VERITAS NetBackup™ 3.4 for NDMP

System Administrator's Guide

June 2000
100-001492

VERITAS

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Printed in the USA, June 2000.

VERITAS NetBackup for NDMP System Administrator's Guide.

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Contents

About This Guide

This guide explains how to install, configure, and use VERITAS NetBackup for NDMP (Network Data Management Protocol). In this guide, VERITAS NetBackup is referred to as NetBackup.

Audience

This guide is intended for the system administrator responsible for installing, configuring, and using NetBackup for NDMP, and assumes a thorough working knowledge of how to administer both NetBackup and the NDMP host platform.

Organization

- Chapter 1, "Introduction to NetBackup for NDMP," is an overview of the NetBackup for NDM capabilities and includes an explanation of NDMP terminology.
- Chapter 2, "Installing NetBackup for NDMP," explains installation prerequisites and how to install NetBackup for NDMP on Windows NT/2000 and UNIX hosts.
- Chapter 3, "Configuring NetBackup for NDMP," explains how to configure your system to use NetBackup for NDMP. This chapter supplements the information in the *NetBackup System Administrator's Guides* (both Windows NT/2000 and UNIX).
- Chapter 4, "Using NetBackup for NDMP," explains how to back up and restore NetBackup for NDMP classes, and includes a section on troubleshooting. This chapter supplements the information in the *NetBackup System Administrator's Guides* (both Windows NT/2000 and UNIX).
- Appendix A, "set_ndmp_attr," describes the `set_ndmp_attr` command.
- Appendix B, "Auspex 4Front NS2000 Servers," contains supplemental information on installing and configuring Auspex NS2000.
- Appendix C, "Network Appliance File Servers," contains supplemental information on installing and configuring NetApp file servers from Network Appliance Inc.
- Appendix D, "EMC Celerra File Servers," contains supplemental information on configuring EMC Celerra file servers.

Related Manuals

See the following manuals if you are using and administrating NetBackup for NDMP on a UNIX host:

- *NetBackup Release Notes*

  Provides other important information such as the platforms and operating systems that are supported and operating notes that are not in the manuals.

- *Media Manager Device Configuration Guide*

  Provides information about configuring storage devices on UNIX systems.

- *NetBackup System Administrator's Guide - UNIX*

  Explains how to configure and manage NetBackup.

- *NetBackup User's Guide - UNIX*

  Explains how to perform backups, restores, and archives.

- *Media Manager System Administrator's Guide - UNIX*

  Explains how to configure and manage the storage devices and media that NetBackup servers use for backups.

- *NetBackup Troubleshooting Guide - UNIX*

  Provides troubleshooting information for the NetBackup product.

See the following manuals if you are using and administrating NetBackup for NDMP on a Windows NT/2000 host:

- *NetBackup Release Notes*

  Provides important information about platforms and operating systems that are supported and operating notes that are not in the manuals.

- *NetBackup System Administrator's Guide - Windows NT/2000*

  Explains how to configure and manage NetBackup.

- *NetBackup User's Guide - Windows NT/2000*

  Explains how to perform backups, restores, and archives.

- *Media Manager System Administrator's Guide - Windows NT/2000*

  Explains how to configure and manage the storage devices and media that NetBackup servers use for backups.

- *NetBackup Troubleshooting Guide - Windows NT/2000*

  Provides troubleshooting information for the NetBackup product.

For more information about NDMP, see the following web site:

`http://www.ndmp.org`

Conventions

The following explains typographical and other conventions used in this guide.

Type Style

Table 1. Typographic Conventions

Typeface	Usage
`Bold fixed width`	Input. For example, type **`cd`** to change directories.
`Fixed width`	Paths, commands, filenames, or output. For example: The default installation directory is `/opt/VRTSxx`.
Italics	Book titles, new terms, or used for emphasis. For example: *Do not* ignore cautions.
Sans serif (italics)	Placeholder text or variables. For example: Replace *filename* with the name of your file.
Sans serif (no italics)	Graphical user interface (GUI) objects, such as fields, menu choices, etc. For example: Enter your password in the Password field.

Notes and Cautions

Note This is a Note and is used to call attention to information that makes it easier to use the product or helps you to avoid problems.

Caution This is a Caution and is used to warn you about situations that can cause data loss.

Key Combinations

Some keyboard command sequences use two or more keys at the same time. For example, you may have to hold down the Ctrl key before you press another key. When this type of command is referenced, the keys are connected by plus signs. For example:

Press Ctrl+t

Command Usage

The following conventions are frequently used in the synopsis of command usage.

brackets [ ]

The enclosed command line component is optional.

Vertical bar or pipe (|)

Separates optional arguments from which the user can choose. For example, when a command has the following format:

`command` *arg1*|*arg2*

the user can use either the *arg1* or *arg2* variable.

Getting Help

For updated information about this product, including system requirements, supported platforms, supported peripherals, and a list of current patches available from Technical Support, visit our web site:

`http://www.veritas.com/`

For product assistance, contact VERITAS Customer Support.

US and Canadian Customers: 1-800-342-0652

International Customers: +1 (650) 335-8555

VERITAS Customer Support can also be reached through electronic mail at:

`support@veritas.com`

Introduction to NetBackup for NDMP 1

NetBackup for NDMP is a separately priced application that enables NetBackup to use the Network Data Management Protocol (NDMP) to control backups and restores on an NDMP host.

NetBackup for NDMP Features

NetBackup for NDMP includes the following features:

- High speed local backup of an NDMP host

  Backup data travels between disk and tape drives attached directly to the same NDMP host. This provides high-speed backup without increasing network traffic.

- Backup of an NDMP host on the network to a tape device on another NDMP host

  Backup data travels across the network, from a disk on one NDMP host to tape on another NDMP host (this is referred to as *three-way backup*). This is available only with NDMP hosts that support three-way backup.

- Centralized backup-policy management

  Scheduling, catalog management, and other backup tasks are managed from a NetBackup master server. NetBackup for NDMP can be installed on a NetBackup master or media server.

- Device and media management

  NetBackup Media Manager software provides total management and control of the devices and media used for backups and restores of NDMP hosts.

- Shared robots

  Robots can be shared between NDMP hosts and NetBackup servers, or between multiple NDMP hosts. Robotic control can be on an NDMP host or on a NetBackup server.

  If the robot is a Tape Library DLT (TLD) or Tape Library 8MM (TL8) robot, some of the tape drives can attach to NDMP hosts and other drives can attach to NetBackup servers.

NetBackup for NDMP Terminology

This section introduces NetBackup for NDMP terminology.

NDMP (Network Data Management Protocol)

NDMP is an open standard protocol through which an NDMP-compliant backup application can control the backups and restores for an NDMP host.

NDMP Host

An NDMP host runs an NDMP server application.

These hosts are single-purpose products designed to provide fast, simple, reliable, and cost effective data storage to workstations and servers in the network or across the Internet.

In a NetBackup configuration, the NDMP host is considered a client of NetBackup. However, NetBackup client software is not installed on an NDMP host.

NDMP Server Application

An NDMP server application runs on an NDMP host and executes backup, restore, and device control commands that it receives from an NDMP-compliant backup application. An NDMP-compliant backup application (in this case, NetBackup) is considered an NDMP client.

A separate instance of an NDMP server application exists for each connection to an NDMP client. That is, if two backups are in progress, an instance of an NDMP server application exists for each backup.

NDMP Client

An NDMP client is an NDMP-compliant backup application that is a client of an NDMP server application. An NDMP client sends commands to the NDMP server application to control the backups and restores on an NDMP host.

NetBackup for NDMP is an application that allows NetBackup to be an NDMP client.

NetBackup for NDMP Server

A NetBackup for NDMP server is a NetBackup master or media server that has NetBackup for NDMP installed on it.

NDMP Storage Unit

An NDMP storage unit stores the backup data for an NDMP host. The tape drives in this storage unit always attach directly to the NDMP host and cannot be used to store data for non-NDMP hosts.

Three-Way Backup/Restore

In a three-way backup or restore, data travels between an NDMP host and a storage device that is attached to another NDMP host on the network. This contrasts with local NDMP backup/restore, where the data travels between an NDMP host's disk and a storage device directly attached to the same NDMP host.

Alternate Client Restore

In an alternate client restore, files are restored to a client other than the one from which they were originally backed up. In NetBackup for NDMP, this means the restore data travels from an NDMP host with a locally attached storage device to another NDMP host on the network.

Technical Overview

This section describes how NetBackup works with NDMP hosts:

- NDMP (Network Data Management Protocol)

  An overview of NDMP in a NetBackup configuration.

- NetBackup for NDMP

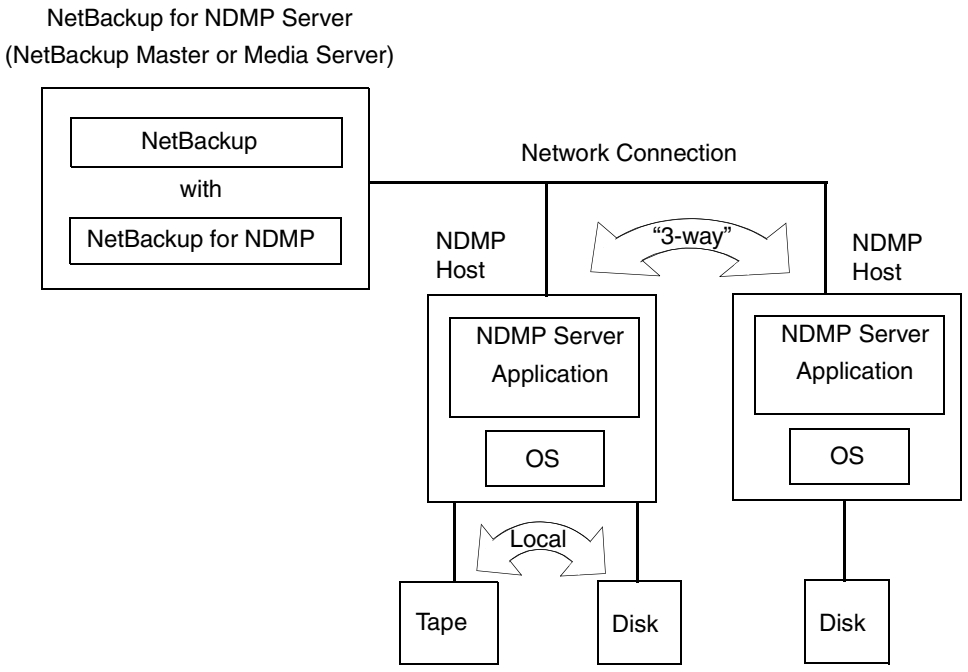
  An overview of NDMP classes, NDMP storage units, and NetBackup processes for backing up and restoring clients in an NDMP class.

NDMP (Network Data Management Protocol)

NDMP is an open standard protocol through which an NDMP-compliant backup application can control the backups and restores of any NDMP host that is running an NDMP server application.

Figure 1 shows an example of NDMP architecture in a NetBackup configuration.

Figure 1. NDMP Architecture



NDMP architecture follows the client/server model.

- The NetBackup master or media server that has NetBackup for NDMP installed is called a NetBackup for NDMP server.
- The host where the NDMP server application resides is called an NDMP host.
- The backup software (NetBackup, in this instance) is a client of the NDMP server application. NetBackup for NDMP is the application that allows NetBackup to be an NDMP client.

The NDMP server application performs backups and restores of the NDMP host, as directed by commands that it receives from an NDMP client (in this example, NetBackup). During a *local* backup or restore, the data travels between the NDMP host's disk and its locally attached storage devices. During a *three-way* backup or restore, the data travels over the network, between an NDMP host and a storage device that is attached to another NDMP host configured on the network.

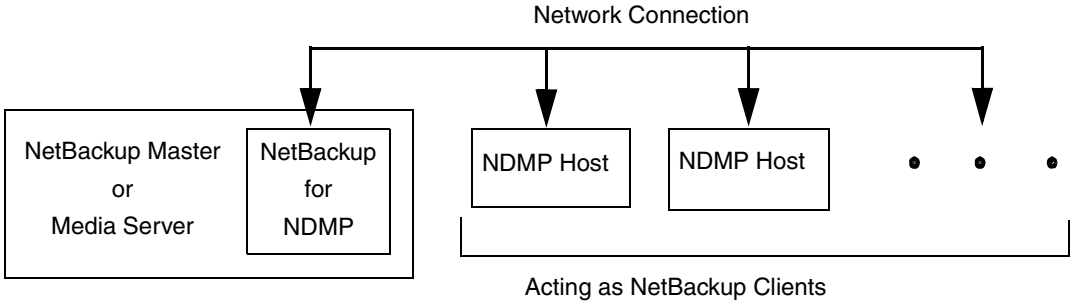
NetBackup for NDMP

NDMP Classes

After installing and configuring NetBackup for NDMP, you can schedule backups by creating an NDMP class in NetBackup.

