VERITAS NetBackup™ 6.0 for NDMP

System Administrator’s Guide

for UNIX, Windows, and Linux

N15271C

September 2005
Disclaimer

The information contained in this publication is subject to change without notice. VERITAS Software Corporation makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. VERITAS Software Corporation shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this manual.

VERITAS Legal Notice

Copyright © 2002 - 2005 VERITAS Software Corporation. All rights reserved. VERITAS, the VERITAS Logo, and NetBackup are trademarks or registered trademarks of VERITAS Software Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

Portions of this software are derived from the RSA Data Security, Inc. MD5 Message-Digest Algorithm. Copyright 1991-92, RSA Data Security, Inc. Created 1991. All rights reserved.

VERITAS Software Corporation
350 Ellis Street
Mountain View, CA 94043
USA
Phone 650-527-8000
Fax 650-527-2908
www.veritas.com

Third-Party Copyrights

For a list of third-party copyrights, see the NetBackup Release Notes appendix.
Contents

Getting Help .............................................................. vii
Finding NetBackup Documentation ............................... vii
Accessing the VERITAS Technical Support Web Site ........ viii
Contacting VERITAS Licensing ...................................... ix
Accessibility Features ................................................... ix
Comment on the Documentation ..................................... x
NetBackup for NDMP Information on the Web ................ x
Advanced Client Information on the Web ........................ x

Chapter 1. Introduction to NetBackup for NDMP ............ 1
NetBackup for NDMP Features ....................................... 2
NetBackup for NDMP Terminology ................................ 4
Network Data Management Protocol (NDMP) ................... 6
Types of NDMP Backup ................................................ 7
  NDMP Local Backup ................................................ 7
  NDMP Three-Way Backup ........................................... 8
Backup to Media Manager Storage Devices (Remote NDMP) ... 9
NDMP Policies ............................................................ 10
Storage Units .............................................................. 11
  NDMP Storage Units ............................................... 11
  Media Manager Storage Units .................................... 11
Assigning Tape Drives to Different Hosts ........................ 11
NDMP Backup Process ................................................ 14
NDMP Restore Process ............................................... 16
Chapter 2. Installing NetBackup for NDMP ........................................... 19
   Installation Notes ................................................................. 19
   Installing on UNIX Servers ................................................. 20
   Installing on Windows Servers ........................................... 21
   Uninstalling NetBackup for NDMP ........................................ 22

Chapter 3. Configuring NDMP Backup to NDMP-Attached Devices ............. 23
   Authorizing Access to the NDMP Host .................................... 24
      Access for Three-Way Backups and NDMP to Media Manager ...... 27
   Media Manager Device Configuration .................................... 28
      Adding a Robot Directly Attached to an NDMP Host ............... 28
      Adding a Drive .................................................................. 31
      Checking a Media Manager Configuration ............................ 33
      Adding Volumes to a Media Manager Configuration ............... 33
   Verifying NDMP Password and/or Robot Connection .................. 34
   Adding NDMP Storage Units ............................................... 35
   Creating an NDMP Policy .................................................... 37
      Attributes ........................................................................ 37
      Clients .......................................................................... 37
      Files ............................................................................. 38
      Schedules ........................................................................ 38
      Using Environment Variables in Backup Selections list .......... 38
   Enabling/Disabling DAR ..................................................... 40
   Setting Up Clustering ......................................................... 43
      Post-Installation Changes .................................................. 43
   Testing an NDMP Configuration .......................................... 44

Chapter 4. Configuring NDMP Backup to NetBackup Media Servers ........... 45
   Overview ............................................................................ 46
ndmp_start_path_notify.cmd (Microsoft Windows) ......................... 80
ndmp_end_path_notify (UNIX) .................................................... 82
ndmp_end_path_notify.cmd (Microsoft Windows) ............................. 84
ndmp_moving_path_notify (UNIX) .............................................. 86
ndmp_moving_path_notify.cmd (Microsoft Windows) ......................... 88

Index ................................................................. 91
Preface

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.

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.

Getting Help

You can find answers to questions and get help from the NetBackup documentation and from the VERITAS technical support web site.

Finding NetBackup Documentation

A list of the entire NetBackup documentation set appears as an appendix in the NetBackup Release Notes. All NetBackup documents are included in PDF format on the NetBackup Documentation CD.

For definitions of NetBackup terms, consult the online glossary.

To access the NetBackup online glossary

1. In the NetBackup Administration Console, click Help > Help Topics.

2. Click the Contents tab.

3. Click Glossary of NetBackup Terms.

Use the scroll function to navigate through the glossary.
Getting Help

Accessing the VERITAS Technical Support Web Site

The address for the VERITAS Technical Support Web site is http://support.veritas.com.

The VERITAS Support Web site lets you do any of the following:

◆ Obtain updated information about NetBackup, including system requirements, supported platforms, and supported peripherals
◆ Contact the VERITAS Technical Support staff and post questions to them
◆ Get the latest patches, upgrades, and utilities
◆ View the NetBackup Frequently Asked Questions (FAQ) page
◆ Search the knowledge base for answers to technical support questions
◆ Receive automatic notice of product updates
◆ Find out about NetBackup training
◆ Read current white papers related to NetBackup

From http://support.veritas.com, you can complete various tasks to obtain specific types of support for NetBackup:

1. Subscribe to the VERITAS Email notification service to be informed of software alerts, newly published documentation, Beta programs, and other services.
   a. From the main http://support.veritas.com page, select a product family and a product.
   b. Under Support Resources, click Email Notifications.

      Your customer profile ensures you receive the latest VERITAS technical information pertaining to your specific interests.

2. Locate the telephone support directory at http://support.veritas.com by clicking the Phone Support icon. A page appears that contains VERITAS support numbers from around the world.

   Note  Telephone support for NetBackup is only available with a valid support contract. To contact VERITAS for technical support, dial the appropriate phone number listed on the Technical Support Guide included in the product box and have your product license information ready for quick navigation to the proper support group.

3. Contact technical support using e-mail.
a. From the main http://support.veritas.com page, click the E-mail Support icon. A wizard guides you to do the following:
   ◆ Select a language of your preference
   ◆ Select a product and a platform
   ◆ Provide additional contact and product information, and your message
   ◆ Associate your message with an existing technical support case

b. After providing the required information, click Send Message.

Contacting VERITAS Licensing

For license information, you can contact us as follows:
   ◆ Call 1-800-634-4747 and select option 3
   ◆ Fax questions to 1-650-527-0952
   ◆ In the Americas, send e-mail to amercustomercare@veritas.com.
     In the Asia and Pacific areas, send email to apaccustomercare@veritas.com.
     In all other areas, send email to internationallicense@veritas.com.

Accessibility Features

NetBackup contains features that make the user interface easier to use by people who are visually impaired and by people who have limited dexterity. Accessibility features include:
   ◆ Support for assistive technologies such as screen readers and voice input (Windows servers only)
   ◆ Support for keyboard (mouseless) navigation using accelerator keys and mnemonic keys

For more information, see the NetBackup Installation Guide.
Comment on the Documentation

Let us know what you like and dislike about the documentation. Were you able to find the information you needed quickly? Was the information clearly presented? You can report errors and omissions or tell us what you would find useful in future versions of our manuals and online help.

Please include the following information with your comment:

- The title and product version of the manual on which you are commenting
- The topic (if relevant) on which you are commenting
- Your comment
- Your name

Email your comment to NBDocs@veritas.com.

Please only use this address to comment on product documentation. See “Getting Help” in this preface for information on how to contact Technical Support about our software.

We appreciate your feedback.

NetBackup for NDMP Information on the Web

The VERITAS support web site has a pdf document about supported NDMP operating systems and NAS vendors. It also contains configuration and troubleshooting help for particular NAS systems.

Go to www.support.veritas.com and enter “NAS Appliance” in the search field. The title of the document is: NetBackup for NDMP Supported OS and NAS Appliance Information.

Advanced Client Information on the Web

The VERITAS support web site has a pdf document about Advanced Client containing a list of NAS vendors currently supported for the NAS_Snapshot method and for SnapVault, along with configuration notes.

Go to www.support.veritas.com and enter “Advanced client configuration” in the search field. The title of the document is: VERITAS NetBackup Advanced Client Configuration and Compatibility.
Introduction to NetBackup for NDMP

NetBackup for NDMP is an optional application that enables NetBackup to use the Network Data Management Protocol (NDMP) to initialize and control backups and restores of Network Attached Storage (NAS) systems.

This chapter contains the following topics.

◆ NetBackup for NDMP Features
◆ NetBackup for NDMP Terminology
◆ Network Data Management Protocol (NDMP)
◆ Types of NDMP Backup
◆ NDMP Policies
◆ Storage Units
◆ NDMP Backup Process
◆ NDMP Restore Process
◆ Direct Access Recovery (DAR)
NetBackup for NDMP Features

NetBackup for NDMP includes the following features:

◆ Support for NDMP protocol versions V2, V3, and V4.
◆ Centralized backup-policy management
  
  Scheduling, catalog management, and other backup tasks are managed from a NetBackup master server. NetBackup for NDMP may be installed on a NetBackup master or media server.
◆ Device and media management
  
  NetBackup Media Manager software provides complete management and control of the devices and media used for backups and restores of NDMP hosts. The NetBackup Device Configuration wizard can discover and configure storage devices that are attached to an NDMP host (requires NDMP protocol versions V3 or V4). Note that wizard-based discovery depends upon a number of device-specific features, such as SCSI inquiry and serialization, which may not be supported by all NAS vendors.
◆ High speed local backup of NDMP hosts
  
  Backup data travels between disk and tape drives that are directly attached to the same NDMP host. This provides high-speed backup without impairing network throughput.
◆ Backup of network-attached NDMP hosts to a tape device on another NDMP host or to advanced tape libraries with embedded NDMP server.
  
  Backup data travels across the network, from a disk on an NDMP host to tape on another NDMP host. This is referred to as three-way backup. This data movement option requires support from the NAS/NDMP host.
◆ Backup of a network-attached NDMP host to a tape device on a NetBackup media server. This is a form of three-way backup also known as remote NDMP. This feature supports NDMP versions V2, V3, and V4 on the NDMP hosts.
◆ Shared tape libraries
  
  Tape libraries 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.
◆ Shared tape drives with the Shared Storage Option
  
  Tape drives can be shared between servers (both NetBackup servers and NDMP hosts). This requires the Shared Storage Option (SSO) license. To see if your NAS vendor supports SSO, refer to the NetBackup for NDMP Supported OS and NAS Appliance Information document (see “NetBackup for NDMP Information on the Web” on page x for help accessing this document).
◆ Snapshots of data on NDMP hosts

NetBackup can make point-in-time snapshots of data on an NDMP (NAS) host without interrupting client access to the data, using the NDMP V4 snapshot extension. The snapshot is stored on the same device that contains the NDMP client data. From the snapshot, you can restore individual files or roll back a file system or volume, by means of Advanced Client Instant Recovery. A NetBackup Advanced Client license is required, in addition to the NetBackup for NDMP license. This Advanced Client feature uses the NAS_Snapshot method. Refer to the NetBackup Advanced Client System Administrator’s Guide for details.

◆ NetBackup can also create a SnapVault disk copy from a NAS snapshot. Configuration details are contained in the NetBackup Advanced Client System Administrator’s Guide.

For a list of NAS vendors that NetBackup currently supports for SnapVault and NAS_Snapshot, refer to the Advanced Client Configuration and Compatibility online document (see the preface of this manual for help accessing that document).

◆ Direct Access Recovery (DAR)

For NDMP hosts that support DAR, this feature can greatly reduce the time it takes to restore a single file or small number of files.

◆ Path-based file history

The NDMP server can send catalog information consisting of complete path names to NetBackup. This feature is not supported by all vendors. For up-to-date information on the vendors supporting path-based history, refer to “NetBackup for NDMP Information on the Web” on page x.

