <p>where:</p> <p>&lt;fs_name&gt; = name of the VDM root file system</p> <p>Example:</p> <p>To verify the size of the file system root_fs_vdm_Marketing, type:</p> <pre>\$ /nas/sbin/rootnas_fs -size root_fs_vdm_Marketing</pre>
Output
<pre>total = 504 avail = 503 used = 0 ( 0% ) (sizes in MB) ( blockcount = 1048576 ) volume: total = 512 (sizes in MB) ( blockcount = 1048576)</pre>

## Create a VDM in the loaded state that uses Automatic Volume Management

You can add only CIFS servers to loaded VDMs. You must specify the storage pool, that determines the volume layout and size.

Action
<p>To create a VDM in the loaded state that uses AVM, use this command syntax:</p> <pre>\$ nas_server [-name &lt;name&gt;] -type vdm -create &lt;movername&gt; pool=&lt;pool&gt;</pre> <p>where:</p> <p>&lt;name&gt; = name for the VDM, and if specified, it must be unique to the entire system</p> <p>&lt;movername&gt; = name of the physical Data Mover</p> <p>&lt;pool&gt; = name of the storage pool</p> <p>Note: The storage pool assigns a rule set for the root file system of the VDM, the storage pool rule set contains automatically created volumes and defines the type of disk volumes used, and how they are aggregated.</p> <p>Available system-defined storage pool types are:</p> <pre>symm_std, clar_r1, clar_r5_performance, symm_std_rdf_src, symm_std_rdf_tgt, symm_ata, symm_ata_rdf_src, symm_ata_rdf_tgt, symm_ssd, cm_r6, cmata_r6, clar_r5_economy, clar_r6, clarata_r3, clarata_r6, clarata_archive, clarssd_r5, clarsas_archive, clarsas_r6, clarsas_r10, cmsas_archive, cm- sas_r6, cmsas_r10, cmssd_r5.</pre> <p>Example:</p> <p>To create a loaded VDM named Marketing, with a root file system of 128 MB on server_2, that uses the storage pool symm_std, type:</p> <pre>\$ nas_server -name Marketing -type vdm -create server_2 pool=symm_std</pre>
Output
<pre>id          = 1 name        = Marketing acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_vdm_Marketing I18N mode   = UNICODE mountedfs   = Mkt_user member_of   = standby     = status      : defined     = enabled actual      = loaded, active Interfaces to services mapping:</pre>

## Create a VDM in the mounted state

### Before you begin

If you use the VNX Replicator, the file system must be a Universal Extended File System (UxFS), which is the default, and therefore you can omit the `fstype` option.

When creating a VDM that uses AVM, you must specify the storage pool.

### Procedure

#### Note:

The internationalization is set in the same way as the physical Data Mover on which the VDM resides. Refer to [Convert a VDM from ASCII to Unicode mode on page 47](#).

The default size for a VDM root file system is 128 MB.

Action
<p>To create a VDM in the mounted state that uses AVM, use this command syntax:</p> <pre>\$ nas_server [-name &lt;name&gt;] -type vdm -create &lt;movername&gt; -setstate mounted pool=&lt;pool&gt; [-option fstype=rawfs]</pre> <p>where:</p> <p><code>&lt;name&gt;</code> = name for the VDM, and if specified, it must be unique to the entire system</p> <p><code>&lt;movername&gt;</code> = name of the physical Data Mover in which the VDM resides</p> <p><code>&lt;pool&gt;</code> = name of the storage pool</p> <p>Note: The storage pool assigns a rule set for the root file system of the VDM, the storage pool rule set contains automatically created volumes and defines the type of disk volumes used, and how they are aggregated.</p> <p>Available system-defined storage pool types are: <code>symm_std</code>, <code>clar_r1</code>, <code>clar_r5_performance</code>, <code>symm_std_rdf_src</code>, <code>symm_std_rdf_tgt</code>, <code>symm_ata</code>, <code>symm_ata_rdf_src</code>, <code>symm_ata_rdf_tgt</code>, <code>symm_ssd</code>, <code>cm_r6</code>, <code>cmata_r6</code>, <code>clar_r5_economy</code>, <code>clar_r6</code>, <code>clarata_r3</code>, <code>clarata_r6</code>, <code>clarata_archive</code>, <code>clarssd_r5</code>, <code>clarsas_archive</code>, <code>clarsas_r6</code>, <code>clarsas_r10</code>, <code>cmsas_archive</code>, <code>cmsas_r6</code>, <code>cmsas_r10</code>, <code>cmssd_r5</code>.</p> <p>Example:</p> <p>To create a VDM named HR in the mounted state as a raw file system that uses the <code>symm_std</code> pool, type:</p> <pre>\$ nas_server -name HR -type vdm -create server_2 -setstate mounted pool=symm_std -option fstype=rawfs</pre>

## Output

```

id          = 2
name        = HR
acl         = 0
type        = vdm
server      = server_2
rootfs      = root_fs_vdm_HR
I18N mode   = ASCII
mountedfs   = HR_user
member_of   =
status_     :
defined     = enabled
actual      = mounted, inactive
Interfaces to services mapping:

```

## Create a user file system

*Managing Volumes and File Systems with VNX Automatic Volume Management* provides more information about file systems.

## Action

To create a user file system in a VDM, use this command syntax:

```
$ nas_fs -name <name> -create size= <integer>[T|G|M] pool=<pool>
```

where:

<name> = name for the file system

<size> = required size of the file system in terabytes (T), gigabytes (G), or megabytes (M)

<pool> = name of the AVM storage pool

Example:

To create a user file system named Mkt\_user, type:

```
$ nas_fs -name Mkt_user -create size=100M pool=symm_std
```



## Output

```

id          = 261
name        = Mkt_user
acl         = 0
in_use      = False
type        = uxfs
volume      = v1116
pool        = symm_std
member_of   = root_avm_fs_group_1
rw_servers=
ro_servers=
rw_vdms     =
ro_vdms     =
stor_devs   = 000187940268-0074,000187940268-0075,000187940268-0076,
000187940268-0077,000187940268-0078,000187940268-0079,000187940268-007A,
000187940268-007B
disks       = d113,d114,d115,d116,d117,d118,d119,d120

```

## Create a mount point for a user file system

## Action

To create a mount point for a user file system in the VDM, use this command syntax:

```
$ server_mountpoint <vdm_name> -create <pathname>
```

where:

<vdm\_name> = name of the VDM

<pathname> = path to the mount point

Example:

To create a mount point named Mkt\_user, type:

```
$ server_mountpoint Marketing -create /Mkt_user
```

## Output

```
Marketing : done
```

## Mount a user file system

### Before you begin

If the mount point does not exist, perform the task [Create a mount point for a user file system on page 41](#).

### Procedure

Perform this procedure for each user file system in the VDM.

Action
<p>To mount a user file system in the VDM, use this command syntax:</p> <pre>\$ <b>server_mount</b> &lt;movername&gt; &lt;fs_name&gt; &lt;mount_point&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the VDM</p> <p>&lt;fs_name&gt; = name of the file system</p> <p>&lt;mount_point&gt; = path to the mount point</p> <p>Example:</p> <p>To mount the user file system named Mkt_user in the VDM named Marketing, type:</p> <pre>\$ <b>server_mount Marketing Mkt_user /Mkt_user</b></pre>
Output
<pre>Marketing : done</pre>

### After you finish

To verify that the file system is mounted, perform the task [Display a list of mounted or temporarily unmounted file systems on page 52](#).

## Configure an interface

Action
<p>To configure an interface, use this command syntax:</p> <pre>\$ <b>server_ifconfig</b> &lt;movername&gt; <b>-create -Device</b> &lt;device_name&gt; <b>-name</b> &lt;if_name&gt; <b>-protocol IP</b> &lt;ipaddr&gt; &lt;ipmask&gt; &lt;ipbroadcast&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the physical Data Mover &lt;device_name&gt; = device name &lt;if_name&gt; = name of the interface &lt;ipaddr&gt; = IP address &lt;ipmask&gt; = IP mask &lt;ipbroadcast&gt; = IP broadcast address</p> <p>Example:</p> <p>To configure an interface named Mkt for the existing virtual device s2_trk1, type:</p> <pre>\$ <b>server_ifconfig</b> server_2 <b>-create -Device</b> s2_trk1 <b>-name</b> Mkt <b>-protocol IP</b> 172.24.100.125 255.255.255.0 172.24.100.255</pre>
Output
<pre>server_2 : done</pre>

## Create a CIFS server in a VDM

The default CIFS server is incompatible with VDM because it uses all interfaces and does not leave a free interface for the VDM. Each CIFS server in the VDM and physical Data Mover must have its own interface explicitly specified. If a VDM exists on a Data Mover, a default CIFS server cannot be created.