An NDMP class can have one or more NetBackup clients. Each NetBackup client must be an NDMP host (see Figure 2). Note that you do not install any NetBackup software on the NDMP hosts.

Figure 2. NDMP Hosts as NetBackup Clients

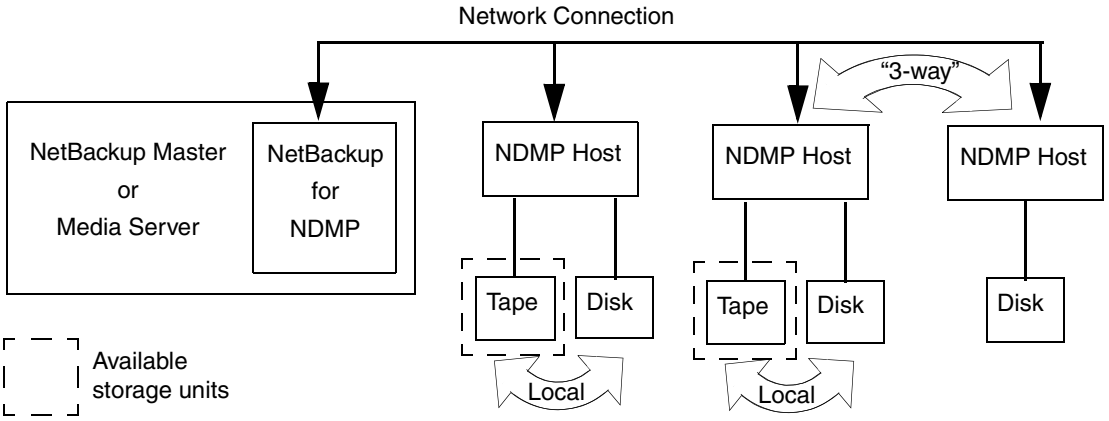


The allowable backup types for schedules in an NDMP class are: Full, Cumulative Incremental, or Differential Incremental. User backups and archives are not allowed, because there is no NetBackup client software on the NDMP hosts.

Restores of NDMP host backups can be initiated from any NetBackup server. The data can be restored to the NDMP host where it was backed up or to an alternate NDMP host.

NDMP classes can use only NDMP-type storage units. NDMP storage units can store data from any networked NDMP host (local or "three-way"). Three-way means that an NDMP host on the network can send backup data to (or receive restore data from) a storage unit that is attached to different NDMP host. See Figure 3.

Figure 3. NDMP Storage Units



NDMP Storage Units

An NDMP storage unit can contain standalone or robotic drives. Robotic drives can be in a TSD (Tape Stacker DLT), TLD (Tape Library DLT), TL8 (Tape Library 8MM) robot, or an ACS-controlled robot.

If the robot type is TLD or TL8, some drives can attach to NDMP hosts and other drives can attach to NetBackup servers.

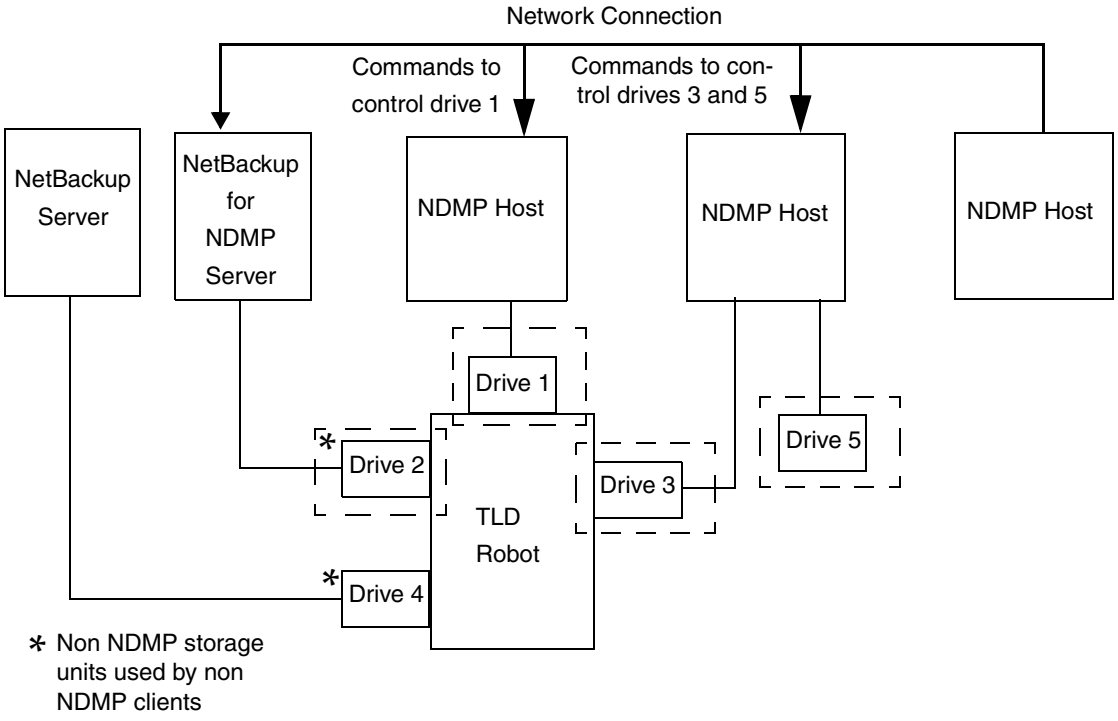
For example, in Figure 4:

- Drives 1, 3, and 5 attach to NDMP hosts and are in NDMP storage units that can be used for NDMP backup (local or three-way).

  The commands that control these drives originate on the NetBackup for NDMP server and are sent through the NDMP connection on the network. The NDMP server application on each NDMP host translates the NDMP commands into SCSI commands for the local drives.

- Drives 2 and 4 attach to NetBackup servers and are in non-NDMP storage units. These drives can be used only for non-NDMP clients of NetBackup and are controlled in the same way as other drives on NetBackup servers.

Figure 4. NDMP and Non-NDMP Storage Units

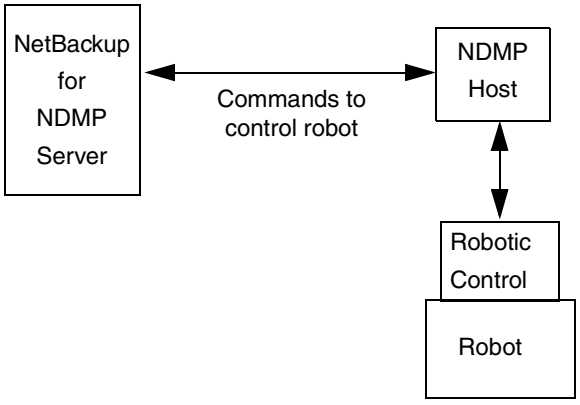


Robotic control can attach to either of the following:

- An NDMP host (see Figure 5).

  Commands that control the robot are sent over the network and are passed to the robot by the NDMP server application running on the NDMP host.

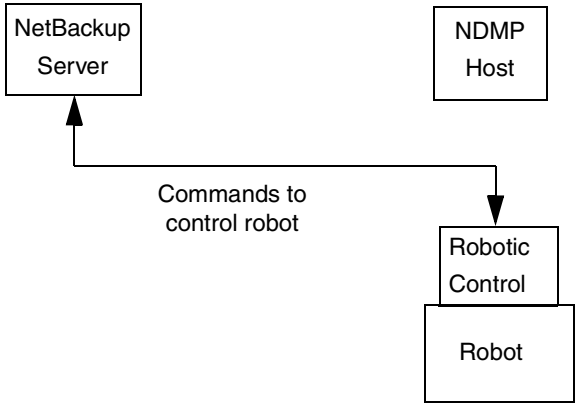
Figure 5. Robotic Control Attached to an NDMP Host



- A NetBackup server (see Figure 6). This can be a NetBackup for NDMP server.

  The robot is controlled in the same way as other robots on NetBackup servers.

Figure 6. Robotic Control Attached to a NetBackup Server

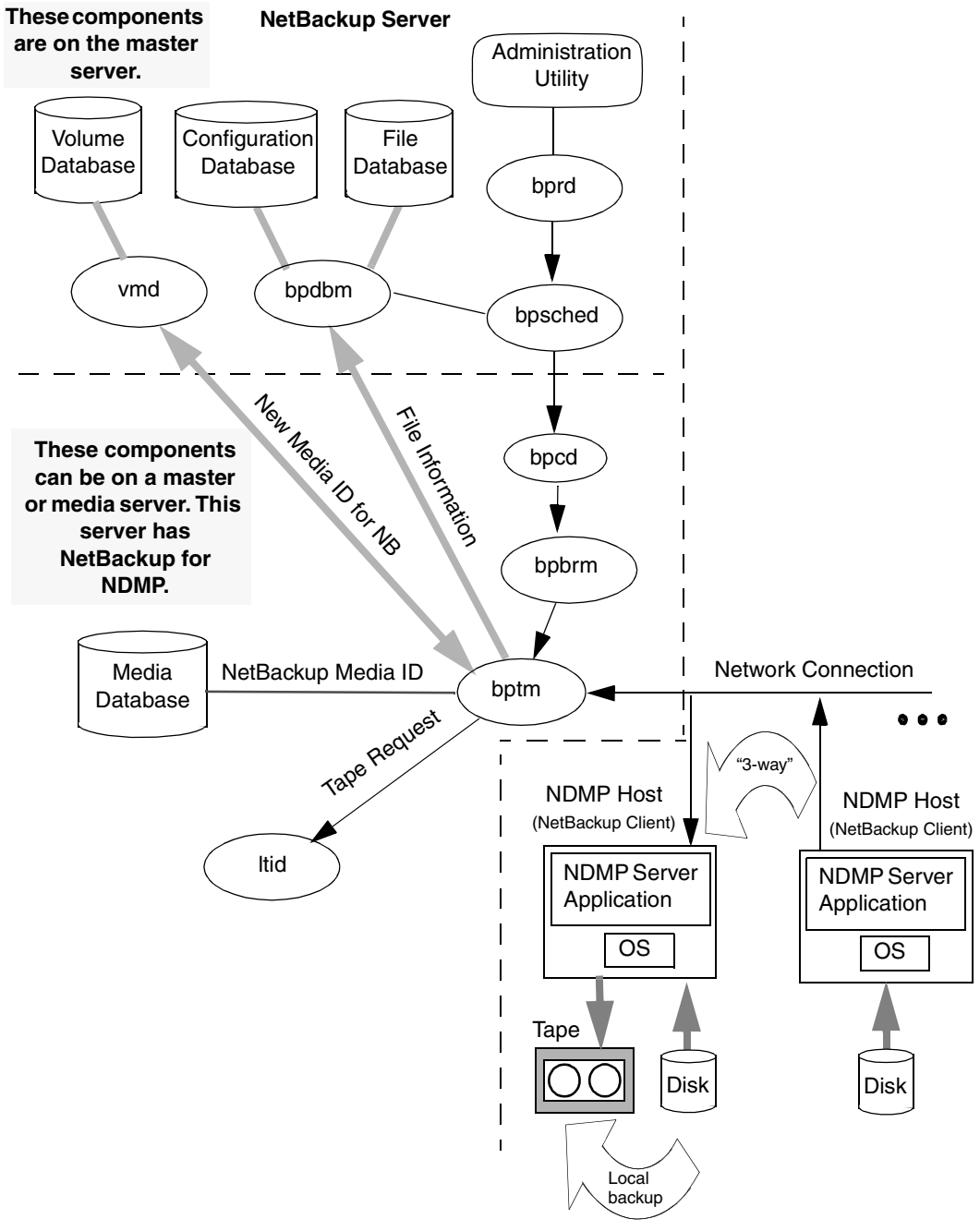


NDMP Backup Processes

Figure 7 shows the NetBackup processes that are involved in NDMP backups. During a backup, the following events occur:

- NetBackup obtains a media ID for the tape that will be used for the backup and requests `ltid` to mount that tape.
- `ltid` on the NetBackup for NDMP server sends the NDMP commands necessary to get the requested tape mounted on the storage device.
- NetBackup sends the NDMP commands necessary to have the NDMP server application perform a backup to the tape. The backup data travels in one of two ways:
  - Between the local disk and tape drives on an NDMP host
  - Over the network, from an NDMP host without its own storage device to another NDMP host with a locally attached storage device (so-called *three-way* backup*)*
- The NDMP server application sends information to the NetBackup for NDMP server about the files that were backed up. This information is stored in the NetBackup file database.
- The NDMP server application sends status about the backup operation to the NetBackup for NDMP server.