◆ NetBackup for NDMP servers are supported in a NetBackup clustered environment.

◆ The enhanced ability to execute customized scripts during a backup, especially for relational databases residing on NAS devices.
NetBackup for NDMP Terminology

This section introduces NetBackup for NDMP terminology. For explanations of other NetBackup terms, consult the NetBackup online glossary in NetBackup help.

**DAR (Direct Access Recovery)**
The NDMP host positions the tape to the exact location of the requested file(s), reading only the data needed for those files. Restore times can be reduced from hours to minutes.

**NDMP (Network Data Management Protocol)**
NDMP is a widely used protocol through which an NDMP-conformant backup application can control the backups and restores for an NDMP host.

**NDMP Backup to Media Manager Devices**
This is a form of three-way backup/restore also known as Remote NDMP, in which data travels from an NDMP host to a tape drive attached to a NetBackup media server.

**NDMP Client**
An NDMP client is an NDMP-compliant backup application (also known as a Data Management Application or DMA) 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 software installed on it.

**NDMP Host**
A NAS system that serves files to clients using HTTP, FTP, CIFS, or NFS protocols. It also runs an NDMP server application that communicates with NDMP client backup software to configure and perform backup and restore tasks.

NAS systems are designed to provide fast, multi-protocol file access 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 never 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-conformant backup application. The backup application (NetBackup) is considered an NDMP client.
A separate instance of an NDMP server process exists for each connection to an NDMP client. That is, if two backups are in progress, an NDMP server process exists for each backup.

**NDMP Storage Unit**
An NDMP storage unit stores the backup data for an NDMP host. The tape drives in this storage unit attach directly to the NDMP host or can be configured on a SAN.

Note that NDMP storage units cannot be used to store data for non-NDMP hosts, and NetBackup disk storage units cannot be used for NDMP tasks.

**Redirected Restore (to a Different Client)**
In a redirected 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 (or NetBackup media server) with a locally attached storage device to another NDMP host on the network.

**Remote NDMP**
See “NDMP Backup to Media Manager Devices.”

**Three-Way Backup/Restore**
In a three-way backup or restore, data travels between an NDMP host and a storage device attached to another NDMP host or to a NetBackup media server. 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.
Network Data Management Protocol (NDMP)

NDMP is a widely used protocol through which an NDMP-conformant backup application can control the backups and restores of any NDMP host that is running an NDMP server application.

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 NetBackup software is a client of the NDMP server application. The NetBackup for NDMP application allows NetBackup to be an NDMP client. The NDMP hosts, on the other hand, act as NetBackup clients.

**NDMP and NetBackup Hosts as Clients of Each Other**

![Diagram showing the relationship between NetBackup for NDMP server and NDMP hosts]
Types of NDMP Backup

The NDMP server application on the NDMP host performs backups and restores of the NDMP host, directed by commands received from an NDMP client (NetBackup). Backups can be conducted in any of the following ways:

- NDMP local backup
- NDMP three-way backup
- Backup to a Media Manager device on the NetBackup server

NDMP Local Backup

The NetBackup for NDMP server initiates the backup. The data travels from the NDMP host’s disk to a storage device attached to the same host, or to a device available on a SAN.

Local NDMP backup

Data travels from disk to tape on same NDMP host, or from disk to tape device on SAN. Backup data is NOT sent over local network.

The tape drives must be in NDMP-type storage units.
NDMP Three-Way Backup

The NetBackup for NDMP server initiates the backup. The data travels over the network, from an NDMP host to a storage device that is attached to another NDMP host on the local network or available on a SAN.

NDMP Three-Way Backup/Restore

Three-Way NDMP backup
Data travels from disk on an NDMP host to tape device on another NDMP host. *Backup data is sent over the local network.*

The tape drives must be in NDMP-type storage units.
Backup to Media Manager Storage Devices (Remote NDMP)

The data travels over the network from an NDMP host to a Media Manager-type storage device attached to a NetBackup media server or available on the SAN.

NDMP Backup to a Media Manager Device (Remote NDMP)

To NetBackup Server-Attached Media Manager Storage Units
Data travels from NDMP host to a drive on a NetBackup media server or on a SAN. Backup data is sent over the local network.

NOTE: The NetBackup drive(s) must be in Media Manager type storage units.
NDMP Policies

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

An NDMP policy can have one or more NetBackup clients. Each NetBackup client must be an NDMP host (see figure “NDMP and NetBackup Hosts as Clients of Each Other” on page 6). Note that you do not install any NetBackup software on the NDMP hosts.

The allowable backup types for schedules in an NDMP policy are: Full, Cumulative Incremental, or Differential Incremental. User initiated backups and archives are not allowed, because the NDMP protocol does not permit these tasks.

Restores of NDMP host backups can be initiated from any NetBackup media server that is within the same overall NetBackup storage domain and uses the same NetBackup master server as used by the media server that performed the backup. The data can be restored to the NDMP host where it was backed up, or to another NDMP host.

NDMP policies can use either NDMP storage units or Media Manager storage units.
Storage Units

NetBackup uses either NDMP-type storage units (for local or three-way backup), or Media Manager storage units (for backup to devices attached to a NetBackup media server).

NDMP Storage Units

When backing up NDMP host data to devices attached to an NDMP host or available to the NDMP host on a SAN, NetBackup requires NDMP-type storage units.

An NDMP storage unit can contain standalone or robotic drives. Robotic controls can be in a TLD (Tape Library DLT), TL8 (Tape Library 8MM), TLH (Tape Library Half Inch), or ACS robot type.

Media Manager Storage Units

When backing up NDMP host data to devices attached to a NetBackup for NDMP server or available to the server on a SAN, you can use drives configured in Media Manager-type storage units.

For NDMP backup, drives in Media Manager-type storage units do not have to be dedicated to NDMP data: they can store backups of regular (non-NDMP) NetBackup clients as well as of NDMP clients.

Refer to the “Configuring NDMP Backup to NetBackup Media Servers” chapter for configuration help.

Assigning Tape Drives to Different Hosts

Robotic tape drives can be divided up among NDMP hosts and NetBackup servers. For example, referring to the “NDMP and Non-NDMP Storage Units” diagram:

- Tape drives 1, 3, and 5 are attached 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.

- Tape drives 2 and 4 are attached to a NetBackup server and are in non-NDMP storage units, controlled in the same way as other drives on NetBackup servers. Depending on the type of storage unit, these drives can be used for the following:
  - For non-NDMP clients of NetBackup
In the case of tape drives in Media Manager storage units, they can be used for both NDMP (local or three-way) and non-NDMP backup.

In this diagram, all tape drives except drive 4 can be used for NDMP backup.

**NDMP and Non-NDMP Storage Units**

- **In NDMP storage unit**
- **In NetBackup Media Manager storage unit**
- **In another type of NetBackup storage unit (not NDMP or Media Manager)**

**LAN/WAN**

- **Drive-control commands for NDMP**

- Drive 1
- Drive 3
- Drive 5

- Drive 2
- Drive 4 (TLD Robot)

Drives 1, 3, and 5 (in NDMP storage units) can be used for NDMP backups.

Drive 2 (in Media Manager storage unit) can be used for NDMP or non-NDMP backup.

Drive 4 (in different type of NetBackup storage unit) cannot be used for NDMP backup.
Robotics control can be attached to an NDMP host or to a NetBackup server, as follows.

**NDMP host**

Commands are sent by NetBackup over the network to the NDMP host, which in turn sends them to the robot.

Robotics Control Attached to an NDMP Host

**NetBackup server**

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

Robotics Control Attached to a NetBackup Server
NDMP Backup Process

The following diagram ("NetBackup Backup Processes.") shows the NetBackup processes that are involved in NDMP backups. During a backup, the following events occur:

1. From the EMM database, NetBackup obtains a media ID for the tape that will be used for the backup and sends a tape-mount request to \texttt{ltid}.

2. \texttt{ltid} on the NetBackup for NDMP server sends the NDMP (SCSI robotic) commands necessary to get the requested tape mounted on the storage device.

3. 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 a NDMP host (or NetBackup media server) with a locally attached storage device (three-way backup).

4. 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.

5. The NDMP server application sends status about the backup operation to the NetBackup for NDMP server.
NDMP Backup Process

NetBackup Backup Processes.

NetBackup Master Server

- Configuration Database
- File Database

NetBackup Administration Console
- bprd

NetBackup Master or Media Server
- This server has NetBackup for NDMP

Catalog Information
- bpdsm
- nbproxy
- nbemmm
- nbemm
- nbjm

Network Connection
- bpcd
- nbbrm
- ndmpagent

"3-way"

Tape Request
- ltid

NDMP Host
- NDMP Server
- OS
- Tape
- Disk
- Local

Chapter 1, Introduction to NetBackup for NDMP
NDMP Restore Process

Because of the design of the NDMP protocol, only an administrator on a NetBackup server (master or media) can restore files from NDMP backups. During a restore, the administrator browses the file catalog and selects files from NDMP images in the same manner as for standard backup images.

“NetBackup Restore Processes” shows the NetBackup processes involved in NDMP restores. The following events occur during a restore:

1. The NetBackup for NDMP server looks in its EMM database for the tape that contains the backup, and asks \texttt{ltid} to mount that tape.

2. \texttt{ltid} on the NetBackup for NDMP server sends the NDMP commands necessary to get the requested tape loaded on the storage device.

3. 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 (or NetBackup media server) with a locally attached storage device to another NDMP host (three-way backup/restore)

4. The NDMP server application sends status about the restore operation to the NetBackup for NDMP server.
NetBackup Restore Processes

**NetBackup Master Server**

- **bprd** is on the master server

**NetBackup Master or Media Server**

- This server has NetBackup for NDMP.

**NDMP Host**

- "3-way" connection

**OS**

- Disk

- Tape

**Local**

**Network Connection**

**Backup, Archive, and Restore (on master or media server)**
Direct Access Recovery (DAR)

Quickly restoring a single file or group of files from a backup image created by NetBackup for NDMP can be accomplished automatically using Direct Access Recovery (DAR). DAR can greatly reduce the time it takes to restore files. DAR is enabled by default (no configuration required).

There are two prerequisites for using DAR with NetBackup for NDMP:

- DAR must be supported by the NDMP host where the NDMP server application resides.
- The backup must have been made by NetBackup 4.5 GA or later, with the catalog in binary format (binary format is the default).

Note  File-level DAR is supported; directory-level DAR is not supported.

DAR enables the NDMP host to position the tape to the exact location of the requested file(s), reading only the data needed for those files. NetBackup automatically determines whether DAR will shorten the duration of the restore, and activates DAR only when it will result in a faster restore.

NetBackup DAR can be disabled for all NDMP policies (see “Enabling/Disabling DAR” on page 40).
Installing NetBackup for NDMP

This chapter explains how to install the NetBackup for NDMP application on NetBackup servers.

Installation Notes

◆ The NetBackup for NDMP master/media server must be running NetBackup 6.0 or later.

◆ The NetBackup for NDMP 6.0 software supports Solaris, HP-UX, Red Hat Linux, AIX, and Windows 2000/2003 (including 64-bit) master or media servers.

For a detailed list of NAS platforms supported by NetBackup for NDMP, refer to “NetBackup for NDMP Information on the Web” on page x.

◆ For making snapshots of NDMP (NAS) hosts, NetBackup Advanced Client software must be installed on the NetBackup master server, and on the clients that are used to perform backups. For more information, refer to the NetBackup Advanced Client System Administrator’s Guide.

◆ Drives and robots attached to the NDMP host must be types supported by the NDMP host and NetBackup. See “NDMP Storage Units” on page 11 for a list of supported robot types. For more information on storage devices, see the NetBackup Media Manager System Administrator’s Guide (UNIX or Windows).