Action
<p>To create a CIFS server, use this command syntax:</p> <pre>\$ <b>server_cifs</b> &lt;movename&gt; <b>-add compname=&lt;comp_name&gt;, domain=&lt;full_domain_name&gt;, interface=&lt;if_name&gt;</b></pre> <p>where:</p> <p>&lt;movename&gt; = name of the VDM</p> <p>&lt;comp_name&gt; = name of the computer</p> <p>&lt;full_domain_name&gt; = full name of the domain; for Windows NT 4.0, use uppercase</p> <p>&lt;if_name&gt; = name of the interface</p> <p>Example:</p> <p>To create the CIFS server named Marketing, type:</p> <pre>\$ <b>server_cifs Marketing -add compname=Mkt_NE, domain=clt1.pt1.c3lab.nsgprod.emc.com, interface=Mkt</b></pre>
Output
<pre>Marketing : done</pre>

## Join the CIFS servers to a domain

A VDM does not inherit the physical Data Mover WINS configuration. Add the WINS configuration at the VDM level when WINS is used.

Action
<p>To join the CIFS servers to the domain, use this command syntax:</p> <pre>\$ <b>server_cifs</b> &lt;movername&gt; <b>-Join compname=&lt;comp_name&gt;,domain=&lt;full_domain_name&gt;,interface=&lt;interface_name&gt;,admin=&lt;admin_name&gt;</b></pre> <p>where:</p> <p>&lt;movername&gt; = name of the VDM</p> <p>&lt;comp_name&gt; = name of the computer</p> <p>&lt;full_domain_name&gt;= full name of the domain</p> <p>&lt;interface_name&gt;= name of the interface</p> <p>&lt;admin_name&gt; = name of the system administrator</p> <p>Example:</p> <p>To join the Marketing CIFS server to the domain nsgprod.emc.com, type:</p> <pre>\$ <b>server_cifs Marketing -Join compname=Mkt_NE,domain= c1t1.pt1.c3lab.nsgprod.emc.com,interface=Mkt,admin=admin</b></pre>
Output
<pre>Marketing: Enter Password: ***** Done</pre>

To display the status of the VDM and the CIFS servers in the VDM, perform these tasks:

- ◆ [Display the attributes of a VDM on page 50](#)
- ◆ [Display the CIFS protocol configuration on page 51](#)

## Create shares for CIFS servers in a VDM

The CIFS service stop or start operations can be done only at the physical Data Mover level. You cannot stop or start the CIFS service at each VDM level.

Action
<p>To create the shares for CIFS servers in a VDM, use this command syntax:</p> <pre>\$ <b>server_export</b> &lt;movername&gt; <b>-Protocol cifs -name</b> &lt;sharename&gt; /&lt;mountpoint&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the VDM</p> <p>&lt;sharename&gt; = name for the share name</p> <p>&lt;mountpoint&gt; = path to the mountpoint</p> <p>Example:</p> <p>To create shares named Shared_Files for the CIFS servers, type:</p> <pre>\$ <b>server_export Marketing -Protocol cifs -name Shared_Files /Mkt_user</b></pre>
Output
<pre>Marketing: done</pre>

## Verify the CIFS shares in a VDM

Action
<p>To verify that CIFS shares are created in a VDM, use this command syntax:</p> <pre>\$ <b>server_export</b> &lt;movername&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the VDM</p> <p>Example:</p> <p>To verify the CIFS shares in the VDM named Marketing, type:</p> <pre>\$ <b>server_export Marketing</b></pre>
Output
<pre>Marketing : share "Shared_Files" "/Mkt_user" maxusr=4294967295 umask=22</pre>

## Convert a VDM from ASCII to Unicode mode

When converting the internationalization mode of a VDM, you must convert the file or directory names separately through the `uc_config -convert` command. *Using International Character Sets on VNX for File* provides more information to perform this task if the user file system contains non-ASCII files or directory names.

**CAUTION** This procedure does not trigger conversion (from non-ASCII to Unicode) of file or directory names within user file systems mounted on the VDM.

Action
<p>To convert a VDM from ASCII to Unicode mode, use this command syntax:</p> <pre>\$ nas_server -vdm &lt;vdm_name&gt; -setstate &lt;state&gt; &lt;movername&gt; -ConvertI18N</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name assigned to the VDM</p> <p>&lt;state&gt; = VDM state (mounted, loaded, tempunloaded, or permunloaded)</p> <p>&lt;movername&gt; = name of the Data Mover in which the VDM resides</p> <p>Example:</p> <p>To convert vdm_1 from ASCII to Unicode mode, type:</p> <pre>\$ nas_server -vdm vdm_1 -setstate mounted server_2 -ConvertI18N</pre>
Output
<pre>id          = 1 name        = vdm_1 acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_vdm_vdm_1 I18N mode   = UNICODE mountedfs   = member_of   = status      : defined     = enabled actual      = mounted Interfaces to services mapping:</pre>
Note
<p>The output shows internationalization (I18N) mode as UNICODE.</p>





Topics included are:

- ◆ Display the server table for a VDM on page 50
- ◆ Display the attributes of a VDM on page 50
- ◆ Display the CIFS protocol configuration on page 51
- ◆ Display a list of mounted or temporarily unmounted file systems on page 52
- ◆ Display the DNS configuration on page 53
- ◆ Display the time services configuration on page 54
- ◆ Display parameters for configured interfaces on page 54
- ◆ Display the network connectivity for a Data Mover on page 55
- ◆ Change the VDM state on page 56
- ◆ Unload a VDM temporarily on page 57
- ◆ Unload a VDM permanently on page 58
- ◆ Rename a VDM on page 59
- ◆ Move a VDM when using different IP addresses on page 60
- ◆ Move a VDM when using the same IP address on page 67
- ◆ Delete a VDM on page 70
- ◆ Use VDMs and NDMP backup on page 71

## Display the server table for a VDM

Action	
To display a list of all VDMs in the Data Mover server table, type:	
<code>\$ nas_server -list -vdm</code>	
Output	
<pre>id acl server mountedfs rootfs name 1 0 2 32 Marketing 2 0 2 34 HR 3 0 1 86 Operations 4 0 2 87 vdm_4</pre>	

## Display the attributes of a VDM

Action	
To display the attributes of a specific VDM, use this command syntax:	
<code>\$ nas_server -info -vdm &lt;vdm_name&gt;</code>	
where:	
<code>&lt;vdm_name&gt;</code> = name of the VDM	
Example:	
To display the attributes of the VDM named Marketing, type:	
<code>\$ nas_server -info -vdm Marketing</code>	

### Note:

The following output shows important information about the VDM:

- ◆ name = name of the VDM
- ◆ server = name of the physical Data Mover
- ◆ rootfs = name of the VDM root file system
- ◆ mountedfs = file systems mounted on the VDM
- ◆ status= VDM state
- ◆ Interface = name of the interface and mapped service

## Output

```
id          = 1
name        = Marketing
acl         = 0
type        = vdm
server      = server_2
rootfs      = root_fs_vdm_Marketing
I18N mode   = UNICODE
mountedfs   = Mkt_user
member_of   =
standby     =
status      :
defined     = enabled
actual      = loaded, active
Interfaces to services mapping:
Interface   = Mkt:cifs
```

## Display the CIFS protocol configuration

## Action

To display the CIFS protocol configuration, use this command syntax:

```
$ server_cifs <movertime>
```

where:

<movertime> = name of the VDM

Example:

To display the CIFS protocol configuration of the VDM named Marketing, type:

```
$ server_cifs Marketing
```

## Output

```

Marketing :
  96 Cifs threads started
  Security mode = NT
  Max protocol = NT1
  I18N mode = UNICODE
  CIFS service of VDM Marketing (state=loaded)
  Home Directory Shares ENABLED, map=/.etc/homedir

Enabled interfaces: (All interfaces are enabled)

Disabled interfaces: (No interface disabled)

Unused Interface(s):
  if=HR l=172.24.100.203 b=172.24.100.255 mac=0:4:23:7:f7:10
  if=172_24_100_200 l=172.24.100.200 b=172.24.100.255 mac=0:4:23:7:f7:10

  if=ace0 l=172.24.106.21 b=172.24.106.127 mac=0:60:cf:21:7e:e0

DOMAIN C1T1 FQDN=clt1.pt1.c3lab.nsgprod.emc.com RC=4
  SID=S-1-5-15-64ae4905-6fc45226-40d54d1d-ffffffff
>DC=LNSGA183(172.24.100.183) ref=3 time=0 ms
  DC=LNSGC222(172.24.101.222) ref=2 time=0 ms

CIFS Server MKT_NE[C1T1] RC=2
  Full computer name=mkt_ne.clt1.pt1.c3lab.nsgprod.emc.com
  realm=C1T1.PT1.C3LAB.N
  SGPROD.EMC.COM
  Comment='EMC-SNAS:T5.3.8.2016'
  if=Mkt l=172.24.100.247 b=172.24.100.255 mac=0:4:23:7:f7:10
  FQDN=mkt_ne.clt1.pt1.c3lab.nsgprod.emc.com (Updated to DNS)

```

## Display a list of mounted or temporarily unmounted file systems

## Action

To display a list of mounted or temporarily unmounted file systems, use this command syntax:

```
$ server_mount <movename>
```

where:

<movename> = name of the Data Mover

Example:

To display a list of mounted or temporarily unmounted file systems on server\_2, type:

```
$ server_mount server_2
```

## Output

```

server_2 :
root_fs_vdm_Marketing on /root_vdm_1/.etc udfs,perm,rw
Mkt_Shared on /root_vdm_1/Mkt_Shared udfs,perm,rw
Mkt_User on /root_vdm_1/Mkt_User udfs,perm,rw

```

## Note

The user file systems are accessible and have read/write permission.