Figure 7. NetBackup Backup Processes



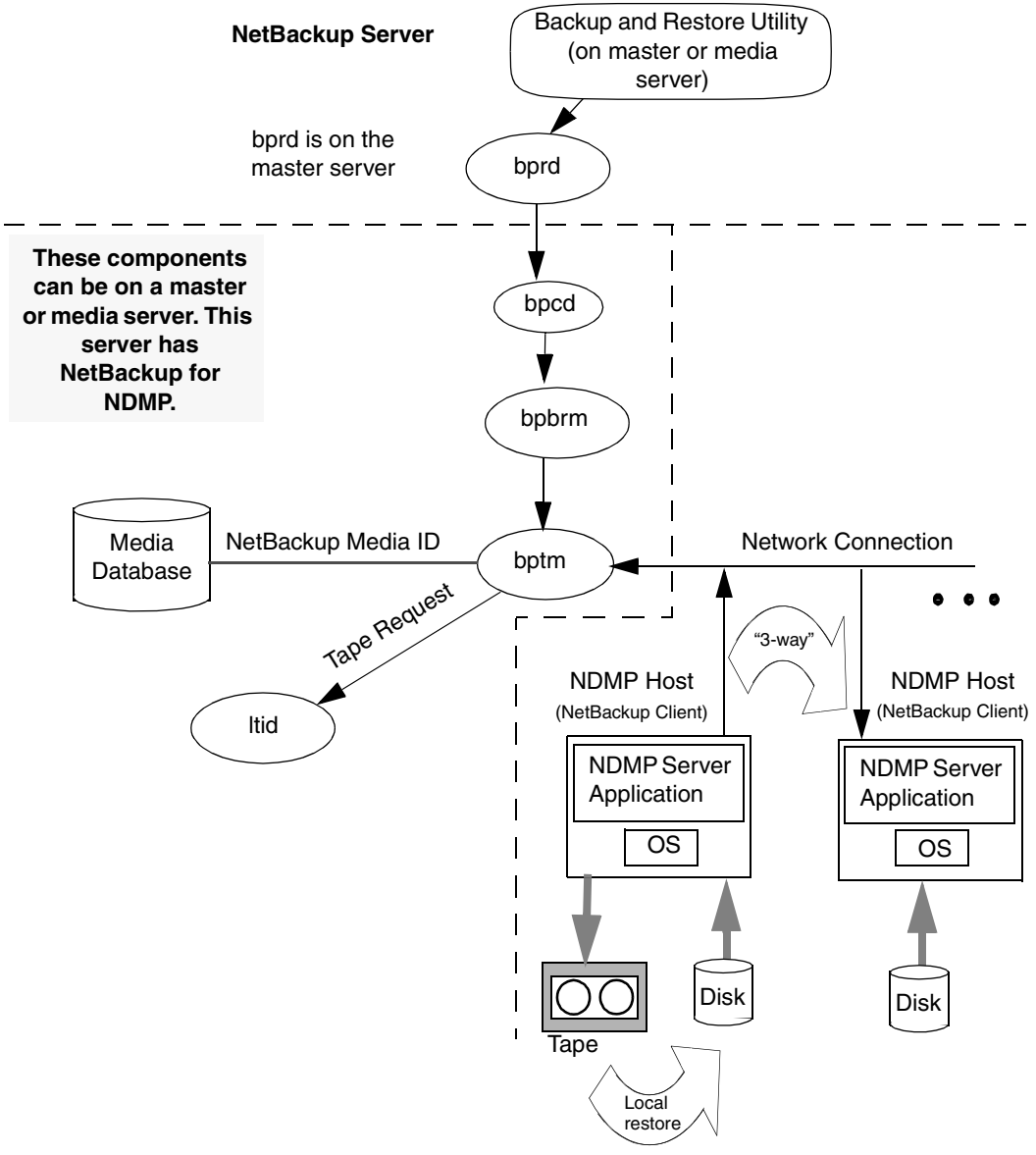
NDMP Restore Processes

Only the administrator on a NetBackup server (master or media) can restore files from NDMP backups. During a restore, the administrator browses and selects files from NDMP images in the same manner as for standard backup images.

Figure 8 shows the NetBackup processes involved in NDMP restores. The following events occur during a restore:

- The NetBackup for NDMP server looks in its media database for the tape that contains the backup, and requests `ltid` to mount that tape.
- `ltid` on the NetBackup for NDMP server sends the NDMP commands necessary to get the requested tape loaded on the storage device.
- NetBackup sends the NDMP commands necessary to have the NDMP server application perform a restore operation to the disk. The restore data travels in one of two ways:
  - From a tape drive to a local disk (tape drive and disk are on the same NDMP host)
  - Over the network, from an NDMP host with a locally attached storage device to another NDMP host (three-way backup/restore)
- The NDMP server application sends status about the restore operation to the NetBackup for NDMP server.

Figure 8. NetBackup Restore Processes



Installing NetBackup for NDMP 2

This chapter explains how to install the NetBackup for NDMP application on UNIX and Windows NT/2000 hosts.

Installation Prerequisites

- The NetBackup for NDMP 3.4 software must be installed on a supported Solaris, HP-UX, AIX, or Windows NT/2000 master or media server.

  For a detailed list of platform versions supported by NetBackup for NDMP 3.4, refer to "Supported Platforms and Peripherals" in the *NetBackup Release Notes*.

- Drives and robots attached to the NDMP host must be types supported by the NDMP host and NetBackup. Allowable robot types are TSD, TLD, TL8, or drives controlled by the Automated Cartridge System (ACS). For more information on storage devices, see the *Media Manager System Administrator's Guides* (UNIX or Windows NT/2000).
- The NetBackup for NDMP server must meet some system resource requirements. See "Resource Requirements for the NetBackup for NDMP Server," below.
- See the appendices of this guide for any restrictions for specific NDMP hosts.
- The NetBackup for NDMP master/media server must be running NetBackup 3.4 or later.

Before Starting the Installation

Review any procedures for your type of NDMP host in the appendices of this guide, to ensure that the NDMP host is operating correctly before you start.

Resource Requirements for the NetBackup for NDMP Server

When an NDMP backup is performed, the NetBackup for NDMP server (which is a client for the NDMP server application running on the NDMP host) has some special resource requirements. The following information may help you in planning your NetBackup configuration needs.

While a backup is running, catalog information is sent from the NDMP host over the network to the NetBackup for NDMP server. Because of the method used by the NDMP host to perform the backup, catalog information about specific inodes is sent as the inodes are encountered. The NetBackup for NDMP server must store this information. When the transfer of inode information is complete, the NetBackup `bptm` process remains active and processes the inode information to produce the full pathnames needed for the NetBackup catalogs.

It can take some time for the pathnames to be produced and sent on to the NetBackup master server. VERITAS recommends that you choose as powerful a system as possible for the NetBackup server.

The following are some sample test times for processing inode information and creating full pathnames. Remember, actual performance depends on many dynamic factors, such as machine resources available, CPU speed, and the load on the server.

- 50,000 files on a UNIX Ultra 10 were processed at a rate of 9200 files/second.
- 50,000 files on a Windows NT4 workstation (an Intel Pentium 166 with 64MB of RAM and 75MB of virtual memory) were processed at a rate of 2538 files/second.

The resource usage explained in "Temporary Disk Space Required," below, and "Memory Used by the bptm Process" on page 25 depends on the number of files being backed up, not on the total number of bytes. Backing up a million very small files consumes more resources than backing up a thousand large files.

For more information about specific types of NDMP hosts, see the appendices of this guide.

Temporary Disk Space Required

Some of the inode information is buffered in a file in a temporary directory.

The size of the file created depends on the number of files that you are backing up as follows:

(60 * *number of files being backed up*)

For example, if you are backing up one million files, the size of the temporary file would be 60 megabytes (60 * 1,000,000).

The file name has the following form:

`inomap.`*`pid`*

Where *pid* is the process ID for the `bptm` process. For example, `inomap.26582`.

On UNIX hosts, the location of this temporary directory is:

```
/usr/openv/netbackup/BPFSMAP_TMPDIR
```

- You can create a symbolic link for `BPFSMAP_TMPDIR` to point to another partition (if desired).

On Windows NT/2000 hosts:

- A registry entry called `BPFSMAP_TMPPATH` is created during the installation under the following directory:

  `HKey_Local_Machine\Software\VERITAS\Netbackup\CurrentVersion\Path`

  This entry points to the directory where the product is installed. To change the location, run `regedit` and change this value. Note that the entry must have two backslashes (`\\`) for each directory. For example:

  `BPFSMAP_TMPPATH E:\\temp\\mapfile`

Memory Used by the bptm Process

Some of the inode information is also kept in memory allocated by `bptm`. Use the following formula to obtain an estimate of memory usage:

$(M * 4) + N * (p + 8)$

Where

- M = number of inodes (allocated and unallocated) in the file system
- N = number of files being backed up
- p = average pathname component size. A pathname can consist of a number of components. For example, the UNIX pathname `/dir1/subdir2/file3` consists of three components.

For example, assume the following:

$M = N = 1$ million files

$p = 8$

For this example, the memory requirement is 20 megabytes.

(1,000,000 * 4) + (1,000,000) * (8 + 8) = 20 megabytes

`bptm` processes each path in the file list for your NDMP class as a separate backup and must have sufficient resources to back up each of these paths. If your NDMP server has insufficient resources to back up a specific path, you can divide the backup into smaller parts by listing subdirectories instead of the entire path.

For example, assume that the file list has an entry named `/dir1`, which contains a million files. If your system does not have the resources to back up `/dir1`, divide the backup into smaller backups by listing `/dir1/subdir1`, `/dir1/subdir2`, and so on. `bptm` needs only enough resources to handle the largest part that is being backed up at any one time.

Bypassing Resource Requirements

In some environments, it may be desirable to eliminate the catalog information (inode processing) for certain backups. Doing so dramatically improves backup performance in cases of large numbers of files and/or limited memory and disk resources on the NetBackup server.

Note If no catalog information is included and no inode processing occurs, individual files cannot be restored.

To prevent the NDMP host from sending catalog information to NetBackup, set the NDMP `HIST` variable to no (`SET HIST = N`). The catalog sent by the NDMP host will contain only the backup directory.

For an example with `SET HIST = N`, refer to "Using Environment Variables in a File List" on page 43.

Installation Procedure on UNIX Hosts

On the UNIX host that you want to be the NetBackup for NDMP server, perform the following:

1. Log in as root.

2. Install NetBackup server and client software as explained in the *NetBackup DataCenter Installation Guide - UNIX*.

3. Make sure a valid license key for NetBackup for NDMP has been registered by entering the following command to list and add keys:

   ```
   /usr/openv/netbackup/bin/admincmd/get_license_key
   ```

4. Insert the CD-ROM containing NetBackup for NDMP software in the drive.

5. Change your working directory to the CD-ROM directory:

   ```
   cd /cd_rom_directory
   ```

   Where *cd_rom_directory* is the path to the directory where you can access the CD-ROM. On some platforms, it may be necessary to mount this directory.

6. To install NetBackup for NDMP, execute the following:

   ```
   ./install
   ```

   Since other NetBackup products are included on the CD-ROM, a menu appears.

   a. Select the NetBackup for NDMP option.

   b. Enter **q** to quit the menu.

   c. When asked if the list is correct, answer **y**.

7. If your NetBackup for NDMP server is not your master server, repeat the above steps on the master server.

Installation Procedure on Windows NT/2000 Hosts

On the Windows NT/2000 host that you want to be the NetBackup for NDMP server, perform the following:

1. Log in.

2. Install NetBackup server and client software as explained in the *NetBackup DataCenter Installation Guide - Windows NT/2000*.

3. Make sure a valid license key for NetBackup for NDMP has been registered by doing the following to list and add keys:

   a. From the NetBackup Administration window, choose Help.

   b. From the Help menu, select License Keys ....

      The NetBackup License Keys window appears. Existing keys are listed in the lower part of the window.

   c. To register a new key, type your license key in the New license key field and click Add.

      The new license key appears in the lower part of the dialog box.

4. Insert the NetBackup for NDMP CD-ROM in the CD-ROM drive.

   - If AutoPlay is enabled for CD-ROM drives, the installation program starts automatically.
   - On Intel systems, if AutoPlay is disabled, run the `AutoRunI.exe` program in the `AutoRun` directory on the CD-ROM.
   - On Digital Alpha systems, if AutoPlay is disabled, run the `AutoRunA.exe` program in the `AutoRun` directory on the CD-ROM.

5. Follow the installation wizard prompts to complete the installation.

6. If your NetBackup for NDMP server is not your master server, repeat the above steps on the master server.

Configuring NetBackup for NDMP

3

This chapter explains how to configure NetBackup for NDMP on both UNIX and Windows NT/2000 NetBackup servers. Only the portions of the configuration that are unique to NDMP are described in this guide.