◆ For notes and tips on your particular NDMP host, refer to “NetBackup for NDMP Information on the Web” on page x.
Installing on UNIX Servers

**Note** If you are installing in a cluster environment, you must freeze the active node before you begin the installation process so that migrations do not occur during installation. For information about freezing a service group, see the clustering section in the *NetBackup High Availability System Administrator's Guide* for the cluster software you are running.

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

1. Log in as root.

2. Install NetBackup server and client software as explained in the *NetBackup Installation Guide for 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.

7. Select **NetBackup Add-On Product Software**.

   a. Select the **NetBackup for NDMP** option.

   b. Enter q to quit the menu.

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

8. If this NetBackup for NDMP server is not your master server, also install your NDMP license key on the master.

9. In a clustered environment, the above steps must be done on each node in the cluster.
Installing on Windows Servers

Note: If you are installing in a cluster environment, unfreeze the active node after the installation completes. For information about unfreezing a service group, see the clustering section in the NetBackup High Availability System Administrator’s Guide for the cluster software you are running.

Installing on Windows Servers

Note: If you are installing in a cluster environment, you must first freeze the active node so that migrations do not occur during installation. For information about freezing a service group, see the clustering section in the NetBackup High Availability System Administrator’s Guide for the cluster software you are running.

On the Windows 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 Installation Guide for Windows.

3. NetBackup for NDMP is part of the core NetBackup product. 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, click the star icon to open the Add a new License Key dialog. Type the new 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. If this NetBackup for NDMP server is not your master server, install your NDMP license key on the master.

5. In a clustered environment, the above steps must be done on each node in the cluster.
Uninstalling NetBackup for NDMP

On the server where you initially loaded the NetBackup for NDMP software, do the following. This procedure results in total removal of the NetBackup for NDMP software.

Note In a cluster environment, you must first freeze the active node so that migrations do not occur during installation. For help freezing a service group, see the clustering section in the NetBackup High Availability System Administrator’s Guide for the cluster software you are running.

1. Check the Activity Monitor in the Administration Console to make sure no NetBackup for NDMP backups are active or running (State field reads Done).

2. If ltid is running, stop it (use the Activity Monitor > Daemons tab).

3. Pre-6.0 NetBackup on Solaris only: if ndmpmoveragent is running (check the Activity Monitor > Processes tab), stop it by entering the following:
   
   cd /usr/openv/volmgr/bin
   ./ndmpmoveragent.stop

4. To remove the NetBackup for NDMP package, enter the following:

   On Solaris:
   
   pkgrm VRTSnbdmp

   On other UNIX platforms:
   
   rm -f /usr/openv/lib/libndmp_bpfsmap.s?
   rm -f /usr/openv/lib/libndmpclient.s?
   rm -f /usr/openv/volmgr/bin/set_ndmp_attr
   rm -f /usr/openv/share/version_ndmp
   rm -f /usr/openv/netbackup/bin/ndmpmoveragent

   where ? is a wildcard.

5. Restart ltid.

Note If uninstalling in a cluster environment, unfreeze the active node after the uninstall.
Configuring NDMP Backup to NDMP-Attached Devices

This chapter explains how to configure backups on storage devices attached to NDMP hosts. Only NDMP-specific steps are described.

Note As an alternative to the device configuration procedures in this chapter, you can use the NetBackup Device Configuration wizard to discover and configure robots and drives that are attached to an NDMP host (requires NDMP protocol versions V3 or V4).

To configure and use the NAS_Snapshot method when backing up NDMP host data, see the NetBackup Advanced Client System Administrator’s Guide.

The following topics are covered in this chapter:

◆ Authorizing Access to the NDMP Host
◆ Media Manager Device Configuration
◆ Verifying NDMP Password and/or Robot Connection
◆ Adding NDMP Storage Units
◆ Creating an NDMP Policy
◆ Enabling/Disabling DAR
◆ Setting Up Clustering
◆ Testing an NDMP Configuration
Authorizing Access to the NDMP Host

Before NetBackup can carry out backups, it must have access to the NDMP host. To authorize this access, use the following dialog from the NetBackup Administration Console on your NetBackup for NDMP master server. You can also use the NetBackup Device Configuration wizard to create this authorization.

**Note** Do the following on the master server (not media server) if you are going to create snapshots using the Advanced Client NAS_Snapshot method.

▼ To authorize NetBackup access to the NDMP host (from Administration Console)

1. On the NetBackup server: under **Media and Device Management > Devices**, click on **NDMP Hosts**. Under **Actions**, choose **New > NDMP Host**.
   
The NDMP host name dialog appears.

2. Enter the name of the NDMP server that NetBackup will back up.

   **Note** This NDMP host name is case-sensitive. Whenever this host name is used (such as when configuring tape drives and storage units for this host), the name must be identical to the name entered here.

3. Click **OK**.
   
The New NDMP Host dialog appears.
The term *credentials* refers to the username and password that NetBackup will use to access the NDMP host.

Use the global NDMP login.

Create a login to this NDMP host for all NetBackup servers.

Specify different NDMP logins for particular NetBackup servers.

4. **Specify the following:**

   **Use global NDMP credentials for this NDMP host**

   Select this option to enable all NetBackup media servers under the master server to access this NDMP host using a pre-defined global NDMP login. This login is created under **Host Properties > Master Server > Properties > NDMP**, on the NDMP Global Credentials dialog.

   **Use the following credentials for this NDMP host on all media servers**

   Select this option to enable all NetBackup media servers connected to the NDMP host to access the NDMP host using the login you specify on this dialog:

   - **Username**: the user name under which NetBackup will access the NDMP server. This user must have permission to execute NDMP commands.
**Note** To see if your NDMP host vendor requires a particular username or access level (such as root), refer to “NetBackup for NDMP Information on the Web” on page x.

- **Password** and **Confirm Password**: enter the password for this user.

Use different credentials for this NDMP host on each media server

Select this option to specify NDMP logins for particular NetBackup servers, then click **Advanced Configuration**. The Advanced NDMP Credentials dialog appears.

![Advanced NDMP Credentials](image1)

**5.** Click **Add**. The Add Credentials dialog appears.

![Add Credentials](image2)
6. Select a NetBackup server and specify the username and password it will use to access the NDMP host.

7. Click OK. NetBackup validates the username and password.
   The NetBackup server and username appear in the Advanced NDMP Credentials dialog.

8. If needed, click Add again to specify other servers and user names.

9. Repeat this procedure for each NDMP host that NetBackup will back up.

**Access for Three-Way Backups and NDMP to Media Manager**

To perform three-way backups, you must authorize access to the desired NDMP host as described in the previous section.

- Three-way backups: for the **NDMP host name**, specify the NDMP host that has no attached tape drive.

- NDMP to Media Manager backups: for the **NDMP host name**, specify the NDMP host that will be backed up to the media manager storage unit defined on the NetBackup server. See the chapter titled “Configuring NDMP Backup to NetBackup Media Servers” for more information.
Media Manager Device Configuration

On the NetBackup for NDMP server, use **Media and Device Management** in the Administration Console to add drives and robots. As an alternative, you can use the NetBackup Device Configuration wizard.

The following procedures and examples treat NDMP configuration issues only. See the *NetBackup Media Manager System Administrator’s Guide* for general information on configuring NetBackup media.

For more information on configuring storage devices for specific NDMP hosts, refer to “NetBackup for NDMP Information on the Web” on page x.

**Note** These procedures do not apply to setting up devices attached to the NetBackup media server. To back up NDMP data to Media Manager devices (remote NDMP), storage units are configured in the same way as ordinary NetBackup (non-NDMP) devices. For details, refer to “Configuring NDMP Backup to NetBackup Media Servers” on page 45, and to the *NetBackup Media Manager System Administrator’s Guide*.

Adding a Robot Directly Attached to an NDMP Host

Using the NetBackup Administration Console:

1. Start the NetBackup Administration Console on the NetBackup for NDMP server as follows:

   On Windows: from the Windows **Start** menu, select **Programs, VERITAS NetBackup, NetBackup Administration Console**.

   On UNIX, enter the following:

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

2. Select **Media and Device Management > Devices** in the left pane.

3. On the **Actions** menu, select **New**, then select **Robot**... from the popup. The Add Robot dialog appears.
For assistance with the Add Robot dialog, refer to the online help or to the NetBackup Media Manager System Administrator’s Guide. The steps below explain the portions that are unique to configuring NetBackup for NDMP.

4. For Media Manager host, specify the host that manages the EMM database (by default, this is the NetBackup master server).

5. For Device host, use the pull-down to select the NetBackup media server.

6. Specify Robot type and number as explained in the NetBackup Media Manager System Administrator’s Guide.

7. Under Robot control, click Robot control is attached to an NDMP host.
8. For **Robot device path**, enter the device name of the robot. There is no need to include the NDMP host name as part of the device path.

   To determine the device name of the robot, refer to “NetBackup for NDMP Information on the Web” on page x for information pertaining to your NDMP host.

9. For **NDMP host name**, enter the name of the NDMP host to which the robot is attached.

10. Specify the **Bus**, **Target**, and **LUN** values if they are required by the NDMP host. Refer to “NetBackup for NDMP Information on the Web” on page x for information pertaining to your NDMP host. By default, the bus, target and lun values are 0.

11. Click **OK**.

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

Using the NetBackup Administration Console:

1. Select Media and Device Management > Devices in the left pane.

2. On the Actions menu, select New, then select New Drive (on UNIX, Tape Drive) from the popup. The Add Drive dialog appears.

3. For Drive Name: Enter the name of the drive.

4. For Host and path information:
   a. Click Add to specify a drive path.
Media Manager Device Configuration

The Add Path dialog appears:

- For **Device host**, select the name of the NetBackup media server. Use the pull-down to select media servers already defined, or click **Add** to enter a new one.

- For **Path** (called **No rewind device** on UNIX), enter the device file name of the tape drive, such as nrst2a. Refer to the NAS vendor documentation for your drive for the correct format of the device file name.

  As an alternative, you can use the following command to find the device file name for the drive, if the NDMP host is running NDMP protocol V3 or later:

  ```bash
tpautoconf -probe ndmp_host_name
  ```

- Click **This path is for a Network Attached Storage device**.

- For **NDMP Host**, use the drop-down to select the name of the NAS filer to which the drive is attached.

- When finished, click **OK**.

5. Back on the Add a New Drive dialog, enter the **Drive information** as required.

6. Repeat this procedure for each drive that must be added.

   When asked whether or not 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, go to the NetBackup Administration Console and use the Activity Monitor (Processes tab) to verify that the above processes are active.

- From the NetBackup Administration Console, 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 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.
Verifying NDMP Password and/or Robot Connection

When you authorize NetBackup access to the NDMP host and configure robots using the Administration Console, NetBackup automatically verifies your NDMP credentials and the robotic configuration. If desired, you can re-verify them. For example:

```
tpautoconf -verify ndmp_host_name
```

A successful verification looks like the following:

Connecting to host "stripes" as user "root"...
Waiting for connect notification message...
Opening session--attempting with NDMP protocol version 4...
Opening session--successful with NDMP protocol version 4
  host supports MD5 authentication
Getting MD5 challenge from host...
Logging in using MD5 method...
Host info is:
  host name "stripes"
  os type "NetApp"
  os version "NetApp Release 7.0.0.1"
  host id "0033625811"
Login was successful
Host supports LOCAL backup/restore
Host supports 3-way backup/restore
Adding NDMP Storage Units

On the NetBackup master server, add an NDMP-type 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 for more information.

**Note** NDMP-type storage units are not used for backups to media server-attached devices. Use Media Manager storage units, not NDMP-type units. Refer to the “Configuring NDMP Backup to NetBackup Media Servers” chapter for details.