## Display the DNS configuration

**Action**

To display the DNS configuration, use this command syntax:

```
$ server_dns <movename>
```

where:

<movename> = name of the Data Mover

Example:

To display the DNS configuration on server\_2, type:

```
$ server_dns server_2
```

**Output**

```
server_2 :  
DNS is running.  
clt1.pt1.c3lab.nsgprod.emc.com  
  proto:udp server(s):172.24.100.183
```

## Display the time services configuration

Action
<p>To display the time services configuration, use this command syntax:</p> <pre>\$ server_date &lt;movername&gt; timesvc</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>Example:</p> <p>To display the status of time services on server_2, type:</p> <pre>\$ server_date server_2 timesvc</pre>
Output
<pre>server_2 : Timeservice State  time:           Mon Oct 15 05:52:34 EDT 2007 type:           ntp sync delay:     on interval:       60 hosts:          172.24.100.183</pre>

## Display parameters for configured interfaces

Action
<p>To display parameters for configured interfaces on the target Data Mover, use this command syntax:</p> <pre>\$ server_ifconfig &lt;movername&gt; -all</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>Example:</p> <p>To display parameters for configured interfaces on the target Data Mover, server_3, type:</p> <pre>\$ server_ifconfig server_3 -all</pre>

## Output

```

server_3 :
loop protocol=IP device=loop
    inet=127.0.0.1 netmask=255.0.0.0 broadcast=127.255.255.255
    UP, loopback, mtu=32768, vlan=0, macaddr=0:0:0:0:0:0
netname=localhost
e131 protocol=IP device=mge1
    inet=128.221.253.3 netmask=255.255.255.0
broadcast=128.221.253.255
    UP, ethernet, mtu=1500, vlan=0, macaddr=0:60:16:b:b7:17
netname=localhost
e130 protocol=IP device=mge0
    inet=128.221.252.3 netmask=255.255.255.0
broadcast=128.221.252.255
    UP, ethernet, mtu=1500, vlan=0, macaddr=0:60:16:b:b7:18
netname=localhost

```

## Display the network connectivity for a Data Mover

## Action

To display the network connectivity to the target Data Mover, use this command syntax:

```
$ server_ping <movername> -interface <interface> <ip_addr>
```

where:

<movername> = name of the Data Mover

<interface> = name of the interface

<ip\_addr> = IP address

Example:

To display the network connectivity to the target Data Mover, server\_2, type:

```
$ server_ping server_2 -interface Mkt 172.24.100.124
```

## Output

```
server_2 : 172.24.100.124 is alive, time= 0 ms
```

## Change the VDM state

### Before you begin

To get the current VDM information, perform these tasks:

- ◆ [Display the attributes of a VDM on page 50](#)
- ◆ [Display the CIFS protocol configuration on page 51](#)

### Procedure

**Note:** The user file systems appear in the output but are inaccessible through the VDM in the mounted state.

Action
<p>To change the state of a VDM, use this command syntax:</p> <pre>\$ nas_server -vdm &lt;vdm_name&gt; -setstate &lt;state&gt;</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name assigned to the VDM</p> <p>&lt;state&gt; = state of the VDM (mounted, loaded, tempunloaded, or permunloaded)</p> <p>Example:</p> <p>To change the state of the Marketing VDM from loaded to mounted, type:</p> <pre>\$ nas_server -vdm Marketing -setstate mounted</pre>
Output
<pre>id          = 1 name        = Marketing acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_vdm_Marketing I18N mode  = UNICODE mountedfs   = Mkt_user, Mkt_shared member_of   = status      : defined     = enabled actual      = mounted Interfaces to services mapping:</pre>

### After you finish

To check the status of the mounted VDM, perform these tasks:

- ◆ [Display the CIFS protocol configuration on page 51](#)
- ◆ [Display a list of mounted or temporarily unmounted file systems on page 52](#)



## Unload a VDM temporarily

To get current information about the VDM, perform the task [Display the attributes of a VDM on page 50](#).

Action
<p>To unload a VDM temporarily, use this command syntax:</p> <pre>\$ nas_server -vdm &lt;vdm_name&gt; -setstate tempunloaded</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <p>To temporarily unload the VDM named Marketing, type:</p> <pre>\$ nas_server -vdm Marketing -setstate tempunloaded</pre>
Output
<pre>id          = 1 name        = Marketing acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_vdm_Marketing I18N mode   = UNICODE mountedfs   = member_of   = status      : defined     = enabled actual      = temporarily unloaded Interfaces to services mapping:</pre>

## Unload a VDM permanently

To get current information about the VDM, perform the task [Display the attributes of a VDM on page 50](#).

Action
<p>To unload a VDM permanently, use this command syntax:</p> <pre>\$ nas_server -vdm &lt;vdm_name&gt; -setstate permunloaded</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <p>To unload the Marketing VDM permanently, type:</p> <pre>\$ nas_server -vdm Marketing -setstate permunloaded</pre>
Output
<pre>id          = 1 name        = Marketing acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_vdm_Marketing I18N mode  = UNICODE mountedfs   = member_of   = status      : defined     = enabled actual      = permanently unloaded Interfaces to services mapping:</pre>

## Rename a VDM

When you rename a VDM, the Control Station sends a command to the Data Mover to modify the VDM name in the Data Mover (server) table.

---

### Note:

Do not try to rename a VDM during a replication failover or suspend operation. Although there are protections to avoid conflicts, it is recommended to wait until the operation is completed.

The name of the root file system for the VDM is also changed.

---

Action
<p>To rename a VDM, use this command syntax:</p> <pre>\$ nas_server -rename &lt;old_movername&gt; &lt;new_movername&gt;</pre> <p>where:</p> <p>&lt;old_movername&gt; = name currently assigned to the VDM</p> <p>&lt;new_movername&gt; = new name for the VDM</p> <p>Example:</p> <p>To change the name of a VDM from HR to Finance, type:</p> <pre>\$ nas_server -rename HR Finance</pre>
Output
<pre>id          = 2 name        = Finance acl         = 0 type        = vdm server      = server_2 rootfs      = root_fs_Finance I18N mode   = UNICODE_ mountedfs   = Fin_user member_of   = standby     = status      : defined     = enabled actual      = loaded, active Interfaces to services mapping:</pre>

## Move a VDM when using different IP addresses

### Before you begin

To move an existing VDM to another Data Mover, perform these tasks:

- ◆ Interfaces with the same name on both Data Movers
- ◆ IP addresses for both interfaces
- ◆ Name resolution configurations on both Data Movers

To verify the VDM, perform these tasks:

- ◆ [Display the attributes of a VDM on page 50](#)
- ◆ [Display the CIFS protocol configuration on page 51](#)
- ◆ [Display the DNS configuration on page 53](#)
- ◆ [Display the time services configuration on page 54](#)

### Procedure

A VDM can be moved when using different IP addresses on the source and target Data Movers. Use the same or different IP addresses on the source and target physical Data Movers.

To move an existing VDM to another Data Mover, perform these tasks:

1. [Configure the target Data Mover on page 61](#)
2. [Configure an interface on page 43](#)
3. [Configure DNS on the target Data Mover on page 62](#)
4. [Configure time services on the target Data Mover on page 63](#)
5. [Start the CIFS service on page 63](#)
6. [Move the VDM to the target Data Mover on page 65](#)

## Configure the target Data Mover

Note: Enclose the option in quotation marks, as in the example mentioned in the table. If you do not use the quotation marks, the command appears to have executed correctly and the link appears as Link Up. However, the link will not work correctly.

Action
<p>To configure the Data Mover, use this command syntax:</p> <pre>\$ <b>server_sysconfig</b> &lt;movername&gt; <b>-virtual -name</b> &lt;device&gt; <b>-create</b> &lt;device_class&gt; <b>-option</b> &lt;option,..&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>&lt;device&gt; = device name</p> <p>&lt;device_class&gt; = device class</p> <p>Example:</p> <p>To configure server_3 as the target Data Mover, type:</p> <pre>\$ <b>server_sysconfig</b> server_3 <b>-virtual -name</b> s3_trk1 <b>-create</b> trk <b>-option</b> <b>device="cge0,cge1,cge2,cge3 protocol=lacp"</b></pre>
Output
<pre>server_3 : done</pre>

## Configure DNS on the target Data Mover

### Before you begin

To get information about the network connectivity of the target Data Mover, perform these tasks:

- ◆ [Display the network connectivity for a Data Mover on page 55](#)
- ◆ [Display the DNS configuration on page 53](#)

### Procedure

Action
<p>To configure DNS on the target Data Mover, use this command syntax:</p> <pre>\$ <b>server_dns</b> &lt;movername&gt; <b>-protocol</b> {tcp udp} &lt;domainname&gt; &lt;ip_addr&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover &lt;domainname&gt; = domain name &lt;ip_addr&gt; = IP address</p> <p>Example:</p> <p>To configure DNS on server_3, type:</p> <pre>\$ <b>server_dns</b> server_3 <b>-protocol</b> udp c1t1.pt1.c3lab.nsgprod.emc.com 172.24.100.183</pre>
Output
<pre>server_3 : done</pre>

### After you finish

To verify the DNS configuration on the target Data Mover, perform these tasks:

- ◆ [Display the DNS configuration on page 53](#)
- ◆ [Display the network connectivity for a Data Mover on page 55](#)

## Configure time services on the target Data Mover

### Before you begin

To view the current time services configuration, perform the task [Display the time services configuration on page 54](#).