For detailed information about configuring NetBackup and Media Manager, see the *NetBackup System Administrator's Guide* and the *Media Manager System Administrator's Guide* (for UNIX or Windows NT/2000).

For information on configuring devices, see the *Media Manager Device Configuration Guide*.

The following topics are covered in this chapter:

- Authorizing Access To the NDMP Host
- Configuring NDMP Storage Devices
- Adding NDMP Storage Units and Classes
- Testing an NDMP Configuration

Authorizing Access To the NDMP Host

Before NetBackup can carry out backup operations, it must have access to the NDMP host. To authorize this access, execute the following command on the NetBackup for NDMP server (refer to Appendix A for more information on this command):

`set_ndmp_attr -auth` ***ndmp-server-host user-name***

Where:

- *ndmp-server-host* is the name of the NDMP host that NetBackup will be backing up.
- *user-name* is the user name under which NetBackup will be accessing the NDMP host. This user must have permission to execute the NDMP commands and normally has a user ID of `root`.

Note If you are setting up access to an EMC Celerra File Server, the user-name must be `ndmp` (not `root`). Refer to Appendix D for more information on Celerra File Servers.

- On Windows NT/2000 systems, the `set_ndmp_attr` command is located in the *install_path*`\Volmgr\bin` directory. By default, the location is:

  ```
  C:\Program Files\Veritas\Volmgr\bin\
  ```

- On UNIX, the command is located in the `/usr/openv/volmgr/bin/` directory.
- Usage information for the command can be obtained using the `-help` option.

Example

On Windows NT/2000:

```
install_path\Volmgr\bin\set_ndmp_attr -auth toaster root
Password: *******
Re-enter Password: *******
```

On UNIX:

```
/usr/openv/volmgr/bin/set_ndmp_attr -auth toaster root
Password: *******
Re-enter Password: *******
```

Note This password is encrypted and then stored in a file on the NetBackup server. Although this file is only accessible to the root user, if a user could locate and decode this password they would have information permitting them to log into the NDMP host system with full root-user privileges.

Access for Three-Way Backups

To perform three-way backups (described in Chapter 1), the NetBackup for NDMP server must have access to an NDMP host that has no attached tape drive. You must perform the `set_ndmp_attr` command on the NetBackup for NDMP server for this NDMP host. For example:

`set_ndmp_attr -auth` *ndmp-server-host user-name*

where *ndmp-server-host* is the name of the NDMP host that has no tape drive attached.

Configuring NDMP Storage Devices

The drives and robots that attach to the NDMP host must be configured using Media Manager before NetBackup can use them as storage units.

Note You cannot use the NetBackup wizards to configure robots or drives that are attached to the NDMP host.

The following are the two main parts to this task and both are performed on the NetBackup for NDMP server:

- System Device Configuration

  This involves completing the configuration necessary for the hardware and operating system of the NetBackup for NDMP server and the NDMP host to recognize the devices.

- Media Manager Device Configuration

  This involves specifying the information that Media Manager requires to recognize and control the devices.

Also see the appendices in this guide for more information on configuring storage devices for specific NDMP hosts.

System Device Configuration

System device configuration includes configuring robots and drives.

Configuring Robotic Control

The method required to configure the robotic control depends on whether the robotic control attaches to the NDMP host or to the NetBackup for NDMP server.

Robotic Control Attaches to the NetBackup Server

If the robotic control attaches directly to the NetBackup for NDMP server or other NetBackup server, configure the robotic control as explained in the *Media Manager Device Configuration Guide*.

In this type of configuration, the NDMP host will not use the robot for backups.

Robotic Control Attaches to the NDMP Host

If the robotic control attaches directly to the NDMP host, configuration consists of specifying the following robotic control information: device name, controller number, SCSI ID, and LUN (logical unit number).

To specify this information, execute the following command on the NetBackup for NDMP server:

`set_ndmp_attr -robot` ***ndmp-server-host robot-device scsi-controller scsi-id scsi-lun***

Where:

- On Windows NT/2000, the command is located in the *install_path*`\Volmgr\bin` directory.
- On UNIX, the command is located in the `/usr/openv/volmgr/bin/` directory.
- *ndmp-server-host* is the name of the NDMP host where the robotic control attaches.
- *robot-device* is the device name for robotic control.
- *scsi-controller* is the controller number.
- *scsi-id* is the SCSI ID for the robotic control.
- *scsi-lun* is the LUN for the robotic control.

Note The controller number, SCSI ID, and LUN are ignored on some NDMP vendors. In this manual, see the appendix applicable to your NDMP vendor.

Example

In the following NetWork Appliance example, assume that a NetApp file server is the NDMP host and has a robot with robotic control information as follows:

NDMP server host name = toaster

robot device name = spt0

SCSI controller number = 2

SCSI ID = 3

SCSI LUN = 0

For this example on Windows NT/2000, you would execute the following commands:

install_path\Volmgr\bin\set_ndmp_attr -robot toaster spt0 2 3 0

Note that if a second robot were connected to this NDMP host, its robot device name would be spt1.

For this example on UNIX, you would execute the following command:

/usr/openv/volmgr/bin/set_ndmp_attr -robot toaster spt0 2 3 0

Note that if a second robot were connected to this NDMP host, its robot device name would be spt1.

Listing Configuration Settings

When your configuration is complete, you can list your configuration settings by entering the -list option with the set_ndmp_attr command, as follows:

On Windows NT/2000:

***install_path*\Volmgr\bin\set_ndmp_attr -list**

On UNIX:

/usr/openv/volmgr/bin/set_ndmp_attr -list

The following is sample output from this command:

```
Record Type: Authentication
NDMP Server: toaster
Username:    root
Password:    <registered>

Record Type: Robotic Information
NDMP Server: toaster
Device:      spt0
Controller:  2
SCSI Id:     3
SCSI LUN:    0
```

Note If you change the robot configuration on the NDMP host, use set_ndmp_attr -robot to update the NetBackup for NDMP server with your changes.

Verifying NDMP Password

Once you have entered the authorization, you can verify that the NetBackup for NDMP server can connect to the NDMP host.

For example:

```
set_ndmp_attr -verify toaster
```

Where `toaster` is the name of the NDMP host.

A successful verification might look like the following:

```
Verify Host name: toaster
Connecting to host "toaster" as user "root"...
Waiting for connect notification message...
Opening session with NDMP protocol version 2...
Host info is:
   host name "toaster"
   os type "NetApp"
   os version "NetApp Release 5.3.2R1"
   host id "0016794152"
   host supports TEXT authentication
   host supports MD5 authentication
Getting MD5 challenge from host...
Logging in using MD5 method...
Login was successful
Opening SCSI device "spt0"...
Setting SCSI target controller 0 id 0 lun 0...
Inquiry result is "HP      C5173-7000      3.04"
```

A failed verification (due to incorrect password) might look like this:

```
Connecting to host "toaster" as user "root"...
Waiting for connect notification message...
Opening session with NDMP protocol version 2...
Host info is:
   host name "toaster"
   os type "NetApp"
   os version "NetApp Release 5.3.2R1"
   host id "0016782795"
   host supports TEXT authentication
Logging in using TEXT method...
ndmp_connect_client_auth failed
set_ndmp_attr: host "toaster" failed
set_ndmp_attr: unable to continue
```

Configuring Drives

If you are attaching drives to the NDMP host, see the vendor documentation for the drive and the NDMP host for configuration instructions. These are the drives to which NetBackup will be directing the backup data.

It is also possible to attach some of the drives in a robot to NetBackup servers. Those drives, however, cannot be used for NDMP host backups. To configure drives that attach to NetBackup servers, see the *Media Manager Device Configuration Guide*.

Testing a Robot

Depending on the type of robot, use the tests shown in the following table to exercise the robot:

Robot Type	Test
TSD	`tsdtest`
TLD	`tldtest`
TL8	`tl8test`
ACS	`acstest`

For example, to exercise the TSD robot spt0 that is controlled by the NDMP host named toaster, use the following test and commands on Windows NT/2000:

Note Down the drive before performing this test or `avrd` may interfere.

install_path`\Volmgr\bin\tsdtest -r toaster:spt0 -d1 toaster:nrst0a`

`inquiry` (Displays the vendor and product ID. If you get a UNIT ATTENTION message, try the `mode` command and then continue your testing.)

`s s` (Checks slot status.)

`s d` (Checks drive status.)

`m s3 d1` (Moves a tape from slot 3 to drive 1.)

`m d1 s3` (Moves the tape back to slot 3.)

In another example, to exercise drive 1 in the TLD robot (spt0) that is controlled by the NDMP host named toaster, use the following test and commands on UNIX:

`/usr/openv/volmgr/bin/tldtest -r toaster:spt0 -d1 toaster:nrst0a`

`inquiry` (Displays the Vendor and Product ID. If you get a UNIT ATTENTION message, try the `mode` command and then continue your testing.)

`s s` (Checks slot status.)

`s d` (Checks drive status.)

`m s3 d1` (Moves a tape from slot 3 to drive 1.)

`unload d1` (Unloads the tape.)

`m d1 s3` (Moves the tape back to slot 3.)

Media Manager Device Configuration

On the NetBackup for NDMP server, use the Media Manager administrative interface to add drives and robots to the Media Manager configuration.

The following procedures and examples show only the information unique to NDMP configuration. See the *Media Manager System Administrator's Guide* (Windows NT/2000 or UNIX) for more information about configuring Media Manager.

Adding a Robot Directly Attached to an NDMP Host

1. Start the NetBackup Administration interface as follows:

   On Windows NT/2000: from the Windows Start menu, select Programs, VERITAS NetBackup, NetBackup Administration.

   On UNIX: enter the following:

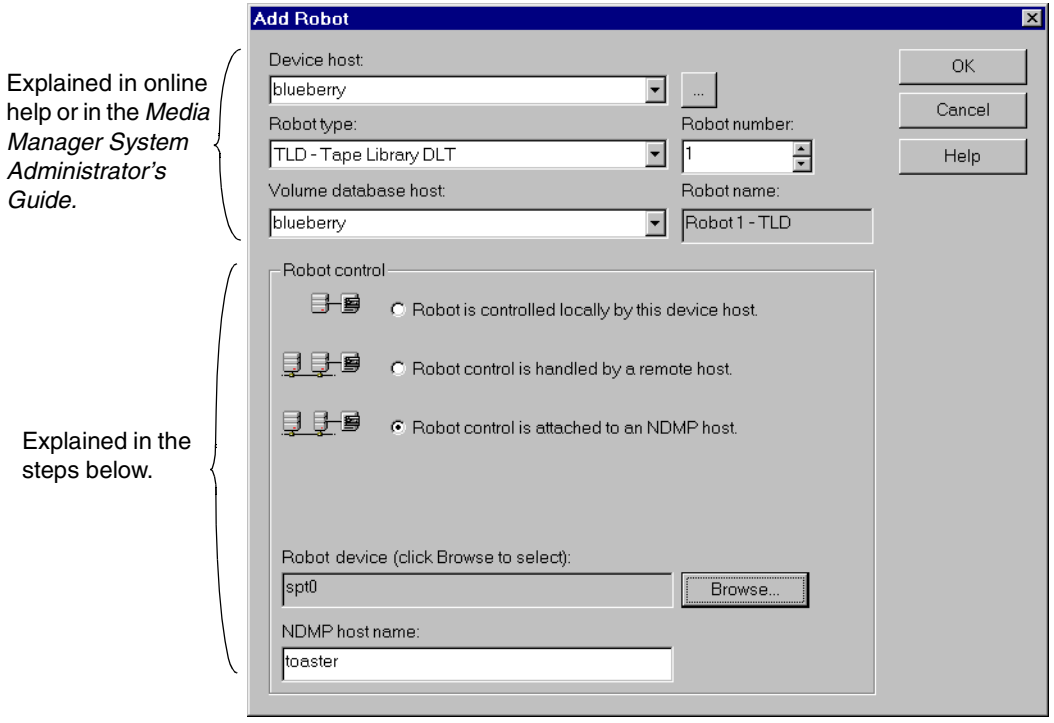
   ```
   /usr/openv/netbackup/bin/jnbSA &
   ```

2. When the NetBackup Administration window appears, click the Media and Device Management icon.

Note On Windows or UNIX, if you are not running the NetBackup Administration interface on the NetBackup for NDMP server, use the Monitor command on the Hosts menu to switch to the NetBackup for NDMP server.