1. In the NetBackup Administration Console, select **NetBackup Management > Storage Units**.

2. On the Actions menu, select **New > Storage Unit**. The New Storage Unit dialog appears.

![New storage unit dialog](image)

**Chapter 3, Configuring NDMP Backup to NDMP-Attached Devices** 35
Adding NDMP Storage Units

3. For **Storage unit name**, enter a unique name for the storage unit.

4. For **Storage unit type**, select **NDMP**.

5. For **On demand only**: this specifies whether the storage unit is available only when a policy or schedule specifically requests it. If this option is not used, the storage unit is available to any NDMP policy or schedule.

6. For **Storage device**, select the type of device for this storage unit.

7. For **NDMP host**, specify the NDMP host where the tape drive is physically attached.

The remaining fields are described in the *NetBackup System Administrator’s Guide*. 
Creating an NDMP Policy

On the NetBackup master server, create an NDMP policy to configure backups of the NDMP host.

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

Creating an NDMP policy is very similar to creating other NetBackup policy types. The following topics explain the differences when creating NDMP policies.

See the *NetBackup System Administrator’s Guide* for more information on NetBackup policies and the Policy utility.

**Note** To configure a policy for the NAS_Snapshot method and SnapVault, see the *NetBackup Advanced Client System Administrator’s Guide*.

**Attributes**

Specify the following policy attributes:

- **Policy Type**: NDMP
- **Policy Storage Unit**:
  - If the NDMP host has more than one storage unit and you want to direct backups for this policy to a specific storage unit, specify the name of that storage unit.
  - For a three-way backup, specify a storage unit that was defined for the target NDMP host with attached tape.
  - For NDMP backup to Media Manager devices, specify a Media Manager storage unit defined for a device connected to a NetBackup media server (see the “Configuring NDMP Backup to NetBackup Media Servers” chapter).

**Clients**

In the client list, specify the following for each client in an NDMP policy:

- **Hostname**
  
  Name of the NDMP host

- **Hardware and operating system**
  
  NDMP NDMP
Files

The Backup Selections list must specify directories from the perspective of the NDMP host.

Two examples:

```
/home/dir1/
/vol1
```

The following Backup Selections capabilities are NOT supported for an NDMP policy:

- Wildcards in pathnames. For example, `/home/*` is an invalid entry.
- Individual file names. Only directory or volume names are allowed.
- Exclude list (because client software is not installed on the NDMP host). You can, however, exclude files by using the `SET` keyword as shown under “Using Environment Variables in Backup Selections 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 which variable can be passed and in what format.

Schedules

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

- Full
- Cumulative Incremental
- Differential Incremental

Specify **Override policy 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 policy.

Using Environment Variables in Backup Selections list

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

- 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:
In NetBackup, environment variables can be set within the Backup Selections list by specifying one or more SET directives.

**Note** In the Backup Selections list, the SET directive must be the first in the list, followed by the file systems or volumes to back up. To obtain up-to-date information on environment variables relating to particular NAS vendors, refer to “NetBackup for NDMP Information on the Web” on page x.

In general, 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 type = tar
```

Setting a variable equal to no value unsets that variable. For example:

```
SET ABC =
```

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

```
/vol/vol1
SET HIST = N
/vol/vol2
SET DEF = 20
SET SAMPLE = all
/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.
Enabling/Disabling DAR

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.

Enabling/Disabling DAR

By default, NetBackup for NDMP is configured to use Direct Access Recovery (DAR). For each restore, NetBackup automatically determines if the use of DAR will speed up the restore. NetBackup uses DAR only when it will result in a faster restore.

Note NetBackup can use DAR only if the NDMP NAS host supports it (contact your NAS vendor for details).

DAR can be turned off if desired. This may be necessary if you are having problems with DAR and your NDMP host is an older machine or is not running the latest NAS OS version.

1. In the NetBackup Administration Console, expand Host Properties and click on Master Servers or Media Servers.

2. Right-click on the name of the server and select Properties.

3. Click on General Server.
Enabling/Disabling DAR

This is the UNIX version of the Properties dialog, General Server:
This is the Windows version of the Properties dialog, **General Server**:

4. Uncheck the **Use direct access recovery for NDMP restores** box, and click **Apply**. This disables DAR on all NDMP restores.
Setting Up Clustering

Before configuring NetBackup for NDMP for clustering, the following must be installed on each node of the cluster:

◆ NetBackup server (see the NetBackup Installation Guide).
◆ NetBackup for NDMP software (see “Installing NetBackup for NDMP” on page 19 of this manual). Note that for Windows servers, only the NetBackup for NDMP licence key has to be installed.

1. Configure NDMP-attached robots and drives, and then storage units and policies, just as you would in a normal, non-clustered environment:
   ◆ You can use the Device Configuration wizard, or configure devices manually as described under “Authorizing Access to the NDMP Host” on page 24 and following.
   ◆ To use the same robotic libraries throughout a cluster, robot numbers must be consistent. The Device Configuration wizard attempts to ensure this configuration. If you are configuring robots manually as described in this guide, be sure to use the same robot number for a given robot, from one host to another in the cluster.

2. When finished configuring devices and policies for NetBackup for NDMP, fail-over to the next node in the cluster and configure the drives and robots.
   ◆ Select the same robot number that you used when configuring the robot for the first node.

Post-Installation Changes

After NetBackup has been configured in a clustered environment, most configuration information is available to all nodes in the cluster, by means of a shared hard drive. However, changes made in the Host Properties area of the Administration Console are not available on the shared drive. Such changes apply only to the active node. Host Properties changes made on the active node must be manually duplicated on each node, if NetBackup is to perform exactly the same way in case of failover to another node. Refer to the NetBackup High Availability Guide for assistance.
Testing an NDMP Configuration

To test the configuration, run the backup and then restore some files. For instructions, see the following topics:

◆ “Performing an NDMP Backup” on page 56.
◆ “Performing a Restore from the Server” on page 57.

If you encounter problems, see “Troubleshooting” on page 59.
Configuring NDMP Backup to NetBackup Media Servers

This chapter describes how to configure NetBackup for NDMP to make backups to Media Manager storage units (remote NDMP). Only NDMP-specific steps are described.

The following topics are covered in this chapter:

- **Overview**
- **Configuring NDMP Backup to Media Manager Devices**
Using a feature known as remote NDMP, you can back up NDMP data to a drive configured in a Media Manager storage unit on a NetBackup media server. The drive can be used for both NDMP backups and for non-NDMP backups. See the following diagram.

**NDMP Backup to a Media Manager Storage Unit**

Data travels between NDMP hosts and a drive on a NetBackup media server.

**NOTE:** The NetBackup media manager drive(s) need not be dedicated to NDMP backups: they can be used for non-NDMP backups as well.
Configuring NDMP Backup to Media Manager Devices

These are the basic steps to configure NDMP backups to Media Manager storage units.

1. Authorize the NetBackup server to access the NDMP hosts you want to back up.

   **Note** Do the following on the master server (not media server) if you are going to create snapshots using the Advanced Client NAS_Snapshot method.

   a. Under **Media and Device Management > Devices**, click on **NDMP Hosts**. Under **Actions**, choose **New > NDMP Host** to display the NDMP Host dialog.

   b. Fill in the values as described under “Authorizing Access to the NDMP Host” on page 24.

   c. Repeat the above for each NDMP host that the NetBackup server will back up.

2. Use the NetBackup Device Configuration wizard to configure the drive(s) and robot(s).

   **Note** Do not use the device configuration procedure in the “Configuring NDMP Backup to NDMP-Attached Devices” chapter in this guide. Rather, configure the robots and drives in the same way as ordinary Media Manager devices, described in the *NetBackup Media Manager System Administrator’s Guide*.

3. Create a Media Manager-type storage unit for the drive(s).

   For details on storage units, refer to the *NetBackup System Administrator’s Guide, Volume I*.

   **Note** The storage unit type must be Media Manager, not NDMP.

Using The Shared Storage Option (SSO)

This chapter describes the steps for setting up the Shared Storage Option with NetBackup for NDMP.

The following topics are covered in this chapter:

- Shared Storage Option (SSO): Basic Diagram
- Setting up SSO: Overview
- Using the Device Configuration Wizard
**Shared Storage Option (SSO): Basic Diagram**

The following figure shows a robotic library on a SAN that can share its drives between two NetBackup for NDMP servers and two NDMP hosts. Drive sharing requires a license for the Shared Storage Option. (A SAN is not required.)

NDMP Backup Using Shared Storage Option

- For each robot, robotic control can be handled by either a NetBackup media server or an NDMP server (not both).
Setting up SSO: Overview

This is an outline of the steps for setting up access to a robotic drive shared between NDMP and NetBackup servers.

For a more complete discussion of SSO, refer to the “Shared Storage Option (SSO) Topics” chapter in the NetBackup Media Manager System Administrator’s Guide.

This procedure assumes the following:

◆ That the requirements for SSO have been met, as described in the NetBackup Media Manager System Administrator’s Guide.
◆ That all physical devices, including the NDMP host, are correctly connected to the network.
◆ That the NDMP host is supported by NetBackup for NDMP. For a document that lists supported NAS systems, see “NetBackup for NDMP Information on the Web” on page x.

1. Configure NetBackup access to the NDMP host.
   For details, see “Authorizing Access to the NDMP Host” on page 24.

2. Verify that the NDMP host can access the required robots and drives.
   To verify NDMP host access to the required devices, run the following commands on a NetBackup media server that is authorized to access the NDMP host:

   ```
   tpautoconf -verify ndmp_host_name
   tpautoconf -probe ndmp_host_name
   ```

   The -verify option verifies that the NetBackup server can access the NDMP host; the -probe option lists the devices that are visible to the NDMP host.

3. From the NetBackup Administration Console, use the Device Configuration Wizard to configure the devices and storage units. See “Using the Device Configuration Wizard” on page 52.

   **Note** An NDMP storage unit must be defined for each NDMP host that will be sharing a drive. If all hosts have access to the shared drive(s), the Device Configuration Wizard can create these storage units automatically.
Using the Device Configuration Wizard

The most convenient way to configure devices and storage units for NDMP hosts (with or without the SSO option) is to use the Device Configuration Wizard.

1. In the NetBackup Administration Console, click **Configure Storage Devices** to launch the Device Configuration Wizard.

2. Click **Next** on the Welcome screen. The Device Hosts screen appears.

3. Under **Device Hosts**, place a check beside the NetBackup media server that will access the NDMP host, click on the server name to highlight it, and click **Change**.
The Change Device Host screen appears.

4. Place a check beside **NDMP server** and click **OK**.

The Device Hosts screen re-appears. “NDMP” is now listed in the **Optional Devices to be Scanned** column for the media server (screen detail shown below).

5. On the Device Hosts screen, click **Next** to continue.
Using the Device Configuration Wizard

The NDMP Hosts screen appears, showing the NDMP host(s) on which you can configure devices.

6. On the NDMP Hosts screen, click Next to configure the NDMP-attached devices.

7. Follow the screens in the wizard to complete the configuration.
Backup and Restore Procedures

This chapter describes the procedures for backing up and restoring NDMP-type policies. For backup and restore of a NAS snapshot, refer to the *NetBackup Advanced Client System Administrator’s Guide*.

- Performing an NDMP Backup
- Performing a Restore from the Server
Performing an NDMP Backup

Only the administrator can perform NDMP backups and restores on the NetBackup server (master or media). The NDMP protocol does not allow users to initiate a backup or restore, and there is no NetBackup client software installed on an NDMP host.

Automatic Backup of an NDMP Policy

To configure an NDMP policy and set up schedules for automatic, unattended backups, see “Creating an NDMP Policy” on page 37 and the NetBackup System Administrator’s Guide.

Manual Backup of an NDMP Policy

Only a NetBackup administrator can initiate an NDMP backup. The following procedure explains how to perform the backup using the NetBackup Administration Console. For further information on the NetBackup Administration Console, see the NetBackup System Administrator’s Guide (Windows or UNIX).