### Procedure

Action
<p>To configure time services on the target Data Mover, use this command syntax:</p> <pre>\$ server_date &lt;movername&gt; timesvc start ntp &lt;host&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>&lt;host&gt; = IP address of the time server host</p> <p>Example:</p> <p>To configure time services on server_3 and use the time server host 172.24.100.183, type:</p> <pre>\$ server_date server_3 timesvc start ntp 172.24.100.183</pre>
Output
<pre>server_3 : done</pre>

### After you finish

To verify the time services configuration, perform the task [Display the time services configuration on page 54](#).

## Start the CIFS service

Action
<p>To start the CIFS service, use this command syntax:</p> <pre>\$ server_setup &lt;movername&gt; -Protocol cifs -option start</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>Example:</p> <p>To start the CIFS service on server_3, type:</p> <pre>\$ server_setup server_3 -Protocol cifs -option start</pre>

Output

```
server_3 : done
```

Figure 4 on page 64 shows the DNS server before the VDM is moved to the target Data Mover.

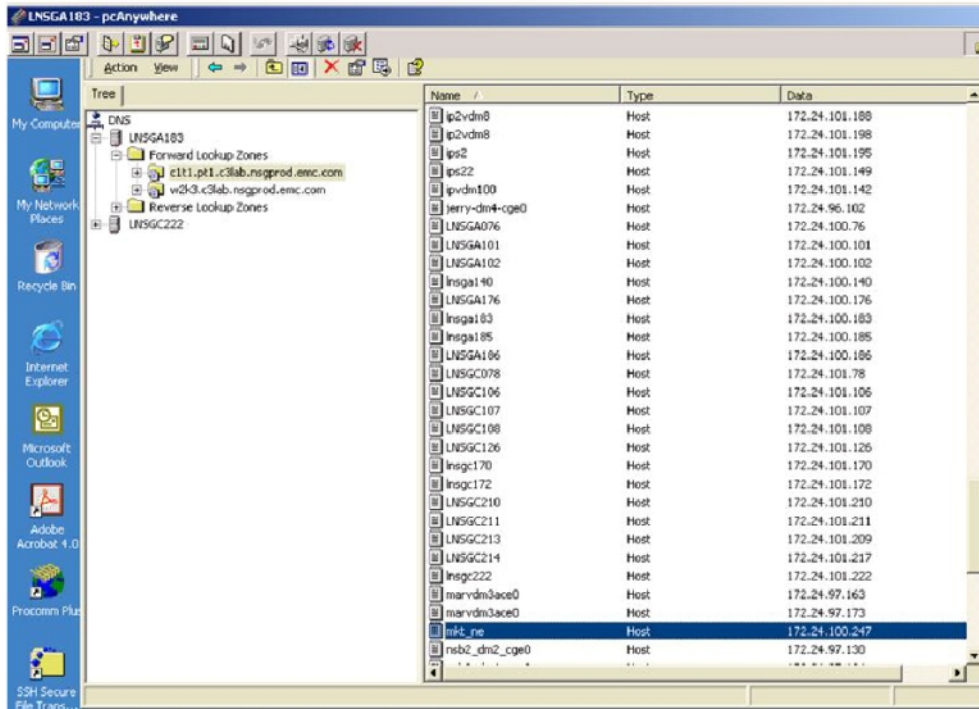


Figure 4. DNS server before VDM move



Figure 5 on page 65 shows the shares to which the CIFS servers have access.

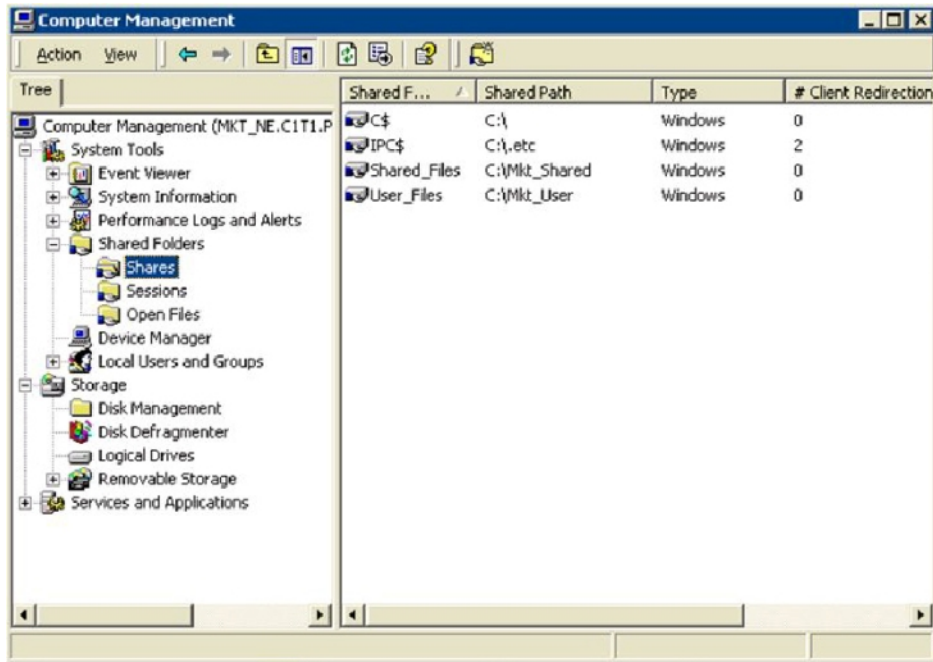


Figure 5. Accessible shares

## Move the VDM to the target Data Mover

### Action

To move the VDM to another Data Mover, use this command syntax:

```
$ nas_server -vdm <vdm_name> -move <movername>
```

where:

<vdm\_name> = name of the VDM

<movername> = name of the target Data Mover

Example:

To move the VDM named Marketing to server\_3, type:

```
$ nas_server -vdm Marketing -move server_3
```

Output

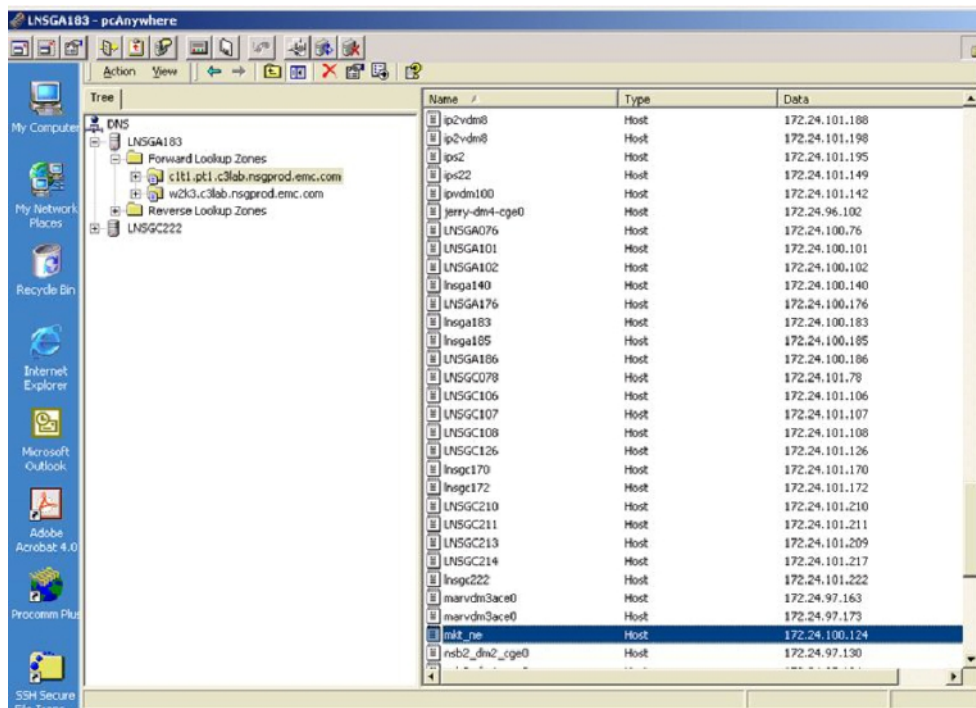
```

id          = 1
name        = Marketing
acl         = 0
type        = vdm
server      = server_3
rootfs      = root_fs_vdm_Marketing
I18N mode   = UNICODE
mountedfs   = Mkt_user, Mkt_shared
member_of   =
status_     :
defined     = enabled
actual      = loaded, active
Interfaces to services mapping:
interface=Mkt :cifs
    
```

**After you finish**

To verify the CIFS configuration, perform the task [Display the CIFS protocol configuration on page 51](#).

[Figure 6 on page 66](#) shows the DNS server after the VDM is moved.



**Figure 6. DNS server after VDM move**

The target interface must be operating before you move the VDM to the target Data Mover. You can use a different IP address for the target Data Mover, as in the last procedure, or keep the same IP address for the VDM interface on the target Data Mover.