---

3. On the Actions menu, select New, then select Robot... from the popup. The Add Robot dialog appears.



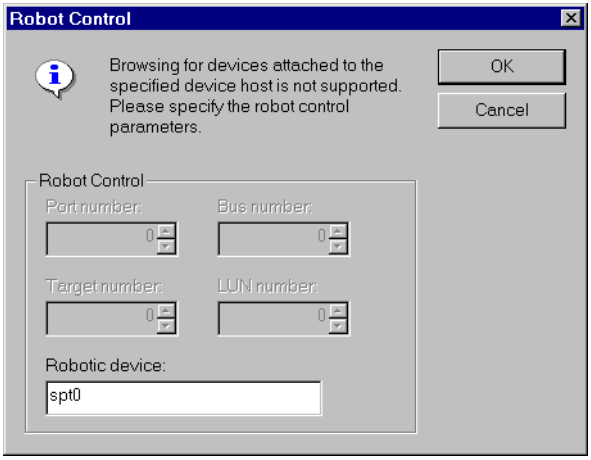
4. For assistance with the Add Robot dialog box, refer to the online help or to the *Media Manager System Administrator's Guide* (Windows NT/2000 or UNIX). The steps below explain the portions that are unique to configuring NetBackup for NDMP.

5. Under Robot control, click the button for Robot control is attached to an NDMP host.

6. In the field labeled NDMP host name, enter the name of the NDMP host to which the robot is attached.

7. Click the Browse button next to the field labeled Robot device.

The Robot Control dialog appears.



8. In the Robotic device field, enter the device name for the robot. To determine the name of the robot, refer to the appendix in this guide that pertains to your system.

9. Click OK, then click OK in the Add Robot dialog.

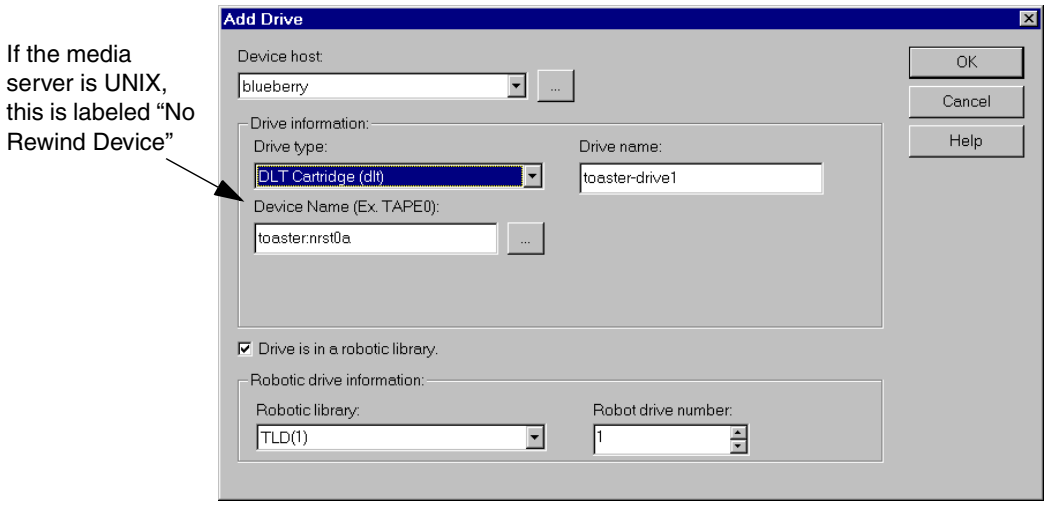
   A popup message asks if you want to stop and restart the device manager service (or daemon). Click Yes.

Adding a Drive

1. If it is not currently running, start the Media and Device Management utility from the NetBackup Administration window.

Note On Windows or UNIX, if you are not running the NetBackup Administration interface on the NetBackup for NDMP server, use the Monitor command on the Hosts menu to switch to the NetBackup for NDMP server.

2. On the Actions menu, select New, then select Drive... from the popup. The Add Drive dialog appears.



3. With the exception of the Device Name entry (labeled No Rewind Device if the media server is a UNIX machine), complete the dialog box as explained in the online help or in the *Media Manager System Administrator's Guide* (Windows NT/2000 or UNIX).

   Device Name (if UNIX media server: No Rewind Device)

   - If the drive does not attach directly to the NDMP host, follow the instructions in the *Media Manager System Administrator's Guide* for this entry.
   - If the drive attaches directly to the NDMP host, use the following notation for the device name (no rewind device) entry:

     ndmp_host:device_file

     Where:

     ndmp_host is the name of the NDMP host where the drive is attached.

     device_file is the name of the file for the drive.

     For example: `toaster:nrst0a`

4. When the dialog box is complete, click OK.

   A popup message should appear, asking whether or not you want to restart the Media Manager device daemon and all robotic daemons. Click Yes.

Checking a Media Manager Configuration

On the NetBackup for NDMP server, do the following:

- On UNIX, execute **`/usr/openv/volmgr/bin/vmps`** and verify that `ltid`, `vmd`, `avrd`, and any required robotic daemons are active. On Windows NT/2000, go to the NetBackup Administration window and use the Activity Monitor (Processes tab) to verify that the above processes are active.
- From the NetBackup Administration window, use the Device Monitor to ensure that the drive is in the UP state.

Adding Volumes to a Media Manager Configuration

Use the NetBackup Media and Device Management utility to add the volumes that you will be using for the NDMP host backups. See the *Media Manager System Administrator's Guide* (Windows NT/2000 or UNIX) for instructions.

Note When specifying the Robot Control Host for a volume that will be in a robot, specify the host name for the NetBackup for NDMP server, not the NDMP host.

Adding NDMP Storage Units and Classes

After ensuring that access to the NDMP host is authorized and NDMP storage devices are configured, use one of the available NetBackup administrative interfaces to add a storage unit and class. Both of these tasks are performed on the NetBackup master server.

Note You can use the Backup Policy Configuration wizard to create NDMP classes.

Adding an NDMP Storage Unit

On the NetBackup master server, add a NetBackup storage unit for the devices that will contain the backup data.

Most of the requirements are the same as for adding a Media Manager storage unit. The following topics explain the differences when adding an NDMP storage unit. See the *NetBackup System Administrator's Guide* (Windows NT/2000 or UNIX) for more information.

Specify the following requirements as indicated:

- Storage unit type

  The type of storage that this storage unit supports. Click the Storage Unit Type box and select NDMP from the list.

- On demand only

  Specifies whether the storage unit is available only on demand (that is, only when a class or schedule requests it). If this option is not used, the storage unit is available to any NDMP class or schedule.

  Specify this option if both of the following conditions exist:

  The NDMP host with the storage unit is the only one in the class.

  There is more than one storage unit for the NDMP host and you want to use them for specific schedules. For example, if there are two storage units, you can specify this option for each and then set up schedules to use one for full and the other for incremental backups.

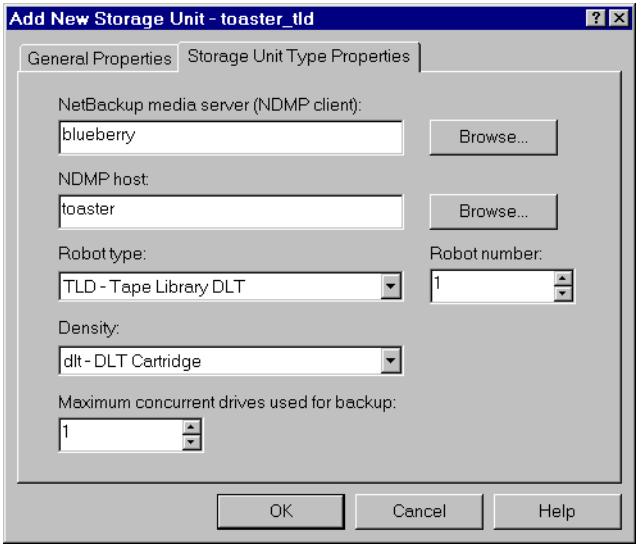
- NetBackup media server (NDMP client)

  The name of the NetBackup for NDMP server that will be backing up the NDMP host.

- NDMP host

  The NDMP host whose data you will send to this storage unit.

The following is an example Add New Storage Unit dialog:



Adding an NDMP Class

On the NetBackup master server, add an NDMP class to the NetBackup configuration to configure backups for the NDMP host.

Most of the requirements are the same as for adding other NetBackup classes. The following topics explain the differences when adding NDMP classes.

See the *NetBackup System Administrator's Guide* (Windows NT/2000 or UNIX) for more information on NetBackup classes and the Backup Policy Management utility.

Attributes

Specify the following class attributes:

- Class Type

  NDMP

- Class Storage Unit

  If the NDMP host has more than one storage unit and you want to direct backups for this class to a specific storage unit, then specify the name of that storage unit.

- For a three-way backup (described in Chapter 1), specify a storage unit on a different NDMP host.

Clients

In the client list, specify the following for each client in a NDMP class:

- Hostname

  Name of the NDMP host

- Hardware and operating system

  NDMP NDMP

Files

The file list must contain directories relative to their perspective on the NDMP host.

For example, `/home/dir1/`

The following file list capabilities are not supported for an NDMP class:

- Wildcards in pathnames. For example, `/home/*` is an invalid file list entry.
- Exclude list (because client software is not installed on the NDMP host). You can, however, exclude files by using the `SET` option as shown under "Using Environment Variables in a File List." The `SET` option allows you to exclude files on a backup. The format is vendor dependent; refer to the vendor's documentation for more details on what variable can be passed and in what format.

Using Environment Variables in a File List

NDMP allows you to use environment variables to pass configuration parameters to an NDMP host with each backup and restore. NDMP environment variables can be one of the following types.

Environment variables that are

- Defined as optional by the NDMP protocol specification.

  You can set these variables.

- Specific to an NDMP host vendor.

  You can set these variables.

- Reserved for use by NetBackup. These variables are as follows:

  TYPE

  FILESYSTEM

  LEVEL

  DIRECT

  EXTRACT

  ACL_START

In NetBackup, environment variables can be set in the file list by specifying one or more `SET` directives. The syntax of a `SET` directive is as follows:

`SET` *variable* `=` *value*

Where *variable* is the name of the environment variable and *value* is the value that is assigned to it. The value can be enclosed in single or double quotes, and must be enclosed in quotes if it contains a space character. For example:

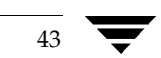
```
SET ABC = 22
SET DEF = "hello there"
SET GHI = y
```

Setting a variable equal to no value removes the variable. For example:

```
SET ABC =
```

Variables accumulate as the file list is processed. For example, if the file list contains the following entries:

```
/vol/vol1
SET HIST = N
/vol/vol2
SET DEF = 20
SET EXCLUDE = *.c,core,*.o
/vol/vol3
```

Directory `/vol/vol1` will be backed up without any user-specified environment variables. The second directory (`/vol/vol2`) will be backed up with the variable `HIST` set to `N`. The third directory (`/vol/vol3`) will be backed up with all three of the environment variables set.

If an environment variable appears again later in the list, the value of this variable overrides the previous value of the variable.

The values used in each backup are saved and provided to subsequent restores of the directory.

The NDMP host may have environment variables that are set internally and these are also saved for restores.

Schedules

You can specify any of the following backup types in a schedule for an NDMP class:

- Full
- Cumulative Incremental
- Differential Incremental

Specify Override class storage unit only if this client of NetBackup (the NDMP host) has more than one storage unit and you want to use a specific storage unit for this schedule. In this case, the client must be the only client in this NDMP class.

Testing an NDMP Configuration

To test the configuration, back up the class and then restore some files. For instructions, see the following topics:

- "Performing a Backup" on page 45
- "Performing a Restore on Windows NT/2000" on page 46 or "Performing a Restore on UNIX" on page 47

If you encounter problems, see "Troubleshooting" on page 48.

Using NetBackup for NDMP 4

The following topics are covered in this chapter:

- Performing a Backup
- Performing a Restore on Windows NT/2000
- Performing a Restore on UNIX
- Troubleshooting

Only the administrator can perform backups and restores on the NetBackup server (master or media).

Performing a Backup

User-directed backups and archives of files are not allowed, since there is no NetBackup client software installed on an NDMP host.

Automatic Backup of an NDMP Class

To configure an NDMP class and set up schedules for automatic, unattended backups, see "Adding NDMP Storage Units and Classes" on page 40 and the *NetBackup System Administrator's Guide* (Windows NT/2000 or UNIX).

Manual Backup of an NDMP Class

The administrator on a NetBackup server (master or media) can use any NetBackup administrative interface to execute a backup for an NDMP class. The procedure below explains how to perform the backup using the NetBackup Administration interface. For further information on the NetBackup Administration interface, see the *NetBackup System Administrator's Guide* (Windows NT/2000 or UNIX).

1. As administrator, start the NetBackup Administration interface on the NetBackup server as follows:

   On Windows NT/2000: from the Windows Start menu, select Programs, VERITAS NetBackup, NetBackup Administration.