1. As administrator, start the NetBackup Administration Console on the NetBackup server as follows:
   On Windows: from the Windows Start menu, select Programs, VERITAS NetBackup, NetBackup Administration Console.
   On UNIX, enter the following:

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

2. Click on Policies. Right click on the NDMP policy name and select Manual Backup from the pop-up menu.
   This opens the Manual Backup dialog.

3. In the Manual Backup dialog, select a schedule, then select 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 configured NDMP hosts.

4. Click OK to start the backup.
Performing a Restore from the Server

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 Backup, Archive, and Restore interface on a NetBackup server (master or media server) to restore files to the NDMP host from which they were backed up, or to a different NDMP host. For help with the basic restore procedure, see the NetBackup online help in the Administration Console, or the NetBackup Backup, Archive, and Restore Getting Started Guide.

Note the following:

In the Specify NetBackup Machines and Policy Type dialog, specify the following:

- For the server, select the NetBackup master server. If your configuration has multiple master servers, specify the master server that has the policy for the NDMP host that you are restoring. If the server name is not in the pull-down, use Edit Server List to add it.
- For the source and destination clients, select the appropriate NDMP (NAS) hosts.

**Note** The destination host must be an NDMP host compatible with the data format of the source (the source and destination must be of the same NAS vendor type).

**Caution** An NDMP restore always overwrites existing files.

- If the desired hosts are not available in the pull-down, use Edit Client List to add the client.
- In the policy type field, select NDMP.
Performing a Restore from the Server
Troubleshooting

The following information may be useful in troubleshooting NetBackup.

◆ NDMP Operating Notes and Restrictions
◆ Troubleshooting NetBackup
◆ Troubleshooting Media Manager on Windows Systems
◆ Troubleshooting Media Manager on UNIX systems
◆ Troubleshooting DAR
◆ Testing a Robot

Note For explanations of NetBackup status codes, refer to the “NetBackup Status Codes and Messages” chapter in the NetBackup Troubleshooting Guide.
NDMP Operating Notes and Restrictions

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

To obtain troubleshooting information that may apply to particular NDMP hosts, refer to “NetBackup for NDMP Information on the Web” on page x.

◆ 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.

◆ In the Backup Selections list for an NDMP policy, you can include only directory paths. Wildcards and individual file names are not allowed.

◆ You cannot back up files where the path length is greater than 1024 characters.

◆ The NDMP protocol uses port 10000 for communication.

◆ On UNIX systems, the NetBackup avrd process utilizes ICMP (Internet Control Message Protocol) to ping NDMP hosts to verify network connectivity. This protocol is required for the NetBackup for NDMP product.

◆ If backup or restore jobs are running slowly, verify that the network interface cards (NIC) are set to full duplex. Half duplex often causes poor performance. For assistance viewing and resetting duplex mode for a particular NAS host, consult the documentation provided by the manufacturer. You may be able to use the ifconfig (or ipconfig) command, as explained in the NetBackup Troubleshooting Guide.

Notes on DAR

◆ DAR can be used when restoring backups that were made by NetBackup 4.5GA or later. Starting with NetBackup 4.5GA, NetBackup stores the required DAR offset information on each backup.

**Note** For backups made by pre-4.5GA versions of NetBackup, restores cannot use DAR, because the pre-4.5 versions did not store the DAR offset information.

◆ DAR can be used when restoring files, but not when restoring directories.

◆ Backups must have been performed with the NetBackup catalog set to binary mode. For backups made with the catalog set to ASCII mode, restores cannot use DAR, because ASCII mode did not store the required DAR offset information on each backup. Note that all backups made prior to NetBackup 4.5 used ASCII catalog mode.

◆ To use DAR with NetBackup, the NDMP host you want to restore must support DAR. Some NDMP host vendors do not currently support DAR.
Troubleshooting NetBackup

Types of Logs

NetBackup uses two types of logging: unified logging, new in this 6.0 release, and legacy logging as used in previous releases. Both are described in the “Using Logs and Reports” chapter in the NetBackup Troubleshooting Guide.

Note:

◆ All unified logs are written to /usr/openv/logs (UNIX) or install_path\logs (Windows). Unlike legacy logging, there is no need to create logging directories.

◆ Use the vxlogview command to examine unified logs (see examples in the next section):

  On UNIX: /usr/openv/netbackup/bin/vxlogview

  On Windows: install_path\NetBackup\bin\vxlogview

Refer to the NetBackup Troubleshooting Guide for assistance in using the vxlogview command. See also the vxlogview man page or the NetBackup Commands Guide.

Troubleshooting Steps

◆ Check the NetBackup All Log Entries report for information about the failed job.

◆ To get more information about a problem, do the following:

 ◆ In the NetBackup Administration Console: expand Host Properties in the left pane, click on Media Server, and right click on the server name in the right pane. From the pop-up, select Properties, then click Logging and set the Global logging level to 5. This increases logging detail to the highest level, for both unified logging and legacy logging.

 ◆ View the unified logging information in /usr/openv/logs (UNIX) or install_path\logs (Windows) for the following processes: ndmpagent (originator ID 134), ndmp (originator ID 151), nbpem (originator ID 116), nbjm (originator ID 117), and nbrb (originator ID 118).

For ndmpagent logs, try the vxlogview command as follows:

  /usr/openv/netbackup/bin/vxlogview -i ndmpagent -d T,s,x,p

For ndmp logs, try the vxlogview command as follows:

  /usr/openv/netbackup/bin/vxlogview -i ndmp -d T,s,x,p
Troubleshooting NetBackup

- On the NetBackup for NDMP server, create `bptm`, `bpbrm`, and `ndmpagent` legacy debug log folders in the `/usr/openv/netbackup/logs` directory (UNIX) or `install_path\NetBackup\logs` folder (Windows). NetBackup writes legacy log files in these directories, if the directories exist.

**Note** The legacy and unified logging files can consume a lot of disk space; delete the log files when you are finished troubleshooting and set logging to a lower level of detail.

- To verify that the appropriate services are running, use either the NetBackup **Activity Monitor**, the Windows 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 may be one of the following:
  - Verify that the NetBackup configuration is correct.
  - There may be a conflict between the policy type and storage unit type (for example, if the policy 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 policy Backup Selections 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.

**NDMP Backup Levels**

At the start of a debug log, you may see an entry titled `LEVEL`. This refers to an environment variable that was set by NetBackup based on the type of backup. Below is an example from a `bptm` log. For more information on environment variables, refer to “Using Environment Variables in Backup Selections list” on page 38.

```
08:48:38.816 [22923] <2> write_data_ndmp: backup environment values:
08:48:38.816 [22923] <2> write_data_ndmp: Environment 1: TYPE=dump
08:48:38.816 [22923] <2> write_data_ndmp: Environment 2:
  FILESYSTEM=/vol/vol0/2million
08:48:38.817 [22923] <2> write_data_ndmp: Environment 3:
  PREFIX=/vol/vol0/2million
08:48:38.817 [22923] <2> write_data_ndmp: Environment 4: LEVEL=0
```

The NDMP backup `LEVEL` is modeled after UNIX dump levels. The backup level is a number in the range of 0 to 9.
An NDMP backup level of 0 is a full backup. A backup level above 0 is an incremental backup of all objects modified since the last backup of a lower level. For example, level 1 is a backup of all objects modified since the full backup (level 0); level 3 is a backup of all objects modified since the last level 2 incremental.

### NetBackup Backup Types and Corresponding NDMP Backup Levels

<table>
<thead>
<tr>
<th>NetBackup Backup Types</th>
<th>NDMP Backup Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetBackup Full</td>
<td>NDMP level 0</td>
</tr>
<tr>
<td>NetBackup Cumulative Incremental</td>
<td>NDMP level 1</td>
</tr>
<tr>
<td>NetBackup Differential Incremental</td>
<td>NDMP level (last level + 1, up to 9)</td>
</tr>
</tbody>
</table>

never goes higher than 9

### Troubleshooting Media Manager on Windows Systems

- For legacy logging, 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 Event Viewer Application log for troubleshooting clues. For more information on the Event Viewer logging option, refer to the *NetBackup Troubleshooting Guide*.
- Use the Activity Monitor interface or the Windows 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.
- Start `ltid` with the `-v` option. Check the system’s syslog for troubleshooting clues.
- Use `vmps` to make sure that the appropriate Media Manager daemons 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. For details, refer to the last main bullet and note under the “Troubleshooting Media Manager on Windows Systems” section.

Troubleshooting DAR

In certain situations, one of the following messages may appear in the unified logs for `ndmpagent` (originator ID 134) on the NetBackup media server. These are also written to the progress log.

**Message:**
DAR disabled - Number of paths n > DAR_MAXIMUM_FILE_LIST_COUNT x

**Explanation:**
The number of files being restored is greater than the maximum allowed (default is 1024). You can either select fewer files for the restore, or increase the DAR maximum Backup Selections list count. (Increasing the maximum is not supported by some NDMP host vendors.)

To increase the DAR maximum Backup Selections list count, place a “DAR_MAXIMUM_FILE_LIST_COUNT x” entry in the following file and specify `x` as a number greater than 1024.

On UNIX:
```
/usr/openv/netbackup/db/config/ndmp.cfg
```

On Windows:
```
install_path\NetBackup\db\config\ndmp.cfg
```

**Message:**
DAR disabled - not supported by NDMP host

**Explanation:**
The current NDMP host does not support DAR.

**Message:**
DAR disabled - unable to retrieve DAR info

**Explanation:**
DAR information is not available for the file.

**Message:**
DAR disabled - Backup performed prior to NB 4.5

**Explanation:**
The DAR feature can be used when restoring backups that were made by NetBackup 4.5GA or later. Starting with NetBackup 4.5GA, NetBackup stores the required DAR offset information on each backup. For backups made by pre-4.5GA versions of NetBackup, restores cannot use DAR, because the pre-4.5 versions did not store the DAR offset information.

**Message:**
DAR disabled - NDMP host did not provide DAR info during backup

**Explanation:**
The backup was performed with an NDMP host version that does not support DAR. Ask the NDMP host vendor if a later NAS software version is available that supports DAR.

**Message:**
DAR disabled - Optimal DAR parameters exceeded for this image size

**Explanation:**
NetBackup determined that the restore would take longer with DAR than without it.

**Message:**
DAR disabled - Directory DAR not supported

**Explanation:**
DAR is automatically disabled when a restore job specifies a directory to restore. DAR can be used when restoring files, but not when restoring directories.
Troubleshooting DAR

Message:
DAR disabled by DAR config file

Explanation:
DAR was disabled by adding the entry NDMP_DAR_DISABLED to the following file:
On UNIX:
/usr/openv/netbackup/db/config/ndmp.cfg
On Windows:
install_path\NetBackup\db\config\ndmp.cfg

This method of disabling DAR is obsolete. Use the Host Properties dialog as explained under “Enabling/Disabling DAR” on page 40.

Message:
DAR disabled by host parameters

Explanation:
DAR was disabled on the Master or Media Server Properties dialog.
To re-enable DAR, see “Enabling/Disabling DAR” on page 40.
Testing a Robot

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

<table>
<thead>
<tr>
<th>Robot Type</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLD</td>
<td>tldtest</td>
</tr>
<tr>
<td>TL8</td>
<td>tl8test</td>
</tr>
<tr>
<td>TLH</td>
<td>tlhtest</td>
</tr>
<tr>
<td>ACS</td>
<td>acstest</td>
</tr>
</tbody>
</table>

**TL8 Example for Windows**

To exercise the TL8 robot c2t310 that is controlled by the NDMP host named stripes, use the following test and commands on Windows:

```
install_path\Volmgr\bin\tl8test -r stripes:c2t310 -d1 stripes:/dev/rmt/0cbn
```

When prompted, enter ? for help information.

- `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.)