## Move a VDM when using the same IP address

### Before you begin

To move an existing VDM to another Data Mover, perform these tasks:

- ◆ Create interfaces with the same name on both Data Movers
- ◆ Assign IP addresses for both interfaces
- ◆ Check the name resolution configurations on both Data Movers

To get current information about the VDM, perform these tasks:

- ◆ [Display the attributes of a VDM on page 50](#)
- ◆ [Display the CIFS protocol configuration on page 51](#)
- ◆ [Display the DNS configuration on page 53](#)
- ◆ [Display the time services configuration on page 54](#)

### Procedure

To keep the same IP address and move a VDM to another Data Mover, perform these tasks:

1. [Take down the interface on the source Data Mover on page 68](#)
2. [Configure an interface on page 43](#)
3. [Move the VDM to the target Data Mover on page 65](#)
4. [Delete the interface on the source Data Mover on page 69](#)

## Take down the interface on the source Data Mover

You must take down the interface on the source Data Mover to keep the same IP address for the interface on the target Data Mover.

### Before you begin

To verify the status of the CIFS environment, perform the task [Display parameters for configured interfaces on page 54](#).

### Procedure

Action
<p>To take down an interface on the source Data Mover, use this command syntax:</p> <pre>\$ <b>server_ifconfig</b> &lt;movername&gt; &lt;if_name&gt; <b>down</b></pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>&lt;if_name&gt; = name of the interface</p> <p>Example:</p> <p>To take down the interface named Mkt on server_2, type:</p> <pre>\$ <b>server_ifconfig server_2 Mkt down</b></pre>
Output
<pre>server_2 : done</pre>

### After you finish

To verify that the source interface is down, perform the task [Display parameters for configured interfaces on page 54](#).

## Delete the interface on the source Data Mover

This procedure is required after moving a VDM when using the same IP address.

Action
<p>To delete an interface on the source Data Mover, use this command syntax:</p> <pre>\$ <b>server_ifconfig</b> &lt;movername&gt; <b>-delete</b> &lt;if_name&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>&lt;if_name&gt; = name of the interface</p> <p>Example:</p> <p>To delete the interface named Mkt on server_2, type:</p> <pre>\$ <b>server_ifconfig</b> <b>server_2</b> <b>-delete</b> <b>Mkt</b></pre>
Output
<pre>server_2 : done</pre>

## Delete a VDM

The delete operation is used only when a system administrator decides to irreversibly remove a VDM. You cannot delete the VDM root file system independently of the VDM. When you delete a VDM, its root file system is also deleted. The deletion includes the entire CIFS configuration (local group and share databases) of the VDM.

### Before you begin

To delete a VDM, unmount all nonroot file systems that are mounted on it.

### Procedure

Action
<p>To delete a VDM, use this command syntax:</p> <pre>\$ nas_server -delete &lt;movername&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the VDM</p> <p>Example:</p> <p>To delete the VDM named Operations, type:</p> <pre>\$ nas_server -delete Operations</pre>
Output
<pre>id          = 3 name       = Operations acl        = 0 type       = vdm server     = rootfs     = root_fs_Operations I18N mode  = UNICODE mountedfs  = member_of  = standby    = status     : defined    = enabled actual     = permanently unloaded Interfaces to services mapping:</pre>

## Use VDMs and NDMP backup

In a CIFS environment that uses VDMs and NDMP backup, you must specify the full path of the file system in the backup application. This path is listed in the output for the **server\_mount** command on the physical Data Mover. *Configuring NDMP Backups to Disk on VNX* provides information about specific backup software vendors.

Action
<p>To display the full path of a file system, use this command syntax:</p> <pre>\$ server_mount &lt;movername&gt;   grep &lt;fs_name&gt;</pre> <p>where:</p> <p>&lt;movername&gt; = name of the Data Mover</p> <p>&lt;fs_name&gt; = name of the file system</p> <p>Example:</p> <p>To display the full path for the file system Mkt_user, type:</p> <pre>\$ server_mount server_2   grep Mkt_user</pre>
Output
<pre>Mkt_user on /root_fs_vdm_Marketing/Mkt_user uxfs,perm,rw</pre>





## VDM for NFS Multiple Domains Solution

This chapter provides information about the VDM for NFS multiple domains solution.

Major topics include:

- ◆ [VDM for NFS Multiple Domains Solution on page 74](#)
- ◆ [Configuring an NFS endpoint in a VDM on page 75](#)
- ◆ [Configure the domain name resolution service on the Data Mover on page 76](#)
- ◆ [Assign an interface to a VDM on page 78](#)
- ◆ [Edit the VDM STATD hostname file on page 79](#)
- ◆ [Manage NFS exports on a VDM on page 81](#)
- ◆ [Manage the domain configuration for a VDM on page 83](#)
- ◆ [VDM local files setup on page 87](#)
- ◆ [Windows-style credential for UNIX users on page 87](#)
- ◆ [VDM resolution behavior on page 88](#)

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## VDM for NFS Multiple Domains Solution

VNX provides a multinaming domain solution for the Data Mover in the UNIX environment by implementing an NFS server per Virtual Data Mover (VDM). The Data Mover hosting several VDMs is able to serve the UNIX clients that are members of different domains, assuming that each VDM works for a unique naming domain. Similar to the CIFS service, several NFS servers are emulated on the Data Mover in order to serve the file system resources of the Data Mover for different naming domains. Each of these NFS servers is assigned to one or more different Data Mover network interfaces.

The following requirements are satisfied by this feature:

- ◆ The same Data Mover supports the NFS service for different LDAP, NIS, and DNS domains.
- ◆ Each domain is served by a different VDM addressed through a subset of network interfaces configured on the Data Mover.
- ◆ The file systems exported by a VDM can be accessed by CIFS, NFSv3, and NFSv4 over TCP protocols. The VDM solution classifies the file system resources. Consequently, only file systems mounted on a VDM can be exported by the VDM.
- ◆ Secure NFS, NFSv2, and NFSv3 over UDP protocols are not supported by this feature.
- ◆ The FTP, SFTP, and FTPS applications are not supported over a VDM. You can enable these applications on the physical Data Mover.

The VDMs loaded on a Data Mover use the network interfaces configured on the Data Mover. You cannot duplicate an IP address for two VDM interfaces configured on the same Data Mover. There is no thread resource allocated for a VDM and all the VDMs loaded on a Data Mover share the thread pool reserved per service.

The multinaming domain solution implements an NFS server named 'NFS endpoint' per VDM. The VDM is used as a container that includes the file systems exported by the NFS Endpoint and or CIFS server. These file systems of the VDM are visible through a subset of the Data Mover network interfaces attached to the VDM. The same network interface can be shared by both CIFS and NFS protocols on that VDM. The NFS endpoint and CIFS server are addressed through the network interfaces attached to that particular VDM.

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**Note:** The multiple domain configuration is optional for a VDM. By default, the VDM functions for the users of the same domain as the Data Mover that hosts the VDM.

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**Note:** You cannot use the Unisphere to configure this feature.

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### VDM NFS exports

You can manage NFS exports per VDM by using the `server_export` command. All the NFS export options for VDM are supported.

The exports created on a VDM can export only file systems mounted on the VDM. The VDM NFS exports are automatically replicated as part of the VDM replication. The VDM NFS endpoint is automatically operational on destination site after the VDM switchover or failover. Moving a VDM from one Data Mover to another moves the whole NFS endpoint, including file systems and NFS exports. This includes the checkpoints on the file systems.

The *EMC VNX Command Line Interface Reference for File* provides more information about NFS exports on VDM.

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## Configuring an NFS endpoint in a VDM

### Before you begin

1. For the naming resolvers (i.e. LDAP, NIS, and DNS), the Data Mover must be configured with the appropriate network interface configuration that allows it to contact the name servers specified in the LDAP, NIS, and DNS client setup (`server_ldap`, `server_nis`, and `server_dns`).

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Note: The `server_checkup` command allows verifying these prerequisites once the LDAP, NIS, and DNS resolvers are configured.

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2. IP addresses must be reserved for network interfaces being attached to the VDM.
3. You must create the user file systems for a fresh installation, or else the existing user file systems will be remounted in the new VDM.

### Procedure

The tasks to configure the VDM for NFS multiple domain solution:

1. Configure the Data Mover network interfaces for the VDM using the `server_ifconfig` command. [Configure an interface on page 43](#) provides more information about this.
2. If the VDM is intended to be configured for a naming space different than that of the Data Mover, then:

Add the appropriate NIS, LDAP, and DNS naming domains to the Data Mover resolvers configuration using the `server_nis`, `server_ldap`, and `server_dns` commands. [Configure the domain name resolution service on the Data Mover on page 76](#) provides more information about this.

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Note: This is an optional task and is required only if the VDM works in a naming space other than that of the Data Mover hosting it.

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3. Create a VDM as described in [Create a VDM on page 32](#).
4. Perform the task [Assign an interface to a VDM on page 78](#).
5. Setup the STATD file for the VDM as described in [Edit the VDM STATD hostname file on page 79](#).