   On UNIX, enter the following:

   ```
   /usr/openv/netbackup/bin/jnbSA &
   ```

2. Click the icon for Backup Policy Management.

   The Backup Policy Management (Classes) window appears.

3. Find the NDMP class name in the left pane of this window and click on that name to select it.

4. In the Class menu, select Manual Backup.

   This opens the Manual Backup dialog. Notice that the name in the dialog is the class that you selected.

5. In the Manual Backup dialog, select the schedule and the clients (NDMP hosts) that you want to back up.

   If you do not select any schedules, NetBackup uses the schedule with the highest retention level. If you do not select any clients, NetBackup backs up all clients.

6. Click OK to start the backup.

Performing a Restore on Windows NT/2000

User-directed restores of files are not allowed, since there is no NetBackup client software installed on an NDMP host.

The administrator can use the client user interface on a NetBackup server (master or media server) to restore files to the NDMP host from which they were backed up, or to an alternate client.

The following procedure explains how to restore using the NetBackup Administration interface for Windows NT/2000.

Caution An NDMP restore always overwrites existing files.

1. As the administrator, start the NetBackup Administration interface on any NetBackup server. The NetBackup Administration window appears.
2. Click the icon for Backup, Archive, and Restore.

   The Backup, Archive, and Restore window appears.
3. Click Select for Restore from the tool bar, then select the Actions menu, and click Specify NetBackup Machines.

   The Specify NetBackup Machines dialog appears. Modifications made in this dialog affect all open restore windows and are not saved after closing the Restore window.
4. On the Servers tab, specify the NetBackup master server. If your configuration has multiple master servers, specify the master server that has the class for the NDMP host that you are restoring.
5. When finished, click the Make Current button.
6. On the Source Clients tab, specify the NDMP host.
7. In the Class Type field, select NDMP.
8. On the Destination Clients tab, select the NDMP host. Then click OK.
9. In the Restore window, browse and mark the files and folders you want to restore.
10. Start the restore.

Performing a Restore on UNIX

User-directed restores of files are not allowed, since there is no NetBackup client software installed on an NDMP host.

The administrator can use the client user interface on a NetBackup server (master or media server) to restore files to the NDMP host from which they were backed up, or to an alternate client.

The following procedure explains how to restore using the NetBackup Java Administration interface.

Caution An NDMP restore always overwrites existing files.

1. As the administrator, start the NetBackup Administration interface on any NetBackup server. The NetBackup Administration window appears.

2. Click the icon for Backup, Archive, and Restore.

   The Backup, Archive, and Restore window appears. Modifications made in this window affect all open restore windows and are not saved after closing the restore window.

3. On the NetBackup server tab, specify the NetBackup master server. If your configuration has multiple master servers, specify the master server that has the class for the NDMP host that you are restoring.

4. On the Source client tab, specify the NDMP host.

5. In the Type of client field, select NDMP.

6. On the Destination client tab, select the NDMP host.

7. Browse and mark the files and folders you want to restore.

8. Start the restore.

Troubleshooting

The following topics provide information useful for troubleshooting NetBackup for NDMP. See the *NetBackup Troubleshooting Guide* (Windows NT/2000 or UNIX) for troubleshooting information about NetBackup.

Before troubleshooting a suspected problem, review the following operating notes and restrictions.

Also see the appendices of this guide for any troubleshooting information or restrictions for specific NDMP hosts.

NDMP Operating Notes and Restrictions

- A tape created on an NDMP storage unit is in backup format and cannot be restored from a non-NDMP storage unit. If you duplicate an NDMP backup image the new copy is still in backup format and cannot be used for restores on a non-NDMP storage unit.
- You cannot back up files where the path length is greater than 1024 characters.
- In the file list for an NDMP class, you can include only directory paths and cannot use wildcards.

- Duplicate, import, and verify operations can take a very long time, because the data needs to travel across the network.

Troubleshooting NetBackup

- To get more information about a problem, do the following:
  - On a UNIX-based NetBackup for NDMP server: add the `VERBOSE` value (6 or greater) to the `bp.conf` file.
  - On a Windows NT/2000-based NetBackup for NDMP server: From the Start menu of NetBackup Administration, select Configure NetBackup. A configuration windows appears. Select NetBackup for NDMP media server and then select Properties (Read/Write) in the File menu. Select the Universal Settings tab, put a check in Logging enabled, then enter 6 or higher in Verbose logging level.
  - On the NetBackup for NDMP server, create `bptm` and `bpbrm` activity log folders in the *install_path*`\NetBackup\logs` folder (on Windows-based systems) or in `/usr/openv/netbackup/logs` directory (UNIX systems).
  - Create a `bpsched` directory on the master server (the master can also be the NetBackup for NDMP server).

  NetBackup creates activity logs in these three directories, if they exist. These directories can eventually require a lot of disk space; delete them when you are finished troubleshooting.
- To verify that the appropriate services are running, use either the NetBackup Activity Monitor interface, or the Windows NT control panel (on Windows systems) or the `bpps` command (UNIX systems).
- If NDMP host backups terminate with a status code of 154 (storage unit characteristics mismatched to request), the problem can be one of the following.
  - Verify that the NetBackup configuration is correct.
  - There may be a conflict between the class type and storage unit type (for example, if the class type is Standard and the storage unit is of type NDMP).
- If your NDMP backup fails with a status code of 99 (NDMP backup failure), none of the paths in your NDMP class file list were backed up successfully. Check the NetBackup All Log Entries report for more information. A possible cause of this status is that none of the backup paths exist on the NDMP host.

Troubleshooting Media Manager (on Windows NT/2000 systems)

- Enable debug logging, by creating `reqlib` and `daemon` directories in the *install_path*`\Volmgr\debug` directory on the NetBackup for NDMP server.
- Check the Windows NT/2000 Event Viewer Application log for troubleshooting clues. For more information on the Event Viewer logging option, refer to the *NetBackup Troubleshooting Guide -Windows NT/2000*.
- Use the Activity Monitor interface or the Windows NT/2000 control panel to verify that the Media Manager services are running.
- Drives can be unexpectedly set to the DOWN state due to communication problems between `avrd` on the NetBackup for NDMP server and the NDMP server application on the NDMP host. Some possible causes for the communication problems are:
  - Network cable on the NDMP host was unplugged.
  - NIS (Network Information System) problems on the NetBackup for NDMP server (NDMP client).
  - The NDMP host was halted for too long.

Note Whatever the cause, if the `avrd` connection to the NDMP host fails, the drive is set to DOWN and is *not* automatically set to UP when the communication problem is corrected.

Troubleshooting Media Manager (on UNIX systems)

- Ensure that `syslogd` is logging Media Manager messages. For more information on `syslogd`, refer to the *NetBackup Troubleshooting Guide - UNIX*.
- Start `ltid` with the `-v` option. Check `/var/adm/messages` for troubleshooting clues.
- Use `vmps` to make sure that the appropriate Media Manager daemons are running.

Log Messages

```
ndmp_internal_open_and_auth: ndmp connect failed
ndmp_connect_open_and_auth failed, ndmp_result is -4
```

These messages indicate that a connection cannot be made to the NDMP server.

```
ndmp_internal_open_and_auth: ndmp_connect_client_auth failed
ndmp_connect_open_and_auth failed, ndmp_result is -6
```

These messages indicate that a connection could be made to the NDMP server, but authentication failed. Check the password for the NDMP server that is set using the `set_ndmp_attr -auth` command.

```
ndmp_tape_open_func() failed with -2 in io_open()
```

This message indicates that the tape drive is in use.

set_ndmp_attr A

This appendix describes the `set_ndmp_attr` command, which is specific to the NetBackup for NDMP product.

The following are special conventions used in the command description.

- Brackets [ ] mean that the enclosed command line component is optional. For example, assume that a command has the following format:

  ```
  command [arg1]
  ```

  The user can either choose `arg1` or omit it.

- A vertical bar (or pipe) symbol | separates optional arguments. For example:

  ```
  command [arg1 | arg2]
  ```

  The user can choose `arg1` or `arg2` (not both), or can omit both.

- Italics indicate that the information is user supplied. For example, the user supplies a value for *directory* in the following command:

  `-client_libraries` *directory*

set_ndmp_attr

NAME

set_ndmp_attr - authorizes access and sets configuration values for NDMP attached robots.

On Windows NT/2000 systems: *install_path*\Volmgr\bin\set_ndmp_attr

On UNIX systems: /usr/openv/volmgr/bin/set_ndmp_attr

SYNOPSIS

The set_ndmp_attr command can take any of the following sets of parameters as a single line. Two or more sets can be combined into one line (see Example 4).

```
set_ndmp_attr [-insert | -update | -delete | -display] -auth
          [ndmp-server-host] [user-name] [password]

set_ndmp_attr [-insert | -update | -delete | -display] -robot
          [ndmp-server-host] [robot-device] [scsi-controller scsi-id scsi-lun]

set_ndmp_attr -verify [ndmp-server-host]

set_ndmp_attr [-list | -l]

set_ndmp_attr [-list_compact | -lc]
```

DESCRIPTION

Authorizes access and sets configuration values for robots attached to an NDMP client, and places them into the NDMP configuration database.

OPTIONS

-insert (optional)
: Allows user to insert a new authorize access entry or a new robot (must be used with -auth or -robot).

-update (optional)
: Updates an NDMP entry (must be used with -auth or -robot).

-delete (optional)
: Deletes an NDMP entry (must be used with -auth or -robot).

-display (optional)
: Displays an NDMP entry (must be used with -auth or -robot).

-auth
: Creates an entry to allow access to an NDMP client.

-robot
: Sets the configuration values for an NDMP-attached robot.

`-verify` Verifies that the NetBackup for NDMP server has access to the NDMP client.

`-list or -l` (optional)
Lists the current entries in the NDMP configuration database.

`-list_compact or -lc` (optional)
Lists a short version of the NDMP configuration database.

Note If none of the following (`-insert`, `-update`, `-delete`, or `-display`) precedes the options `-robot` or `-auth`, the default is to either insert or update, depending on whether the host or robot already exists.

EXAMPLES

Example 1: Setting the authorization of an NDMP client

```
set_ndmp_attr -insert -auth toaster root
Passwd:XXXXX
Passwd:XXXXX
```

Example 2: Setting the configuration values for a robot attached to an NDMP client. The robot is on control 0, SCSI-ID 0, and LUN 0.

```
set_ndmp_attr -insert -robot toaster:mc0 0 0 0
```

Example 3: Running a verify

```
set_ndmp_attr -verify
Verify Host name: toaster
```

Result of example 3

```
Verify Host name: toaster
Connecting to host "toaster" as user "root"...
Waiting for connect notification message...
Opening session with NDMP protocol version 2...
Host info is:
  host name "toaster"
  os type "NetApp"
  os version "NetApp Release 5.3.4"
```


```
  host id "0016794152"
  host supports TEXT authentication
  host supports MD5 authentication
Getting MD5 challenge from host...
Logging in using MD5 method...
Login was successful
Opening SCSI device "mc0"...
Setting SCSI target controller 0 id 0 lun 0...
Inquiry result is "HP      C5173-7000      3.04"
```

This is an example of the verify failing due to incorrect password entry.

```
set_ndmp_attr -verify toaster
Connecting to host "toaster" as user "root"...
Waiting for connect notification message...
Opening session with NDMP protocol version 2...
Host info is:
  host name "toaster"
  os type "NetApp"
  os version "NetApp Release 5.3.2R1"
  host id "0016782795"
  host supports TEXT authentication
Logging in using TEXT method...
ndmp_connect_client_auth failed
set_ndmp_attr: host "toaster" failed
set_ndmp_attr: unable to continue
```

Example 4: This shows several sets of parameters combined

```
set_ndmp_attr -insert -auth toaster root pw -insert -robot toaster
      mc0 1 2 3 -verify toaster -lc
```

Auspex 4Front NS2000 Servers B

The information in this appendix is supplemental to the NDMP host topics found in other sections of this guide. For more information on Auspex 4Front NS2000, refer to the *Auspex 4Front NS2000 NDMP TurboReplicator Manager's Guide*.

This appendix contains information on the following topics, which are useful for configuring and using Auspex 4Front NS2000 servers:

- Auspex 4Front NS2000 Server Overview
- Restrictions
- Before Starting a NetBackup Installation
- System Device Configuration
- Troubleshooting

Auspex 4Front NS2000 Server Overview

Auspex 4Front NS2000 servers are dedicated file servers developed and marketed by Auspex Inc. These file servers have an NDMP server application which provides tape backup solutions for LFS files systems on the NS2000 platform.

NDMP TurboReplicator supports two types of backups: file-based and image-based. Refer to the *Auspex 4Front NS2000 NDMP TurboReplicator Manager's Guide* for more information on these two types of backups.