**TLD Example for UNIX**

To exercise drive 1 in the TLD robot c2t310 that is controlled by the NDMP host stripes, use the following commands on UNIX:

```
/usr/openv/volmgr/bin/tldtest -r stripes:c2t310 -d1 stripes:/dev/rmt/0cbn
```

When prompted, enter ? for help information.

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

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.)

**TLH Example for UNIX**

To exercise drive 1 in a TLH robot, use the following command on UNIX:

```
/usr/openv/volmgr/bin/tlhtest -r /dev/lmcpo -d1 stripes:/dev/rmt/0cbn
```

Note that a TLH robot cannot attach directly to the NDMP host; only a TLH drive can directly attach to the NDMP host.

When prompted, enter ? for help information.

inv (Inventories the robot.)
drstat (Shows drive status.)
m media_id drive_name (Moves specified media to the specified drive.)
dm drive_name (Dismounts the tape.)
unload drive_name (Unloads the tape.)
Using Scripts

This chapter explains how to customize the NDMP-specific notify scripts.

**Note** Before using the notify scripts on UNIX, ensure they are executable by other. Do this by executing `chmod 755 script_name`, where `script_name` is the name of the script.

The UNIX scripts are provided as examples only. You must customize the scripts before using them. For example, the -ne value in the first if statement must be modified to reflect the number of parameters passed.

NetBackup for NDMP provides the following scripts (commands on Windows) for collecting information and providing notification of events.

### Scripts to run on the NetBackup for NDMP server

<table>
<thead>
<tr>
<th>Scripts for UNIX</th>
<th>Scripts for Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>ndmp_start_notify</td>
<td>ndmp_start_notify.cmd</td>
</tr>
<tr>
<td>ndmp_end_notify</td>
<td>ndmp_end_notify.cmd</td>
</tr>
<tr>
<td>ndmp_start_path_notify</td>
<td>ndmp_start_path_notify.cmd</td>
</tr>
<tr>
<td>ndmp_end_path_notify</td>
<td>ndmp_end_path_notify.cmd</td>
</tr>
<tr>
<td>ndmp_moving_path_notify</td>
<td>ndmp_moving_path_notify.cmd</td>
</tr>
</tbody>
</table>

The scripts are similar to those already included in your NetBackup server installation. To create the scripts on UNIX, copy the `bpstart_notify` and `bpend_notify` scripts from

```
/usr/openv/netbackup/bin/goodies (UNIX)
```

and then rename the copied scripts and *modify as needed*. You must customize the scripts before using them; see the above note.
On Windows, you must create the scripts from scratch.

**ndmp_start_notify (UNIX)**

**Note** Before using this script, ensure that it is executable by other on the media server. Do this by executing `chmod 755 script_name`, where `script_name` is the name of the script.

The UNIX scripts are provided as examples only. You must customize the scripts before using them. For example, the -ne value in the first if statement must be modified to reflect the number of parameters passed. For the `ndmp_start_notify` script, the -ne value must be set to 5.

On the UNIX media server, NetBackup calls the `ndmp_start_notify` script each time the client starts a backup operation. To use this script, create a script similar to

```
/usr/openv/netbackup/bin/goodies/bpstart_notify
```

on the server, and copy it to

```
/usr/openv/netbackup/bin/ndmp_start_notify
```

on the UNIX NetBackup for NDMP server. Then, modify the script as desired and ensure that you have execute permission.

The `ndmp_start_notify` script executes each time a backup starts and after the tape has been positioned. This script must exit with a status of 0 for the calling program to continue and for the backup to proceed. A nonzero status causes the client backup to exit with a status of `ndmp_start_notify failed`.

If the `/usr/openv/netbackup/bin/ndmp_start_notify` script exists, it executes in the foreground and the `bptm` process on the NetBackup for NDMP server waits for it to complete before continuing. Any commands in the script that do not end with an & character execute serially.

The server expects the client to respond with a continue message within the period of time specified by the NetBackup `CLIENT_READ_TIMEOUT` option on the server.

The default for `CLIENT_READ_TIMEOUT` is 300. If the script needs more time than 300 seconds, increase the value to allow more time.

NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>Name of the NDMP host.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>$2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>$3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
</tbody>
</table>
| $4 | One of the following:  
FULL  
INCR (differential incremental)  
CINC (cumulative incremental) |
| $5 | The NetBackup status code for the operation. |

For example:

```
ndmp_start_notify freddie cd4000s fulls FULL 0
ndmp_start_notify danr cd4000s incrementals INCR 0
ndmp_start_notify hare cd4000s fulls FULL 0
```

To create an ndmp_start_notify script for a specific policy or policy and schedule combination, create script files with a `.policyname` or `.policyname.schedulename` suffix. The following are two examples of script names for a policy named `production` that has a schedule named `fulls`:

```
/usr/openv/netbackup/bin/ndmp_start_notify.production
/usr/openv/netbackup/bin/ndmp_start_notify.production.fulls
```

The first script affects all scheduled backups in the policy named `production`. The second script affects scheduled backups in the policy named `production` only when the schedule is named `fulls`.

**Note** For a given backup, NetBackup uses only one ndmp_start_notify script and that is the one with the most specific name. For example, if there are both `ndmp_start_notify.production` and `ndmp_start_notify.production.fulls` scripts, NetBackup uses only `ndmp_start_notify.production.fulls`.

The ndmp_start_notify script can use the following environment variables:

- BACKUPID
- UNIXBACKUPTIME
- BACKUPTIME
The NetBackup bptm process creates these variables. The following are examples of strings that are available to the script for use in recording information about a backup:

```
BACKUPID=freddie_0857340526
UNIXBACKUPTIME=0857340526
BACKUPTIME=Sun Mar 2 16:08:46 1997
```

**ndmp_start_notify.cmd (Microsoft Windows)**

For Windows NetBackup for NDMP media servers, you can create batch scripts that provide notification whenever the client starts a backup. These scripts must reside on the media server in the following directory:

```
install_path\NetBackup\bin
```

Where *install_path* is the directory where NetBackup is installed.

You can create `ndmp_start_notify` scripts that provide notification for all backups or just for backups of a specific policy or schedule. The `ndmp_start_notify` script executes each time a backup starts and after the tape has been positioned.

To create a script that applies to all backups, name the script:

```
install_path\netbackup\bin\ndmp_start_notify.cmd
```

To create an `ndmp_start_notify` script that applies only to a specific policy or policy and schedule combination, add a `.policyname` or `.policyname.schedulename` suffix to the script name.

- The following script applies only to a policy named *days*:
  
  ```
  install_path\netbackup\bin\ndmp_start_notify.days.cmd
  ```

- The following script applies only to a schedule named *fulls* that is in a policy named *days*:
  
  ```
  install_path\netbackup\bin\ndmp_start_notify.days.fulls.cmd
  ```

The first script affects all scheduled backups in the policy named *days*. The second script affects scheduled backups in the policy named *days* only when the schedule is named *fulls*.

For a given backup, NetBackup calls only one `ndmp_start_notify` script and checks for them in the following order:

- `ndmp_start_notify.policy.schedule.cmd`
- `ndmp_start_notify.policy.cmd`
- `ndmp_start_notify.cmd`
For example, if there are both `ndmp_start_notify.policy.cmd` and `ndmp_start_notify.policy.schedule.cmd` scripts, NetBackup uses only the `ndmp_start_notify.policy.schedule.cmd` script.

**Note** If you are also using `ndmp_end_notify` scripts, they can provide a different level of notification than the `ndmp_start_notify` scripts. For example, if you had one of each, they could be `ndmp_start_notify.policy.cmd` and `ndmp_end_notify.policy.schedule.cmd`.

When the backup starts, NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>%2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
</tbody>
</table>
| %4        | One of the following:  
|           | FULL  
|           | INCR  
|           | CINC  |
| %5        | Status of the operation is always 0 for `bpstart_notify`. |
| %6        | Results file that NetBackup checks for a return code from the script.  
|           | NetBackup uses %6 to pass the file name and then expects the script to create the file in the same directory as the script.  
|           | If the script applies to a specific policy and schedule, the results file must be named  
|           | `install_path\netbackup\bin\NDMP_START_NOTIFY_RES.policy.schedule`  
|           | If the script applies to a specific policy, the results file must be named  
|           | `install_path\netbackup\bin\NDMP_START_NOTIFY_RES.policy`  
|           | If the script applies to all backups, the results file must be named  
|           | `install_path\netbackup\bin\NDMP_START_NOTIFY_RES`  
|           | An echo `0>` %6 statement is one way for the script to create the file.  
|           | NetBackup deletes the existing results file before calling the script. After the script executes, NetBackup checks the new results file for the status. The status must be 0 for the script to be considered successful. If the results file does not exist, NetBackup assumes that the script was successful. |
The server expects the client to respond with a `continue` message within the period of time specified by the NetBackup `CLIENT_READ_TIMEOUT` option on the server. The default is 300 seconds. If the script needs more than 300 seconds, increase the value to allow more time.

**ndmp_end_notify (UNIX)**

**Caution** The `ndmp_end_notify` script is executed at the end of the backup. The backup does not wait for the script to complete.

**Note** Before using this script, ensure that it is executable by `other` on the media server. Do this by executing `chmod 755 script_name`, where `script_name` is the name of the script.

The UNIX scripts are provided as examples only. You must customize the scripts before using them. For example, the `-ne` value in the first if statement must be modified to reflect the number of parameters passed. For the `ndmp_end_notify` script, the `-ne` value must be set to 5.

For a UNIX media server, if you need notification whenever the NDMP host completes a backup, copy

```
/usr/openv/netbackup/bin/goodies/bpend_notify
```

from the server, to

```
/usr/openv/netbackup/bin/ndmp_end_notify
```

on the UNIX NetBackup for NDMP host. Then, modify the script as desired, and ensure that you have execute permission.

The `ndmp_end_notify` script executes each time a backup completes.

NetBackup passes the following parameters to the `ndmp_end_notify` script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>$2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>$3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
</tbody>
</table>
### Parameter Description

**$4**

- **FULL**
- **INCR** (differential incremental)
- **CINC** (cumulative incremental)

**$5**

- Exit code from `bptm`.

For example:

```plaintext
ndmp_end_notify freddie cd4000s fulls FULL 0
ndmp_end_notify danr cd4000s incrementals INCR 73
```

To create an `ndmp_end_notify` script for a specific policy or policy and schedule combination, create script files with a `.policyname` or `.policyname.schedulename` suffix. The following are two examples of script names for a policy named `production` that has a schedule named `fulls`:

```plaintext
/usr/openv/netbackup/bin/ndmp_end_notify.production
/usr/openv/netbackup/bin/ndmp_end_notify.production.fulls
```

The first script affects all scheduled backups in the policy named `production`. The second script affects scheduled backups in the policy named `production` only when the schedule is named `fulls`.

**Note**

For a given backup, NetBackup uses only one `ndmp_end_notify` script and that is the one with the most specific name. For example, if there are both `ndmp_end_notify.production` and `ndmp_end_notify.production.fulls` scripts, NetBackup uses only `ndmp_end_notify.production.fulls`.

The `ndmp_end_notify` script can use the following environment variables:

- `BACKUPID`
- `UNIXBACKUPTIME`
- `BACKUPTIME`

The NetBackup `bptm` process creates these variables. The following are examples of strings that are available to the script for use in recording information about a backup:

```plaintext
BACKUPID=freddie_0857340526
UNIXBACKUPTIME=0857340526
BACKUPTIME=Sun Mar 2 16:08:46 1997
```
ndmp_end_notify.cmd (Microsoft Windows)

For Windows media servers, you can create batch scripts that provide notification whenever the client completes a backup. These scripts must reside on the media server in the same directory as the NetBackup binaries:

```
install_path\NetBackup\bin
```

Where `install_path` is the directory where NetBackup is installed.