6. Create a user file system if it does not exist. [Create a user file system on page 40](#) provides more information about this.
7. Mount the user file system in the VDM. Refer to [Mount a user file system on page 42](#).
8. Create the VDM export(s) for each user file system(s). Refer to [Manage NFS exports on a VDM on page 81](#).
9. If the VDM user file system(s) must be shared by both NFS and CIFS client machines (mixed environment), then:

Create the CIFS server for the VDM and configure it as described in the [Configuring](#) section of this document.

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**Note:** This step is optional. It is required when the VDM user file system must be accessed by NFS and CIFS clients.

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10. If the VDM is intended to be configured for a naming space different than that of the Data Mover:

Add the appropriate NIS, LDAP, and DNS naming domains to the Data Mover resolvers configuration using the `server_nis`, `server_ldap`, and `server_dns` commands. [Manage the domain configuration for a VDM on page 83](#) provides more information about this.

Configure the VDM local files if needed. Refer to [VDM local files setup on page 87](#).

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**Note:** This is an optional task and is required only if the VDM works in a naming space other than that of the Data Mover hosting it.

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11. If the NFS file access must respect the CIFS group access control for a particular domain in a mixed environment, remount the VDM user file system(s) with the 'ntcredential' mount option. Refer to [Windows-style credential for UNIX users on page 87](#). In other cases, edit the VDM windows registry to specify the Windows default user domain for the NFS access.

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## Configure the domain name resolution service on the Data Mover

The tasks to configure the respective domains on the target Data Mover are:

- ◆ [LDAP domain configuration on page 76](#)
- ◆ [NIS domain configuration on page 77](#)

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### LDAP domain configuration

Action
To configure LDAP on the target Data Mover, use this command syntax:

Action
<pre>\$ <b>server_ldap</b> &lt;movername&gt; [-p] -add {-domain &lt;fqdn&gt;-&lt;basedn&gt; attribute_name=attribute_value [-servers &lt;ipv4_addr&gt;[:&lt;port&gt;]&lt;ipv6_addr&gt;[,&lt;ipv6_addr&gt;[:&lt;port&gt;] [, ...]] [-profile &lt;profilename&gt;]{-file &lt;file_name&gt;&lt;ipv6_addr&gt;}}</pre> <p>where:</p> <p>&lt;mover_name&gt; = name of the Data Mover</p> <p>&lt;ip_addr&gt; = address of an LDAP-based directory server (configuration or service) for the specified domain</p> <p>&lt;base_DN&gt; = base distinguished name for the LDAP-based directory service</p> <p>Example:</p> <p>To configure the LDAP domain configuration on server_3 by using the base distinguished name dc=ds,dc=lcsc at IP address 192.168.67.182, type:</p> <pre><b>server_ldap</b> server_3 -add -p -basedn dc=ds,dc=lcsc -servers 192.168.67.182 -binddn "\"cn=Directory Manager\""</pre>
Output
<pre>server_3: Enter Password:***** done</pre>

Note: When used for the first time, the **server\_ldap** configures the original unique domain, using the **-set** option. The **-add** option allows adding more domains, otherwise the supplied domains replaces the current domain.

The *EMC VNX Command Line Interface Reference for File* provides more information about tasks related to LDAP configuration.

## NIS domain configuration

You can run the **server\_nis** command with the **-add** option, by specifying the domain name and up to 10 IP server addresses. The **-add** option allows you to extend the configuration to more than one domain.

When used for the first time, the **server\_nis** configures the original unique domain. You must use the **-add** option to add more domains, otherwise the supplied domain replaces the current one. The subsequent operations for the NIS domain require the domain name specification.

Action
<p>To configure NIS on the target Data Mover, use this command syntax:</p> <pre>\$ <b>server_nis</b> &lt;mover_name&gt; -add &lt;domain_name&gt; &lt;ip_addr&gt;[, ...]</pre> <p>where:</p> <p>&lt;mover_name&gt; = name of the Data Mover</p>

Action
<p>&lt;domain_name&gt; = name of the NIS domain</p> <p>&lt;ip_addr&gt; = address of a NIS server (configuration or service) for the specified domain</p> <p>Example:</p> <p>To configure the NIS domain configuration on server_2 for the specified domain, type:</p> <pre>\$ server_nis server_2 -add nasdocs 172.24.102.30</pre>
Output
<pre>server_2: done</pre>

The *EMC VNX Command Line Interface Reference for File* provides more information about the tasks related to the NIS domain configuration.

## Assign an interface to a VDM

You can explicitly assign one or more Data Mover network interfaces subsets to a VDM for hosting a NFS endpoint. You can apply these on a loaded VDM that has been previously created.

The following task describes the method to assign one or more interfaces to a VDM:

[Attach one or more interfaces to a VDM on page 78](#)

## Attach one or more interfaces to a VDM

To attach one or more interfaces to a VDM, the VDM must be in a loaded state. The network interface being attached to the VDM must exist. Use the `server_ifconfig` command to create the interface for the VDM.

Action
<p>To attach one or more interfaces to a VDM, use this command syntax:</p> <pre>\$ nas_server -vdm &lt;vdm_name&gt; -attach &lt;if_name&gt;[, ...]</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>&lt;if_name&gt; = name of the interface</p> <p>Example:</p> <p>To attach network interfaces to vdm1, type:</p> <pre>\$ nas_server -vdm vdm1 -attach vdm1if1,vdm1if2</pre>
<p><b>Note:</b> It is assumed that the network interfaces vdm1if1 and vdm1if2 exist and they are not attached to another VDM.</p>

## Output

```

id          = 43
name        = vdm1
acl         = 0
type        = vdm
server      = server_2
rootfs      = root_fs_vdm_vdm1
I18N mode   = UNICODE
mountedfs   =
member_of   =
status_     :
defined     = enabled
actual      = loaded, ready
Interfaces to services mapping:
interface=vdm1lif1 :vdm
interface=vdm1lif2 :vdm

```

When you attach the interfaces to the VDM:

- ◆ A network interface cannot be shared by two different VDMs at the same time.
- ◆ If an interface is attached to a loaded VDM with the **nas\_server** command, then only a CIFS server created for the same VDM can share this interface with NFS.
- ◆ If an interface is first attached to a CIFS server member of the physical Data Mover, then the **nas\_server** command cannot attach this interface to a loaded VDM.
- ◆ For backward compatibility with the systems prior to 7.0.50, the NFS clients that are connected to an interface which is not attached to a VDM with the **nas\_server** command, have access to the NFS exports of the physical Data Mover. This access is possible even if these interfaces are assigned to a CIFS server member of a loaded VDM.
- ◆ The NFS clients accessing the interfaces have access to the file system through the exports configured on the VDM.
- ◆ The persistent VDM configuration is updated on the VDM root file system.
- ◆ The system administration prevents the deletion of a VDM attached interface when the **server\_ifconfig -delete** command is issued.
- ◆ This operation can be run successfully several times without any change.

## Edit the VDM STATD hostname file

The STATD daemon is invoked upon a system reboot. One role of this daemon is to notify the NFSv2 and NFSv3 clients about the NFS server reboot in order to offer the possibility to restore in priority the file locks that the clients hold before the server reboot. This stage is limited to 45 seconds (by default) and it is commonly named as NLM grace period. The clients recognize the sender of the statd notifications by the hostname specified in the message. This hostname is supposed to match the hostname and alias(es) used by the clients when they connect to the NFS server.

By default, the NFS server notifies with its local hostname that is `server_x` for a Data Mover. This hostname is private to the VNX administration and generally doesn't make sense for the NFS clients. You can change the Data Mover hostname using the `server_name` command, but only one hostname can be specified. The clients commonly use the NFS server hostname that is resolved from the NIS, DNS, or LDAP servers of the domain.

The Data Mover has no way to discover the hostname used by the clients. Also, the clients may have connected the server from several interfaces. To solve this issue, the Data Mover uses the parameter `'statd.hostname'` which includes the list of hostnames to fill in the statd notification messages. This parameter is global to the Data Mover. It cannot be used for all the VDMs hosted on the Data Mover because each VDM should notify a different hostname for the attached interface(s).

By default, the VDM notifies the VDM name that is managed with the `nas_server` command. The new file named `'.etc/hostname'`, stored in the VDM root file system, allows the administrator to specify the hostname(s) per VDM that must be used for server reboot notifications.

The administrator has to create a file to specify one or multiple hostnames per VDM, one name per line. The comments start with `"#"` and empty lines are allowed.

For example:

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Note: Parameter and facility names are case-sensitive.

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The NFS clients connect the VDM interface using the hostname `'nfsvdm1'`.

Steps to specify the STATD hostname for VDM1 are:

1. Open the vi editor. Type:

```
$ vi hostname
```

By default, you are in command mode.

2. Switch to insert mode, by pressing the `"i"` key. Then type the text of the file in the given format:

```
# hostname : List of possible nfs server host names
# These host names are used by the datamover/vdm after reboot/load
# to build statd notifications to clients that hold some file locks.
#
nfs_server_name1
nfsvdm1
```

Press `"Escape"` to return to command mode.

3. To save the file and exit the vi editor, type:

```
:wq!
```

This gets you back to the UNIX prompt.

4. To display the content of the file, type: .

```
$ cat hostname
```



```
# hostname : List of possible nfs server host names
# These host names are used by the datamover/vdm after reboot/load
# to build statd notifications to clients that hold some file locks.
#
nfs_server_name1
nfsvdm1
```

Once the file is edited, the file must be put on the VDM root file system using the **server\_file** command.