Restrictions

- You should verify that the TurboReplicator software is in the correct mode before attempting a restore. Trying to restore the wrong type will result in a failure to restore the data. For more information, refer to "Starting and Stopping the Auspex NDMP Server" in *Auspex 4Front NS2000 NDMP TurboReplicator Manager's Guide.*
- You cannot back up files where the path length is greater than 1024 characters.

See the *NetBackup Release Notes* for a list of supported Auspex operating system levels.

Before Starting a NetBackup Installation

- Make sure the NDMP TurboReplicator software is installed on the Auspex NS2000 machine, by entering the following:

  ```
  pkginfo -l Axndmp
  ```

- Make sure the NDMP TurboReplicator software has been started by entering:

  ```
  ps -ef | grep ndmpd
  ```

For more information, refer to "Starting and Stopping the Auspex NDMP Server" in *Auspex 4Front NS2000 NDMP TurboReplicator Manager's Guide*.

System Device Configuration

The following buffer size setting is recommended for optimal use of Auspex NS2000 with VERITAS NetBackup:

- For Auspex 2.1, set buffer size to 32 KB

  Before using NetBackup on an NS2000 file server, you need to configure NetBackup to use a 32 KB buffer size for I/O. To do so, create the following file:

  ```
  /usr/openv/netbackup/db/config/SIZE_DATA_BUFFERS_NDMP
  ```

  Make the following entry in the file:

  ```
  32768
  ```

  Once the file is created and NetBackup is restarted, NetBackup will read the file and set the buffer size to 32 KB. Without this file, NetBackup will use the default 63 KB buffer size (65536 bytes).

- For Auspex 2.1.1, allow NetBackup to use the default 63 KB buffer size (do NOT manually set the buffer size).

Robot

The tape library robot devices (also called auto-changers or library grippers) are found in the `/dev/raxac` directory of the Auspex host. The format of the device names is as follows:

`fsp<`*F*`>c<`*C*`>t<`*T*`>`

where:

F = FSP instance (0-255)

C = SCSI channel in an Adaptec controller (0-7)

T = SCSI target ID (0-6, 8-15)

For example, `fsp0c0t3` is the auto-changer device on FSP 0, SCSI channel 0, SCSI target 3.

To see a list of the tape library devices, log onto the Auspex host and list the devices in the `/dev/raxac` directory. For example:

```
# ls -l /dev/raxac/*
crw-r--r-- 1 root root 261,1536 Feb 16 10:42 /dev/raxac/fsp0c6t0
```

Robot devices are handled through the NDMP SCSI interface for the backup and restore operation by NDMP clients, such as NetBackup NDMP client. The SCSI interface name would be that of an FSP instance.

Example:

The robot control is on `fsp0`, SCSI ID `6`, and LUN `0`. The `set_ndmp_attr` would be:

```
/usr/openv/volmgr/bin/set_ndmp_attr -robot Auspex1 fsp0 0 6 0
```

Tape Drives

Tape drives are named by using the following format:

`fsp<`*F*`>c<`*C*`>t<`*T*`>[chm][n]`

where:

F = FSP instance (0-255)

C = SCSI channel in an Adaptec controller (0-7)

T = SCSI target ID (0-6, 8-15)

c = compression

h = high density

m = medium density

n = no rewind on close

To see a list of tape devices, log onto the Auspex host and list the devices in the `/dev/raxmt` directory. For example:

```
# ls -l /dev/raxmt/fsp*
crw-r--r-- 1 root root 259,1552 Feb 16 10:42 /dev/raxmt/fsp0c6t6
crw-r--r-- 1 root root 259,1555 Feb 16 10:42 /dev/raxmt/fsp0c6t6c
crw-r--r-- 1 root root 259,1563 Feb 16 12:02 /dev/raxmt/fsp0c6t6cn
crw-r--r-- 1 root root 259,1554 Feb 16 10:42 /dev/raxmt/fsp0c6t6h
crw-r--r-- 1 root root 259,1562 Feb 16 10:42 /dev/raxmt/fsp0c6t6hn
crw-r--r-- 1 root root 259,1553 Feb 16 10:42 /dev/raxmt/fsp0c6t6m
crw-r--r-- 1 root root 259,1561 Feb 16 10:42 /dev/raxmt/fsp0c6t6mn
```


```
crw-r--r-- 1 root root 259,1560 Feb 16 13:44 /dev/raxmt/fsp0c6t6n
```

For example, device name `fsp0c6t6cn` indicates a tape device that is connected to:

FSP 0

SCSI controller 6

SCSI target 6 with hardware compression on and no rewind on close.

The device file name when configuring tapes would look like this:

```
<hostname>:fsp0c6t6cn
```

Troubleshooting

NDMP Client Logging

Auspex log files which could be helpful in debugging are the following:

```
/var/log/auspex-messages
/var/log/ndmp/srvlog
```

Network Appliance File Servers C

The information in this appendix is supplemental to the NDMP host topics found in other sections of this guide.

This appendix contains information on the following topics, which are useful in configuring and using NetApp file servers:

- NetApp File Server Overview
- NetApp File Server Restrictions
- Resource Requirements for NetBackup for NDMP Server
- Before Starting a NetBackup Installation
- System Device Configuration
- Troubleshooting

NetApp File Server Overview

NetApp file servers are dedicated file servers that are developed and marketed by Network Appliance Inc.

These file servers have an NDMP server application, thus allowing their backups to be controlled by an NDMP-compliant backup application such as NetBackup for NDMP.

NetApp File Server Restrictions

- Prior to OnTap 5.3, a single NetApp file server can connect to a total of only five devices (for example, four drives and one robotic control).
- You cannot backup files where the path length is greater than 1024 characters.

See the *NetBackup Release Notes* for a list of the NetApp operating system levels that are supported.

Resource Requirements for NetBackup for NDMP Server

To determine the number of inodes that are currently being used on a NetWork Appliance system, you can use the `maxfiles` command. This command produces output similar to the following:

```
Maximum number of files is currently 362916 (238275 used)
```

Starting with OnTap 5.3, the robot SCSI controller, ID, and LUN are ignored. Zeros can be used when configuring robots in NetBackup for NDMP. You can use `sysconfig -m` to locate the logical name of the media changer (robot) and `mc0` instead of `spt0` when configuring the robot.

Before Starting a NetBackup Installation

Perform the following steps to ensure that the NetApp file server is operating correctly:

1. Check the release version by logging onto the NetApp system as root and typing **`version`**. The following is example output:

   ```
   NetApp Release 4.3.5: Mon Jul 20 17:46:41 PST 1998
   ```

2. Check that the hardware is functioning correctly.

a. Execute **`sysconfig -v`** and **`sysconfig -t`** and verify that the system recognizes the drives.

b. Execute an **`mt status`** command to verify that the system can access the drives. For example:

```
toaster> mt -f nrst0a status
Tape drive: Quantum DLT4700
   Status: offline
   Format:
   fileno = 0  blockno = 0  resid = 0
```

c. Load a tape into the drive and verify that you can perform a backup and restore. For example:

```
toaster> dump 0ufbB rst0a 63 2097151 /home
toaster> restore tf rst0a
```

3. Start the NDMP server daemon by executing the following command:

`ndmpd on`

If you put this command in your `/etc/rc` script on the NetApp file server, the daemon starts at boot time.

4. Check the NDMP server daemon status by executing the **`ndmpd status`** command. For example:

```
toaster> ndmpd status
ndmpd ON.
Session: 0
 Active
 tape device:    nrst0a
 data state:     Idle
 data operation: None
 mover state:    Idle
Session: 1
 Inactive
Session: 2
 Inactive
Session: 3
 Inactive
Session: 4
 Inactive
```

To get further details on a given session type the following:

`ndmpd probe` ***`session`***

Note Each session represents a separate instance of the NDMP server application. Each connection from an NDMP client (such as NetBackup) results in another session. For example, if two backups are in progress, an active session will exist for each backup.

System Device Configuration

Configuring Robotic Control

The NetApp file server currently provides no way to determine robotic information. You must refer to the vendor manuals, check the physical configuration (jumpers and so forth), and try different combinations with the `set_ndmp_attr` command in order to determine the correct information. After each try with the `set_ndmp_attr` command, use `tsdtest`, `tl8test`, `tldtest`, or `acstest` to check communications with the robot.

For example, your NetApp file server has a host name of toaster3, has one robot, and by looking at the front panel of the robot, you have found that the robotic control is at SCSI ID 3 and LUN 0. You would use the following command:

```
set_ndmp_attr -robot toaster3 spt0 0 3 0
```

Then, see if you can exercise the robot using `tldtest -r toaster3:spt0`

If this is unsuccessful, repeat the two commands, varying the controller number until communications are successful.

```
set_ndmp_attr -robot toaster3 spt0 1 3 0
```

An aid to finding the controller number on a NetApp file server is to log on to that file server and execute the `sysconfig -v` command. The following is example output from this command:

```
NetApp Release 4.3.5: Mon Jul 20 17:46:41 PST 1998
System ID: 0016781532
slot 0: System Board 90 MHz (NetApp System Board I rev-b)
        Firmware release:   1.6_i
        Memory Size:        256 MB
slot 0: SCSI Host Adapter 0 (QLogic ISP 1020A)
        Firmware Version 2.13           Clock Rate 40MHz.
        3: SEAGATE ST15230N        0638 Size=3.9GB (8386733 blocks)
        2: SEAGATE ST15230N        0638 Size=3.9GB (8386733 blocks)
        1: SEAGATE ST15230N        0638 Size=3.9GB (8386733 blocks)
        0: SEAGATE ST15230N        0638 Size=3.9GB (8386733 blocks)
        In-Band Enclosure Services
        0 Swap Events, 0 Enclosure Events
slot 0: Ethernet Controller e0
```

```
        MAC Address:        00:a0:98:00:09:ab (Twisted pair)
slot 4: SCSI Host Adapter 4 (QLogic ISP 1040B)
        Firmware Version 2.26           Clock Rate 60MHz.
        4: QUANTUM DLT7000         1732
        In-Band Enclosure Services
        0 Swap Events, 0 Enclosure Events
slot 6: NVRAM (NetApp NVRAM I)
        Revision:           D1
        Serial Number:      4316
        Memory Size:        8 MB
        Battery 1 Status:   100% (3.16v)
        Battery 2 Status:   100% (3.16v)
slot 9: Dual SCSI Host Adapter (NetApp SCSI Adapter I)
        SCSI Host Adapter 9a (Qlogic ISP 1020A)
        Firmware Version 2.13           Clock Rate 40MHz.
        In-Band Enclosure Services
        0 Swap Events, 0 Enclosure Events
        SCSI Host Adapter 9b (Qlogic ISP 1020A)
        Firmware Version 2.13           Clock Rate 40MHz.
        1: Quantum DLT4700         CF64
        2: Quantum DLT4000         CD43
        In-Band Enclosure Services
        0 Swap Events, 0 Enclosure Events
```

From the example above, there are four controllers as follows:

- SCSI Host Adapter 0 = Controller 0
- SCSI Host Adapter 4= Controller 3
- SCSI Host Adapter 9a = Controller 1
- SCSI Host Adapter 9b = Controller 2

Any controllers located on the system board (slot 0) are also assumed to be slot 0, so host adaptor 0 is controller 0. Controllers 1, 2, and 3 were determined by trying each number with the `set_ndmp_attr` command to find the adapter with which it was associated as explained above.

Troubleshooting

- Watch the NDMP host console for errors.
- Check the `/etc/messages` files on the NDMP host for errors. You must do this from an NFS client of the NDMP host.
- Note that the NDMP client to server communication is through `/etc/services` port 10000.

- An NDMP session may be erroneously left active (with the tape open) even when NetBackup or Media Manager daemons are not running. If these daemons are not running, check `ndmpd` status on the NDMP host.

  To kill an NDMP session, first try the NDMP `kill` ***session*** command on the NDMP host; if that does not work, reboot the NDMP host.

- If you attempt to restore file names that are very long (around 1k), the restore may fail and the NetApp file server may not accept further NDMP connections.

  If you have this problem, enter **`telnet`** ***NDMP_host_name*** **`10000`** and look for the following message: `Filer shutdown in progress`.

  If you get this message, reboot the NetApp file server to clear the condition. This problem has only been encountered when restoring files over an existing system. A solution is to restore files to an empty alternate path location. (This problem may occur with older versions of Network Appliance; contact Network Appliance Inc.)

- Due to the NetApp snapshot feature, the NetApp system can unexpectedly run out of disk space when restoring very large files. For example, if file system snapshots exist, restoring a file that requires 60% of the space on the NetApp system can fill the file system (even without an alternate path restore).