You can create `ndmp_end_notify` scripts that provide notification for all backups or just for backups of a specific policy or schedule.

To create an `ndmp_end_notify` script that applies to all backups, name the script:

```
install_path\netbackup\bin\ndmp_end_notify.cmd
```

To create a script that applies only to a specific policy or policy and schedule combination, add a `.policyname` or `.policyname.schedulename` suffix to the script name.

- The following script applies only to a policy named `days`:
  
  ```
  install_path\netbackup\bin\ndmp_end_notify.days.cmd
  ```

- The following script applies only to a schedule named `fulls` that is in a policy named `days`:
  
  ```
  install_path\netbackup\bin\ndmp_end_notify.days.fulls.cmd
  ```

The first script affects all scheduled backups in the policy named `days`. The second script affects scheduled backups in the policy named `days` only when the schedule is named `fulls`.

For a given backup, NetBackup calls only one `ndmp_end_notify` script and checks for them in the following order:

```
ndmp_end_notify.policy.schedule.cmd
ndmp_end_notify.policy.cmd
ndmp_end_notify.cmd
```

For example, if there are both `ndmp_end_notify.policy.cmd` and `ndmp_end_notify.policy.schedule.cmd` scripts, NetBackup uses only `ndmp_end_notify.policy.schedule.cmd`.

**Note** If you are also using `ndmp_start_notify` scripts, they can provide a different level of notification than the `ndmp_end_notify` scripts. For example, if you had one of each, they could be `ndmp_start_notify.policy.cmd` and `ndmp_end_notify.policy.schedule.cmd`. 
When the backup completes, NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>%2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%4</td>
<td>One of the following: FULL, INCR, CINC</td>
</tr>
<tr>
<td>%5</td>
<td>Status of the operation and is same as sent to the NetBackup server. This is 0 for successful backups and 1 for partially successful backups. If an error occurs, the status is the value associated with that error.</td>
</tr>
</tbody>
</table>

Note: The following file is not checked at the end of a backup.

| %6        | Results file that NetBackup checks for a return code from the script. NetBackup uses %6 to pass the file name and then expects the script to create the file in the same directory as the script. |

If the script applies to a specific policy and schedule, the results file must be named

```
install_path\netbackup\bin\NDMP_END_NOTIFY_RES .policy .schedule
```

If the script applies to a specific policy, the results file must be named

```
install_path\netbackup\bin\NDMP_END_NOTIFY_RES .policy
```

If the script applies to all backups, the results file must be named

```
install_path\netbackup\bin\NDMP_END_NOTIFY_RES
```

An `echo 0> %6` statement is one way for the script to create the file.

NetBackup deletes the existing results file before calling the script. After the script executes, NetBackup checks the new results file for the status. The status must be 0 for the script to be considered successful. If the results file does not exist, NetBackup assumes that the script was successful.
**ndmp_start_path_notify (UNIX)**

**Note** Before using this script, ensure that it is executable by *other* on the media server. Do this by executing `chmod 755 script_name`, where `script_name` is the name of the script.

The UNIX scripts are provided as *examples only*. You must customize the scripts before using them. For example, the `-ne` value in the first if statement must be modified to reflect the number of parameters passed. For the `ndmp_start_path_notify` script, the `-ne` value must be set to 7.

To use this script, create a script similar to

```
/usr/openv/netbackup/bin/goodies/bpstart_notify
```

on the server, and copy it to

```
/usr/openv/netbackup/bin/ndmp_start_path_notify
```

on the UNIX NetBackup for NDMP server. Then, modify the script as desired and ensure that you have execute permission.

On the UNIX media server, the `ndmp_start_path_notify` script executes before the backup process is issued to the NAS machine. This script must exit with a status of 0 for the calling program to continue and for the backup to proceed. A nonzero status causes the client backup to exit with a status of 99 (NDMP backup failure).

If the `/usr/openv/netbackup/bin/ndmp_start_path_notify` script exists, it executes in the foreground and the `bptm` process on the NetBackup for NDMP server waits for it to complete before continuing. Any commands in the script that do not end with an `&` character execute serially.

The server expects the client to respond with a `continue` message within the period of time specified by the NetBackup `CLIENT_READ_TIMEOUT` option on the server.

The default for `CLIENT_READ_TIMEOUT` is 300. If the script needs more time than 300 seconds, increase the value to allow more time.

NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>Name of the NDMP host.</td>
</tr>
<tr>
<td>$2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>$3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
</tbody>
</table>
### Parameter Description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| $4        | One of the following:  
            | FULL  
            | INCR (differential incremental)  
            | CINC (cumulative incremental) |
| $5        | The NetBackup status code for the operation. |
| $6        | Not used. |
| $7        | The path being backed up. |

For example:

```bash
ndmp_start_path_notify freddie cd4000s fulls FULL  
ndmp_start_path_notify danr cd4000s incrementals INCR  
ndmp_start_path_notify hare cd4000s fulls FULL
```

To create an `ndmp_start_path_notify` script for a specific policy or policy and schedule combination, create script files with a `.policyname` or `.policyname.schedulename` suffix. The following are two examples of script names for a policy named `production` that has a schedule named `fulls`:

```bash
/usr/openv/netbackup/bin/ndmp_start_path_notify.production  
/usr/openv/netbackup/bin/ndmp_start_path_notify.production.fulls
```

The first script affects all scheduled backups in the policy named `production`. The second script affects scheduled backups in the policy named `production` only when the schedule is named `fulls`.

**Note** For a given backup, NetBackup uses only one `ndmp_start_path_notify` script and that is the one with the most specific name. For example, if there are both `ndmp_start_path_notify.production` and `ndmp_start_path_notify.production.fulls` scripts, NetBackup uses only `ndmp_start_path_notify.production.fulls`.

The `ndmp_start_path_notify` script can use the following environment variables:

- BACKUPID
- UNIXBACKUPTIME
- BACKUPTIME

The NetBackup `bptm` process creates these variables. The following are examples of strings that are available to the script for use in recording information about a backup:
For Windows media servers, you can create batch scripts that provide notification before the backup process is issued to the NAS machine. These scripts must reside on the media server in the same directory as the NetBackup binaries:

```
install_path\NetBackup\bin
```

Where `install_path` is the directory where NetBackup is installed.

You can create `ndmp_start_path_notify` scripts that provide notification for all backups or just for backups of a specific policy or schedule.

To create an `ndmp_start_path_notify` script that applies to all backups, name the script:

```
install_path\netbackup\bin\ndmp_start_path_notify.cmd
```

To create a script that applies only to a specific policy or policy and schedule combination, add a `.policyname` or `.policyname.schedulename` suffix to the script name.

◆ The following script applies only to a policy named `days`:

```
install_path\netbackup\bin\ndmp_start_path_notify.days.cmd
```

◆ The following script applies only to a schedule named `fulls` that is in a policy named `days`:

```
install_path\netbackup\bin\ndmp_start_path_notify.days.fulls.cmd
```

The first script affects all scheduled backups in the policy named `days`. The second script affects scheduled backups in the policy named `days` only when the schedule is named `fulls`.

For a given backup, NetBackup calls only one `ndmp_start_path_notify` script and checks for them in the following order:

```
ndmp_start_path_notify.policy.schedule.cmd
ndmp_start_path_notify.policy.cmd
ndmp_start_path_notify.cmd
```

For example, if there are both `ndmp_start_path_notify.policy.cmd` and `ndmp_start_path_notify.policy.schedule.cmd` scripts, NetBackup uses only `ndmp_start_path_notify.policy.schedule.cmd`. 
**Note** If you are also using `ndmp_start_notify` scripts, they can provide a different level of notification than the `ndmp_start_path_notify` scripts. For example, if you had one of each, they could be `ndmp_start_notify.policy.cmd` and `ndmp_start_path_notify.policy.schedule.cmd`.

When the backup starts, NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>%2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
</tbody>
</table>
| %4        | One of the following:  
|           | FULL  
|           | INCR  
<p>|           | CINC  |
| %5        | Status of the operation and is same as sent to the NetBackup server. This is 0 for successful backups and 1 for partially successful backups. If an error occurs, the status is the value associated with that error. |</p>
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%6</td>
<td>Results file that NetBackup checks for a return code from the script. NetBackup uses %6 to pass the file name and then expects the script to create the file in the same directory as the script. If the script applies to a specific policy and schedule, the results file must be named <code>install_path\netbackup\bin\NDMP_START_PATH_NOTIFY_RES . policy . schedule</code> If the script applies to a specific policy, the results file must be named <code>install_path\netbackup\bin\NDMP_START_PATH_NOTIFY_RES . policy</code> If the script applies to all backups, the results file must be named <code>install_path\netbackup\bin\NDMP_START_PATH_NOTIFY_RES</code> An <code>echo 0 &gt; %6</code> statement is one way for the script to create the file. NetBackup deletes the existing results file before calling the script. After the script executes, NetBackup checks the new results file for the status. The status must be 0 for the script to be considered successful. If the results file does not exist, NetBackup assumes that the script was successful.</td>
</tr>
<tr>
<td>%7</td>
<td>Pathname being backed up.</td>
</tr>
</tbody>
</table>

**ndmp_end_path_notify (UNIX)**

**Note** Before using this script, ensure that it is executable by other on the media server. Do this by executing `chmod 755 script_name`, where `script_name` is the name of the script.

The UNIX scripts are provided as examples only. You must customize the scripts before using them. For example, the -ne value in the first if statement must be modified to reflect the number of parameters passed. For the ndmp_end_path_notify script, the -ne value must be set to 7.

For a UNIX media server, if you need notification whenever the NDMP host completes a backup, copy
/usr/openv/netbackup/bin/goodies/bpend_notify
from the server, to
/usr/openv/netbackup/bin/ndmp_end_path_notify
on the UNIX NetBackup for NDMP host. Then, modify the script as desired, and ensure that you have execute permission.

The `ndmp_end_path_notify` script executes after the NAS machine has informed NetBackup that it has completed sending data.

NetBackup passes the following parameters to the `ndmp_end_path_notify` script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>$2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>$3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
<tr>
<td>$4</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>FULL</td>
</tr>
<tr>
<td></td>
<td>INCR (differential incremental)</td>
</tr>
<tr>
<td></td>
<td>CINC (cumulative incremental)</td>
</tr>
<tr>
<td>$5</td>
<td>Exit code from <code>bptm</code>.</td>
</tr>
<tr>
<td>$6</td>
<td>Not used.</td>
</tr>
<tr>
<td>$7</td>
<td>The path being backed up.</td>
</tr>
</tbody>
</table>

For example:

```
ndmp_end_path_notify freddie cd4000s fulls FULL 0
ndmp_end_path_notify danr cd4000s incrementals INCR 73
```

To create an `ndmp_end_path_notify` script for a specific policy or policy and schedule combination, create script files with a `.policyname` or `.policyname.schedulename` suffix. The following are two examples of script names for a policy named `production` that has a schedule named `fulls`:  
```
/usr/openv/netbackup/bin/ndmp_end_path_notify.production
/usr/openv/netbackup/bin/ndmp_end_path_notify.production.fulls
```
The first script affects all scheduled backups in the policy named production. The second script affects scheduled backups in the policy named production only when the schedule is named fulls.

**Note** For a given backup, NetBackup uses only one `ndmp_end_path_notify` script and that is the one with the most specific name. For example, if there are both `ndmp_end_path_notify.production` and `ndmp_end_path_notify.production.fulls` scripts, NetBackup uses only `ndmp_end_path_notify.production.fulls`.