- Put the file on VDM vdm1 root file system **server\_file** `<vdm_name> -put <src_file> <dst_file>`

where:

`<vdm_name>` = name of the VDM

`<src_file>` = filename on CS side

`<dst_file>` = filename on dart side which must be "hostname"

Example:

```
$ server_file vdm1 -put hostname hostname
```

Output

```
vdm1: done
```

## Manage NFS exports on a VDM

You can manage the NFS exports per VDM by using the **server\_export** command. The file systems are mounted on the VDM in a similar way as that of the Data Mover. The VDM file systems are visible as mounted on the Data Mover. [Chapter 3](#) and [Chapter 4](#) explain how to manage VDM user file systems.

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Note: All the export options are supported except the Kerberos options of krb5, krb5i, and krb5p. These options must not be used for a VDM NFS export.

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The tasks to manage NFS exports on a VDM are:

- [Create NFS export on a VDM on page 82](#)
- [Unexport an NFS export from a VDM on page 82](#)
- [Query the NFS export list on a VDM on page 83](#)

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Note: The NFS exports on a VDM are managed in a similar way as you manage the NFS exports on a physical Data Mover.

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## Create NFS export on a VDM

Action
<p>To create an NFS export on a VDM, use this command syntax:</p> <pre>\$ <b>server_export</b> &lt;vdm_name&gt; <b>-P nfs</b> [<b>-option options</b>] &lt;pathname&gt;</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>&lt;pathname&gt; = path to the mount point</p> <p>Example:</p> <p>To create an NFS export on vdm1, type:</p> <pre>\$ <b>server_export</b> vdm1 <b>-P nfs</b> /fs42</pre> <p>Note: The above example assumes a file system is mounted on the /fs42 VDM mount point.</p>
Output
vdm1: done

## Unexport an NFS export from a VDM

Action
<p>To unexport an NFS path from a VDM, use this command syntax:</p> <pre>\$ <b>server_export</b> &lt;vdm_name&gt; <b>-P nfs -unexport</b> [<b>-perm</b>] &lt;pathname&gt;</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>&lt;pathname&gt; = the NFS export pathname</p> <p>Example:</p> <p>To permanently unexport the /ufs1 NFS path, type:</p> <pre>\$ <b>server_export</b> vdm1 <b>-Protocol nfs -unexport -perm</b> /ufs1</pre>
Output
vdm1: done

## Query the NFS export list on a VDM

Action
<p>To query the NFS export for a VDM, use this command syntax:</p> <pre>\$ server_export &lt;vdm_name&gt; -P nfs -list -all</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <pre>\$ server_export vdm1 -P nfs -list -all</pre>
Output
<pre>vdm1 : export "/fs42"</pre>

Note: The /fs42 export is only visible when you connect to the interfaces attached to the VDM.

## Manage the domain configuration for a VDM

In a multiple domain environment, you can configure each VDM for a particular naming space. A VDM configured with one or more attached interfaces hosts a NFS endpoint that can work for a domain different than the one configured on the Data Mover. The naming space configuration is specified per VDM by using the `server_nsdomains` command. By default, the VDM domain configuration is disabled. The VDM works with the same naming space as the Data Mover that hosts it. The name resolution becomes confined to the VDM when the VDM domain configuration is enabled by using the `server_nsdomains` command.

When you enable the domain configuration for a VDM:

- ◆ The local VDM .etc files `nsswitch.conf`, `hosts`, `passwd`, `group`, `netgroup` replace the Data Mover .etc files.
- ◆ The VDM works exclusively with the NIS, LDAP, DNS resolvers specified with `server_nsdomains`. No domain defined for a resolver means the VDM does not use a resolver.
- ◆ The NFSv4 domain specified with `server_nsdomains` replaces the global Data Mover parameter 'nfsv4.domain'.
- ◆ The Unix NTCredentialdomain specified by a VDM Windows registry key replaces the global Data Mover parameter 'nfs.NTcred.winDomain'.

You can perform the following tasks to manage the domain configuration for a VDM:

1. [Query the domain configuration for a VDM on page 84](#)

2. [Enable the domain configuration for a VDM on page 84](#)
3. [Configure the domain on a VDM on page 85](#)
4. [View the domain configuration for a VDM on page 86](#)
5. [Disable the domain configuration for a VDM on page 86](#)

## Query the domain configuration for a VDM

The VDM must be in the loaded state.

Action
<p>To query the domain configuration for a VDM, use this command syntax:</p> <pre>\$ <b>server_nsdomains</b> &lt;vdm_name&gt;</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <p>To query the domain configuration for vdm1, type:</p> <pre>\$ <b>server_nsdomains</b> vdm1</pre>
Output
<pre>vdm1 :   NSDOMAINS CONFIGURATION = Disabled</pre>

## Enable the domain configuration for a VDM

This operation confines the naming service resolution to the VDM domains configured with the `server_nsdomains` command.

Action
<p>To enable the domain configuration for a VDM, use this command syntax:</p> <pre>\$ <b>server_nsdomains</b> &lt;vdm_name&gt; <b>-enable</b></pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <p>To enable the domain configuration for vdm1, type:</p> <pre>\$ <b>server_nsdomains</b> vdm1 <b>-enable</b></pre>

## Output

```
vdm1 : done
```

## Configure the domain on a VDM

To configure a domain on the VDM, the VDM must be in the loaded state.

## Action

To configure the NIS domain on the target VDM, use this command syntax:

```
$ server_nsdomains <vdm_name> -set -resolver <resolver>=<value> [-resolver <resolver>=<value>...]
```

```
$ server_nsdomains <vdm_name> -set -resolver <resolver>=<value>[resolver, re
solver=<value>...]
```

where:

<vdm\_name> = name of the VDM

<resolver> = domain name

Example:

To enable the domain configuration on vdm1, type:

```
server_nsdomains vdm1 -set -resolver NIS=emclab -resolver LDAP=eng.lcsc -resolver
DNS=italie.lcsc -resolver NFSV4=eng.emc.com
```

## Output

```
vdm1: done
```

Note: You can configure single or multiple resolver domain names for a VDM. You must specify the respective domain name and the resolver value. The VDM domain configuration includes the NIS, LDAP, DNS, and NFSv4 domains specifications. The supported resolver keywords are 'NIS', 'LDAP', 'DNS,' and 'NFSV4'. The value for each keyword is the appropriate domain name: An NIS domain name for the NIS resolver, a LDAP domain or Base Distinguished Name (Base DN) for the LDAP resolver, a Full Qualified Domain Name (FQDN) for the DNS resolver, and NFSv4 domain name for the NFSv4 resolver.

Note: The **server\_nsdomains** command is used to set up the name service domains. Therefore, you need to specify the domain name. You cannot specify the name server IP address. This setup is specified in the LDAP, NIS, and DNS Data Mover resolvers configuration by using the **server\_nis**, **server\_ldap**, and **server\_dns** commands respectively.

## View the domain configuration for a VDM

The VDM uses the local VDM hosts file (if it exists) and only the NIS domain name to resolve the names for CIFS and NFS services.

Action
<p>To query the domain configuration for the VDM, use this command syntax:</p> <pre>\$ <b>server_nsdomains</b> &lt;vdm_name&gt;</pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <p>To query the domain configuration for vdm1, type:</p> <pre>\$ <b>server_nsdomains</b> vdm1</pre>
Output
<pre>vdm1 : NSDOMAINS CONFIGURATION = Enabled  NIS domain      : emclab LDAP domain     : eng.lcsc DNS domain      : italie.lcsc NFSV4 domain    : eng.emc.com</pre>

## Disable the domain configuration for a VDM

Action
<p>To disable the domain configuration for a VDM, use this command syntax:</p> <pre>\$ <b>server_nsdomains</b> &lt;vdm_name&gt; <b>-disable</b></pre> <p>where:</p> <p>&lt;vdm_name&gt; = name of the VDM</p> <p>Example:</p> <p>To disable the domain configuration for vdm1, type:</p> <pre>\$ <b>server_nsdomains</b> vdm1 <b>-disable</b></pre>
Output
<pre>vdm1 :   NSDOMAINS CONFIGURATION = Disabled</pre>

---

Note: When you disable the domain configuration on a VDM, the naming services work with Data Mover etc files and the Data Mover domain configuration. In that case, the VDM uses the same NIS, LDAP, NFSv4, and DNS domains as for the Data Mover.

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Note: The `server_nsdomains` command can be also performed on the physical Data Mover when several NIS, LDAP or DNS domains are configured in the Data Mover resolvers. Otherwise, the Data Mover will use the first LDAP or NIS domain configured in the resolvers.

---

## VDM local files setup

Similar to the Data Mover, the VDM may use local files as a source of resolution for hostnames, users, groups, and netgroups. The `nsswitch.conf` file can also be defined per VDM. This file allows the user to specify a name resolution strategy that is different than the one used by the Data Mover housing the VDM. The content of these files is conformed to the UNIX specification. The content of these VDM files is taken into account once the VDM domain configuration is enabled. Otherwise, the VDM uses the content of the Data Mover files.