  Symptoms for this problem: an `NDMP_HALT_INTERNAL_ERROR` in your NetBackup restore progress log, and a message such as the following in the `/etc/messages` file on the NetApp system:

```
messages.0:Thu Apr 23 09:40:32 CDT [wafl_lopri]: file system is full
```

- Prior to OnTap 5.3, the directory `etc/tmp` must exist on any volume to which a restore is directed.

- If an error 41 (`network connection timed out`) occurs for a restore from an image that contains a large number of files, it may be necessary to increase CLIENT_READ_TIMEOUT.

- Backup failure with a status 99 may indicate that the file list contains a directory that does not exist or a file on the NDMP server.

- Interaction between `avrd` and `tldtest` or `robtest` could cause drives that were thought to be unloaded to be reloaded. Make sure the drives are down before using `tldtest` or manual tape commands on the NDMP host.

Log Messages

`ndmp_connect_open_and_auth failed, ndmp_result is -4`

This log message indicates that a connection cannot be made to the NDMP server. Verify that you can telnet to the NDMP server and that `ndmpd` status on the NDMP server shows that `ndmpd` is ON.

`ndmp_connect_open_and_auth failed, ndmp_result is -6`

This log message indicates that a connection could be made to the NDMP server, but authentication failed. Check the password for the NDMP server (set with the `set_ndmp_attr -auth` command). This password is the administrator password on the NDMP server. Verify that you can telnet to the NDMP server and log in using the password.

EMC Celerra File Servers D

The information in this appendix is supplemental to the NDMP host topics found in other sections of this guide.

This appendix contains information on the following topics, which are useful in understanding and configuring EMC Celerra with NetBackup for NDMP:

- EMC Restrictions
- Connecting Data Movers to the Tape Library Unit (TLU)
- Before Starting a NetBackup Installation
- System Device Configuration
- Troubleshooting

EMC Restrictions

Note the following EMC restrictions.

- The EMC Celerra File Server must be at version 2.1.
- EMC Celerra servers support tape library storage units (differential SCSI) consisting of tape drives, digital linear tapes (DLT), or 8-mm tapes (TL8).
- It is unnecessary to back up the Celerra File Server root file system. You are not allowed to restore to the file system.

Connecting Data Movers to the Tape Library Unit (TLU)

Each Celerra File Server Data Mover used with NetBackup for NDMP should have its own SCSI connection to the Tape Library Unit (TLU) for direct-to-tape backups and restores.

Note If a tape drive is not directly attached to a Data Mover, a "three-way" backup or restore can be performed.

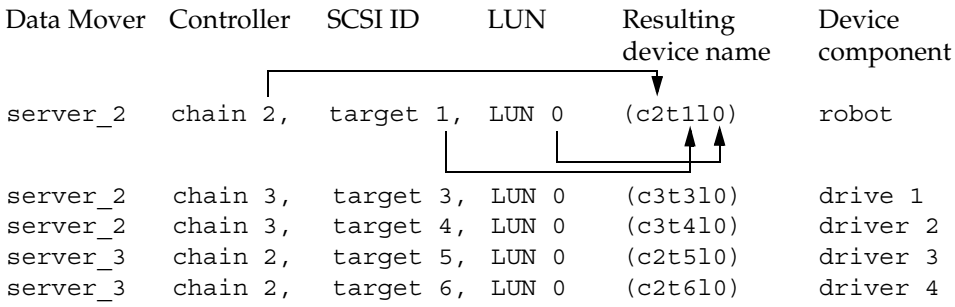
Review the following information before connecting Data Movers to a TLU:

- The Celerra File Server supports a maximum of four simultaneous backups on a Data Mover.
- The Control Station should not be connected to the TLU.
- Multiple Data Movers can be connected to a TLU.
- The Data Mover Symmetrix SCSI connections cannot be daisy chained to the TLU.
- The ability to connect a Data Mover to a TLU depends on the number of SCSI ports on the Data Mover. Some older Data Movers may have only two SCSI ports, which are required for Symmetrix connectivity and redundancy (these SCSI ports cannot be used to connect to a TLU).
- If a Data Mover fails over to its standby, the standby must be physically connected to the appropriate TLU ports.
- The TLU can have multiple SCSI host connections.
- For each TLU SCSI connection, you can attach a maximum of two drives and a robot.

While cabling Data Movers to the TLU tape drives, make sure to label the drives appropriately and record the information as shown in the example below. You need to know these connections when configuring the TLU devices in NetBackup for NDMP.

Note how the device name is composed of the controller (chain number), SCSI ID (target ID number), and LUN number, as indicated by arrows in this example. ("System Device Configuration" on page 75 explains how to use these values to define an NDMP-attached robot.)

Example Connections



Before Starting a NetBackup Installation

Before installing NetBackup for NDMP, do the following (explained in the following sections):

- Define an NDMP user name and password that will give NetBackup for NDMP access to the Celerra (NDMP) host. Define the same user name and password for each Data Mover. The user name must be defined as `ndmp`, and the password used for the Data Mover(s) must be identical to the password used for NetBackup for NDMP.
- Validate the NDMP user name and password.
- Verify the Celerra File Server version number.
- Check the TLU devices.

Setting the NDMP User Name/Password on NetBackup

Since the Celerra File Server is NDMP-compliant, you are strongly advised to assign a trusted user name and password for NetBackup for NDMP *and* for the Data Movers. This is to prevent non-authorized users from accessing your server. Set the NDMP user name and password by entering the following command on the NetBackup for NDMP server:

`set_ndmp_attr -auth` *`ndmp-server-host`* `ndmp` *`password`*

Where *ndmp-server-host* is the Celerra File Server, `ndmp` is the actual user name (no other value is allowed), and *password* specifies the password. For more information on using the `set_ndmp_attr` command to authorize access to the NDMP host, refer to "Authorizing Access To the NDMP Host" in Chapter 3.

Setting the NDMP User Name/Password on a Data Mover

You must create an NDMP password for each Data Mover in the Celerra File Server involved in the backup process.

Creating a Password with NIS Installed

If the Network Information Service (NIS) is installed, enter the following into the NIS database:

- A user ID of **ndmp**
- The password that was entered on NetBackup for NDMP in the previous section. (This NIS password must match the password entered there.)

Note NIS must be enabled on every Data Mover within the Celerra File Server.

Creating a Password without NIS Installed

If NIS is not installed, enter a login ID and password into the Celerra File Server by doing the following:

1. Log on to the Celerra File Server Control Station.
2. On the UnixWare Desktop menu, select Admin_Tools.
3. Click User_Setup.
   a. In the User_Setup window, select User Setup from the Account pulldown menu.
   b. For login ID, enter **ndmp**. Enter the same password that you used for NetBackup for NDMP, above, under "Setting the NDMP User Name/Password on NetBackup" on page 71.
4. To upload a new password file to the Data Mover, do the following. (On the Control Station, the SCO login ID and password you have just entered are stored in the `/etc/shadow` file.)
   a. Log in as root by entering the **su** command.
   b. Enter the following command to copy the Data Mover password file to a temporary file:

```
server_file ndmp-host -g /.etc/passwd /tmp/ndmp
```

Where *ndmp-host* designates a Data Mover to which the login and password (entered above) will be uploaded.

c. In the SCO `shadow` file, find each occurrence of the string `ndmp` and add it to the end of the temporary file, by entering the following:

```
$ grep "^ndmp" /etc/shadow | sed s/:::/:/ >>/tmp/ndmp
```

d. Enter the following command to upload the new password file to the Data Mover:

```
$ server_file ndmp-host -p /tmp/ndmp /.etc/passwd
```

Where:

- *ndmp-host* is the Data Mover to which you are uploading the file.
- `/tmp/ndmp` is the file containing the login ID (`ndmp`) and encrypted password on the Control Station.
- `/.etc/passwd` is the destination file on the Data Mover.

e. Repeat all of step 4 for each Data Mover connected to the TLU.

Validating the NDMP User Name and Password

To validate the NDMP user name and password that you entered above, use an ftp utility to connect to the Data Mover. When connecting, use the Data Mover's external name.

Example Validation:

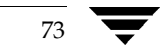
```
$ ftp redweed
Connected to redweed.num.hum.com.
220 server_2 FTP server (Version 6.00) ready.
Name (redweed:nasadmin): ndmp
331 Password required for ndmp.
Password:
230- No directory! Logging in with home=/
230 User ndmp logged in.
```

Verifying the Celerra Version Number

Log on to the Celerra File Server Control Station and enter the following:

```
nas_version
```

The version number must be 2.1.



Checking the TLU Devices

Check that each Data Mover is recognizing the TLU devices by entering the `server_devconfig` command from the Control Station.

Note Do not enter the `server_devconfig` command from the root directory.

For example:

```
server_devconfig server_2 -list -probe -scsi -all
```

This command queries the device configuration of the specified Data Mover (`server_2`). In the following example, the `server_devconfig` command is used to query two Data Movers: the first Data Mover (`server_2`) has two tape drives and a robot attached; the second Data Mover (`server_3`) has two tape drives attached. The first part of each output shows the Symmetrix device configuration; the second part shows the TLU device configuration. Note that `jbox` identifies the TLU robot.

Example of querying Data Mover device configuration

```
$ server_devconfig server_2 -list -probe -scsi –all
tid/lun= 4/1 type= disk sz= 8660 val= 19 info= 52560000F151
.
.
tid/lun= 4/1 type= disk sz= 8660 val= 19 info= 52560000F151
tid/lun= 4/2 type= disk sz= 8660 val= 20 info= 52560000F151
tid/lun= 4/3 type= disk sz= 8660 val= 21 info= 52560000F151
tid/lun= 4/4 type= disk val= -99 info= 526500018151 diskerr -1
chain= 2, scsi-2
tid/lun= 1/0 type= jbox info= BHTi Q2 1.4008/20/9712:40:56
chain= 3, scsi-3
tid/lun= 3/0 type= tape info= QUANTUM DLT7000 18837q7
tid/lun= 4/0 type= tape info= QUANTUM DLT7000 18837q7
$ server_devconfig server_3 -list -probe -scsi –all
tid/lun= 4/1 type= disk sz= 8660 val= 19 info= 52560000F151
.
.
tid/lun= 4/1 type= disk sz= 8660 val= 19 info= 52560000F151
tid/lun= 4/2 type= disk sz= 8660 val= 20 info= 52560000F151
tid/lun= 4/3 type= disk sz= 8660 val= 21 info= 52560000F151
tid/lun= 4/4 type= disk val= -99 info= 526500018151 diskerr -1
chain= 2, scsi-2
tid/lun= 5/0 type= tape info= QUANTUM DLT7000 18837q7
tid/lun= 6/0 type= tape info= QUANTUM DLT7000 18837q7
```

Symmetrix device configuration

TLU device configuration

Symmetrix device configuration

TLU device configuration

As shown in "Example Connections" on page 71, the Celerra File Server identifies a TLU device by its controller (chain number), SCSI ID (target ID or tid number), and LUN. See "System Device Configuration" below for help in using these values to set the attributes for an NDMP-attached robot.

System Device Configuration

Robot

Use the `set_ndmp_attr` command to set attributes for an NDMP-attached robot. (Appendix A contains more detail on the `set_ndmp_attr` command.)

For example:

```
set_ndmp_attr -robot redweed c2t1l0 2 1 0
```

Where:

- `redweed` is the name of the Data Mover
- `c2t1l0` is the device name for the robotic controller (the "Example Connections" on page 71 shows how this name is composed)
- `2` is the chain number (the `scsi-controller` number on the `set_ndmp_attr` command as described in Appendix A)
- `1` is the target ID or tid of the robot control (the `scsi-id` on the `set_ndmp_attr` command as described in Appendix A)
- `0` is the LUN number (`scsi-lun` on the `set_ndmp_attr` command as described in Appendix A)

Drives

On an EMC Celerra File Server there is only one device file per tape drive. When configuring the tape device files for NetBackup for NDMP, use this device file. For assistance in configuring this device file, refer to step 3 on page 39, under "Adding a Drive" in Chapter 3.

Example of device file:

```
redweed:c3t3l0
```

where `redweed` is the Data Mover external name and `c3t3l0` is the tape device file name.

Troubleshooting

If there are problems when backing up files to the TLU, check the TLU by performing a manual backup from the Celerra File Server Control Station (use the `server_archive` command).

For example, to archive data files to drive 1:

```
server_archive dm6_ana0 -w C3t3l0
```

Where:

- `dm6_ana0` is the customer-assigned Data Mover name
- `-w` is the write command option
- `C3t3l0` is the device name of drive 1

If the archive did not take place, there may be a problem with the TLU. Refer to the *Celerra File Server Command Reference Manual* for a detailed description of the `server_archive` command options.

Log Files

To investigate backup problems, review the appropriate system log files and the `server_log` file generated by the Data Mover.

For example, to access the `server_2` Data Mover log file, you would enter the following at the Celerra File Server Control Station:

```
server_log server_2
```

Index