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Note: The local files are installed with the `server_file` command. The `server_user` command allows managing the `passwd` file only for the physical Data Mover. Therefore, the `passwd` file for the VDM must be edited on the Control Station side and installed with the `server_file` command.

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*Configuring Naming Services on VNX* provides more information about local files and their applications.

## Windows-style credential for UNIX users

The VDM multiple domain feature impacts the Windows-style credential for UNIX users. In order to support the NFS NTcredential domain for this feature, the following Windows registry entry is used to specify an equivalent parameter per VDM value. The 'nfs.NTcred.winDomain' global parameter is replaced with the Windows registry key.

```
[HKEY_LOCAL_MACHINE\Software\EMC\UnixNTCredential]
"NetbiosDomainName" = "<domain_name>"
```

When the VDM name resolution is confined to the VDM, the `nfs NTcred` feature uses the Windows domain specified in the VDM registry. Accordingly, a CIFS server member of this domain must be configured in the VDM and joined to the appropriate CIFS domain user to allow NFS access using a CIFS user credential.

*Managing a Multiprotocol Environment on VNX* provides more information about Windows-style credential for UNIX users.

## VDM resolution behavior

summarizes the naming services rules applied to a VDM based on the VDM domain configuration. The VDM name resolution is explicitly specified in the VDM resolution operation.

**Table 4. VDM name resolution behavior**

VDM resolution operation	The VDM domain configuration is disabled (Default behavior after installation)	The VDM domain configuration is enabled
Nsswitch rules applied	Rules defined in the Data Mover nsswitch.conf file.	Rules defined in the VDM nsswitch.conf file.
Local files query	Data Mover files content.	VDM files content.
NIS query	The first NIS domain configured in the NIS client.	The NIS domain specified in the VDM domain configuration.
LDAP query	The first LDAP domain configured in the LDAP client.	The LDAP domain specified in the VDM domain configuration.
DNS query	The DNS domain configured in the DNS client matching the requested FQDN.	The DNS domain specified in the VDM domain configuration.
NFS NT credential domain	The global dart parameter nfs.NTcred.win-Domain specifies the Windows domain user for the NFS access.	The Windows domain specified in the VDM Windows Registry replaces the parameter nfs.NTcred.winDomain.
NFSv4 domain	The global dart parameter nfsv4.domain specifies the NFSv4 domain.	The NFSv4 domain specified in the VDM domain configuration replaces the parameter nfsv4.domain.



As part of an effort to continuously improve and enhance the performance and capabilities of its product lines, EMC periodically releases new versions of its hardware and software. Therefore, some functions described in this document may not be supported by all versions of the software or hardware currently in use. For the most up-to-date information on product features, refer to your product release notes.

If a product does not function properly or does not function as described in this document, please contact your EMC Customer Support Representative.

Topics included are:

- ◆ [EMC E-Lab Interoperability Navigator on page 90](#)
- ◆ [VNX user customized documentation on page 90](#)
- ◆ [Troubleshooting CIFS server accessibility errors on page 90](#)
- ◆ [Troubleshooting VDM unloading errors on page 90](#)
- ◆ [Error messages on page 90](#)
- ◆ [EMC Training and Professional Services on page 91](#)

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## EMC E-Lab Interoperability Navigator

The EMC E-Lab™ Interoperability Navigator is a searchable, web-based application that provides access to EMC interoperability support matrices. It is available on the EMC Online Support website at <http://Support.EMC.com>. After logging in, locate the applicable Support by Product page, find **Tools**, and click **E-Lab Interoperability Navigator**.

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## VNX user customized documentation

EMC provides the ability to create step-by-step planning, installation, and maintenance instructions tailored to your environment. To create VNX user customized documentation, go to: <https://mydocs.emc.com/VNX>.

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## Troubleshooting CIFS server accessibility errors

When no accessible CIFS servers are found, verify the state of the VDM. If the VDM is in the mounted state, try changing the VDM to the loaded state before verifying the CIFS servers again.

Troubleshoot this error by performing these tasks:

1. [Display the CIFS protocol configuration on page 51](#)
2. [Display the attributes of a VDM on page 50](#)
3. [Change the VDM state on page 56](#)
4. [Display the attributes of a VDM on page 50](#)

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## Troubleshooting VDM unloading errors

When temporarily unloading a VDM, there are file systems mounted on the VDM. You cannot unload a VDM with mounted file systems.

Troubleshoot this error by performing these tasks:

1. [Display a list of mounted or temporarily unmounted file systems on page 52](#)
2. [Display the attributes of a VDM on page 50](#)
3. [Unload a VDM temporarily on page 57](#)

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## Error messages

All event, alert, and status messages provide detailed information and recommended actions to help you troubleshoot the situation.

To view message details, use any of these methods:

- ◆ Unisphere software:
  - Right-click an event, alert, or status message and select to view Event Details, Alert Details, or Status Details.
- ◆ CLI:
  - Type `nas_message -info <MessageID>`, where `<MessageID>` is the message identification number.
- ◆ *Celerra Error Messages Guide*:
  - Use this guide to locate information about messages that are in the earlier-release message format.
- ◆ EMC Online Support website:
  - Use the text from the error message's brief description or the message's ID to search the Knowledgebase on the [EMC Online Support](#) website. After logging in to EMC Online Support, locate the applicable **Support by Product** page, and search for the error message.

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## EMC Training and Professional Services

EMC Customer Education courses help you learn how EMC storage products work together within your environment to maximize your entire infrastructure investment. EMC Customer Education features online and hands-on training in state-of-the-art labs conveniently located throughout the world. EMC customer training courses are developed and delivered by EMC experts. Go to the EMC Online Support website at <http://Support.EMC.com> for course and registration information.

EMC Professional Services can help you implement your system efficiently. Consultants evaluate your business, IT processes, and technology, and recommend ways that you can leverage your information for the most benefit. From business plan to implementation, you get the experience and expertise that you need without straining your IT staff or hiring and training new personnel. Contact your EMC Customer Support Representative for more information.



## C

### ***CIFS server***

Logical server that uses the CIFS protocol to transfer files. A Data Mover can host many instances of a CIFS server. Each instance is referred to as a CIFS server.

### ***CIFS service***

CIFS server process that is running on the Data Mover and presents shares on a network as well as on Microsoft Windows-based computers.

### ***Control Station***

Hardware and software component of VNX for file that manages the system and provides the user interface to all VNX for file components.

## M

### ***Multi-Path File System (MPFS)***

VNX for file feature that allows heterogeneous servers with MPFS software to concurrently access, directly over Fibre Channel or iSCSI channels, shared data stored on a EMC Symmetrix or VNX for block storage system. MPFS adds a lightweight protocol called File Mapping Protocol (FMP) that controls metadata operations.

### ***multibyte support***

Generic term for encoding schemes for characters that may require more than one byte.

## V

### ***Virtual Data Mover (VDM)***

VNX for file software feature that enables users to administratively separate CIFS servers, replicate CIFS environments, and move CIFS servers from one Data Mover to another.



**A**

attributes of VDM, displaying 50

**C**

cautions 12

changing VDM state 56

CIFS servers

  creating in VDMs 44

  creating shares in VDMs 46

  displaying configuration 51

  joining to domain 45

  troubleshooting 90

concepts 16

configuring

  interface on Data Mover 43

converting VDM from ASCII to Unicode 47

creating

  CIFS servers in VDMs 44

  mount point for user file system 41

  shares for CIFS servers in VDM 46

  slice for VDM root file system 33

  VDMs 32

  VDMs by using default values 32

**D**

displaying

  CIFS protocol configuration 51

  mounted or temporarily unmounted file systems 52

  network connectivity for Data Mover 55

  parameters for interfaces 54

  server table for VDM 50

  VDM attributes 50

domain, join CIFS servers 45

**E**

EMC E-Lab Navigator 90

error messages 90

**F**

file systems

  displaying mounted or temporarily unmounted 52

  mounting 41, 42

**H**

hardware requirements 10

**I**

I18N 47

interfaces

  configuring 43

  displaying parameters 54

interfaces, user 12

internationalization mode 47

**J**

joining CIFS servers to domain 45

**M**

messages, error 90

mounted file systems, displaying 52

mounting user file systems 42

MPFS restrictions 11

## N

network connectivity, displaying 55  
network requirements 10

## R

renaming VDMs 59  
requirements, system 10  
restrictions 10

## S

server table, displaying 50  
shares, creating for VDM CIFS servers 46  
software requirements 10  
state of VDM, changing 56  
storage requirements 10  
system requirements 10

## T

temporarily unmounted file systems, displaying 52  
troubleshooting  
    CIFS server accessibility errors 90  
    unloading VDMs 90

## U

Unicode mode 47

unloading VDM  
    permanently 58  
    temporarily 57  
user interface choices 12

## V

VDMs  
    changing states 56  
    concepts 16  
    creating 32  
    creating CIFS servers 44  
    displaying information 50  
    internationalization mode 47  
    querying 50  
    renaming 59  
    unloading permanently 58  
    unloading temporarily 57  
verifying  
    CIFS shares in VDM 46  
    size of root file system 37  
VNX 9  
VNX Data Migration Service 10  
VNX Replicator 21

## W

warnings 12