The `ndmp_end_path_notify` script can use the following environment variables:

- BACKUPID
- UNIXBACKUPTIME
- BACKUPTIME

The NetBackup `bptm` process creates these variables. The following are examples of strings that are available to the script for use in recording information about a backup:

```
BACKUPID=freddie_0857340526
UNIXBACKUPTIME=0857340526
BACKUPTIME=Sun Mar 2 16:08:46 1997
```

**ndmp_end_path_notify.cmd (Microsoft Windows)**

For Windows media servers, you can create batch scripts that provide notification whenever the client is finished writing to tape. These scripts must reside on the media server in the same directory as the NetBackup binaries:

```
install_path\NetBackup\bin
```

Where `install_path` is the directory where NetBackup is installed.

You can create `ndmp_end_path_notify` scripts that provide notification for all backups or just for backups of a specific policy or schedule.

To create an `ndmp_end_path_notify` script that applies to all backups, name the script:

```
install_path\netbackup\bin\ndmp_end_path_notify.cmd
```

To create a script that applies only to a specific policy or policy and schedule combination, add a `.policyname` or `.policyname.schedulename` suffix to the script name.

- The following script applies only to a policy named `days`:

```
install_path\netbackup\bin\ndmp_end_path_notify.days.cmd
```
The following script applies only to a schedule named fulls that is in a policy named days:

```
install_path\netbackup\bin\ndmp_end_path_notify.days.fulls.cmd
```

The first script affects all scheduled backups in the policy named days. The second script affects scheduled backups in the policy named days only when the schedule is named fulls.

For a given backup, NetBackup calls only one `ndmp_end_path_notify` script and checks for them in the following order:

- `ndmp_end_path_notify.policy.schedule.cmd`
- `ndmp_end_path_notify.policy.cmd`
- `ndmp_end_path_notify.cmd`

For example, if there are both `ndmp_end_path_notify.policy.cmd` and `ndmp_end_path_notify.policy.schedule.cmd` scripts, NetBackup uses only `ndmp_end_path_notify.policy.schedule.cmd`.

**Note** If you are also using `ndmp_end_notify` scripts, they can provide a different level of notification than the `ndmp_end_path_notify` scripts. For example, if you had one of each, they could be `ndmp_end_notify.policy.cmd` and `ndmp_end_path_notify.policy.schedule.cmd`.

When the backup completes, NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>%2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%4</td>
<td>One of the following: FULL, INCR, CINC</td>
</tr>
<tr>
<td>%5</td>
<td>Status of the operation and is same as sent to the NetBackup server. This is 0 for successful backups and 1 for partially successful backups. If an error occurs, the status is the value associated with that error.</td>
</tr>
</tbody>
</table>

**Note:** The following file is not checked when using `ndmp_end_path_notify`. 

---

Chapter 8, Using Scripts 85
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%6</td>
<td>Results file that NetBackup checks for a return code from the script. NetBackup uses %6 to pass the file name and then expects the script to create the file in the same directory as the script.</td>
</tr>
</tbody>
</table>

If the script applies to a specific policy and schedule, the results file must be named

```
install_path\netbackup\bin\NDMP_END_PATH_NOTIFY_RES\policy\schedule
```

If the script applies to a specific policy, the results file must be named

```
install_path\netbackup\bin\NDMP_END_PATH_NOTIFY_RES\policy
```

If the script applies to all backups, the results file must be named

```
install_path\netbackup\bin\NDMP_END_PATH_NOTIFY_RES
```

An `echo 0 > %6` statement is one way for the script to create the file.

NetBackup deletes the existing results file before calling the script. After the script executes, NetBackup checks the new results file for the status. The status must be 0 for the script to be considered successful. If the results file does not exist, NetBackup assumes that the script was successful.

| %7        | Pathname being backed up. |

**ndmp_moving_path_notify (UNIX)**

**Note** Before using this script, ensure that it is executable by other on the media server. Do this by executing `chmod 755 script_name`, where `script_name` is the name of the script.

The UNIX scripts are provided as examples only. You must customize the scripts before using them. For example, the `-ne` value in the first if statement must be modified to reflect the number of parameters passed. For the `ndmp_moving_path_notify` script, the `-ne` value must be set to 7.

To use this script, create a script similar to
/usr/openv/netbackup/bin/goodies/bpstart_notify

on the server, and copy it to

/usr/openv/netbackup/bin/ndmp_moving_path_notify

on the UNIX NetBackup for NDMP server. Then, modify the script as desired and ensure
that you have execute permission.

On UNIX media servers, the `ndmp_moving_path_notify` script executes once the
backup process has sent data to NetBackup.

If the `/usr/openv/netbackup/bin/ndmp_moving_path_notify` script exists, it
executes in the foreground and the `bptm` process on the NetBackup for NDMP server
waits for it to complete before continuing. Any commands in the script that do not end
with an `&` character execute serially.

The server expects the client to respond with a `continue` message within the period of
time specified by the NetBackup `CLIENT_READ_TIMEOUT` option on the server.

The default for `CLIENT_READ_TIMEOUT` is 300 seconds. If the script needs more than
300 seconds, increase the value to allow more time.

NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>Name of the NDMP host.</td>
</tr>
<tr>
<td>$2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>$3</td>
<td>Schedule name from the NetBackup catalog</td>
</tr>
<tr>
<td>$4</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>FULL</td>
</tr>
<tr>
<td></td>
<td>INCR (differential incremental)</td>
</tr>
<tr>
<td></td>
<td>CINC (cumulative incremental)</td>
</tr>
<tr>
<td>$5</td>
<td>The NetBackup status code for the operation.</td>
</tr>
<tr>
<td>$6</td>
<td>Not used.</td>
</tr>
<tr>
<td>$7</td>
<td>The path being backed up.</td>
</tr>
</tbody>
</table>

For example:

```
ndmp_moving_path_notify freddie cd4000s fulls FULL
```
To create an `ndmp_moving_path_notify` script for a specific policy or policy and schedule combination, create script files with a `.policyname` or `.policyname.schedulename` suffix. The following are two examples of script names for a policy named `production` that has a schedule named `fulls`:

```
/usr/openv/netbackup/bin/ndmp_moving_path_notify.production
/usr/openv/netbackup/bin/ndmp_moving_path_notify.production.fulls
```

The first script affects all scheduled backups in the policy named production. The second script affects scheduled backups in the policy named production only when the schedule is named `fulls`.

**Note** For a given backup, NetBackup uses only one `ndmp_moving_path_notify` script and that is the one with the most specific name. For example, if there are both `ndmp_moving_path_notify.production` and `ndmp_moving_path_notify.production.fulls` scripts, NetBackup uses only `ndmp_moving_path_notify.production.fulls`.

The `ndmp_moving_path_notify` script can use the following environment variables:

- `BACKUPID`
- `UNIXBACKUPTIME`
- `BACKUPTIME`

The NetBackup `bptm` process creates these variables. The following are examples of strings that are available to the script for use in recording information about a backup:

```
BACKUPID=freddie_0857340526
UNIXBACKUPTIME=0857340526
BACKUPTIME=Sun Mar 2 16:08:46 1997
```

**ndmp_moving_path_notify.cmd (Microsoft Windows)**

For Windows media servers, you can create batch scripts that provide notification whenever the NAS machine starts sending data. These scripts must reside on the media server in the same directory as the NetBackup binaries:

```
install_path\NetBackup\bin
```

Where `install_path` is the directory where NetBackup is installed.

You can create `ndmp_moving_path_notify` scripts that provide notification for all backups or just for backups of a specific policy or schedule.
To create an `ndmp_moving_path_notify` script that applies to all backups, name the script:

```
install_path\netbackup\bin\ndmp_moving_path_notify.cmd
```

To create a script that applies only to a specific policy or policy and schedule combination, add a `.policyname` or `.policyname.schedulename` suffix to the script name.

- The following script applies only to a policy named `days`:

```
install_path\netbackup\bin\ndmp_moving_path_notify.days.cmd
```

- The following script applies only to a schedule named `fulls` that is in a policy named `days`:

```
install_path\netbackup\bin\ndmp_moving_path_notify.days.fulls.cmd
```

The first script affects all scheduled backups in the policy named `days`. The second script affects scheduled backups in the policy named `days` only when the schedule is named `fulls`.

For a given backup, NetBackup calls only one `ndmp_moving_path_notify` script and checks for them in the following order:

```
ndmp_moving_path_notify.policy.schedule.cmd
ndmp_moving_path_notify.policy.cmd
ndmp_moving_path_notify.cmd
```

For example, if there are both `ndmp_moving_path_notify.policy.cmd` and `ndmp_moving_path_notify.policy.schedule.cmd` scripts, NetBackup uses only `ndmp_moving_path_notify.policy.schedule.cmd`.

**Note** If you are also using `ndmp_start_notify` scripts, they can provide a different level of notification than the `ndmp_moving_path_notify` scripts. For example, if you had one of each, they could be `ndmp_start_notify.policy.cmd` and `ndmp_moving_path_notify.policy.schedule.cmd`.

When the backup starts, NetBackup passes the following parameters to the script:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%1</td>
<td>Name of the client from the NetBackup catalog.</td>
</tr>
<tr>
<td>%2</td>
<td>Policy name from the NetBackup catalog.</td>
</tr>
<tr>
<td>%3</td>
<td>Schedule name from the NetBackup catalog.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| %%4       | One of the following:  
|           | FULL  
|           | INCR  
|           | CINC  |
| %%5       | Status of the operation and is same as sent to the NetBackup server. This is 0 for successful backups and 1 for partially successful backups. If an error occurs, the status is the value associated with that error. |
| Note: The following file is not checked when using `ndmp_moving_path_notify`. |
| %%6       | Results file that NetBackup checks for a return code from the script. NetBackup uses %%6 to pass the file name and then expects the script to create the file in the same directory as the script.  
|           | If the script applies to a specific policy and schedule, the results file must be named  
|           | `install_path\netbackup\bin\NDMP_END_NOTIFY_RES.policy.schedule`  
|           | If the script applies to a specific policy, the results file must be named  
|           | `install_path\netbackup\bin\NDMP_END_NOTIFY_RES.policy`  
|           | If the script applies to all backups, the results file must be named  
|           | `install_path\netbackup\bin\NDMP_END_NOTIFY_RES`  
|           | An `echo 0>` %%6 statement is one way for the script to create the file.  
|           | NetBackup deletes the existing results file before calling the script. After the script executes, NetBackup checks the new results file for the status. The status must be 0 for the script to be considered successful. If the results file does not exist, NetBackup assumes that the script was successful. |
| %%7       | Pathname being backed up. |
Index

Numerics
10000, port (used by NDMP) 60

A
accessibility features ix
acstest 67
Activity Monitor interface 63
Add Drive dialog 31, 35
Add Robot dialog 29
adding
  drives 31, 35
  Media Manager storage unit 47
  NDMP storage units 35
  robots 28
  volumes 33
Advanced Client 3
  access web info x
authorization
  NDMP user and password 24
auto discovery of devices 2, 23, 52
avrd 60

B
backup
  automatic 56
  format 60
  level (NDMP vs. NetBackup) 62
  local vs. three-way 2, 5, 8, 14
  manual, of NDMP policy 56
ndmp_end_notify script
  UNIX 74
  Windows 76
ndmp_end_path_notify script
  UNIX 83
  Windows 84
ndmp_moving_path_notify script
  UNIX 87
  Windows 88
ndmp_start_notify script
  UNIX 70
  Windows 72
ndmp_start_path_notify script
  UNIX 78
  Windows 80
overview 14
procedure 56
three-way, configuring for 27
types allowed 38

C
client list 37
clustering 3, 43
configuration
  add Media Manager storage unit 47
  add NDMP storage unit 35
  add volumes 33
  adding drives/robots 28
  Backup Selections list 38
  check Media Manager 33
  client list 37
  drive in media manager 35
  drive, for NDMP-attached host 31
  for clustering 43
  general policy attributes 37
  NDMP policy 37
  policy storage unit 37
  policy type 37
  robot in Media Manager 28
  schedules 38
  testing 44
  control panel, Windows 63

D
DAR 3, 18
defined 4
  how to turn on/off 40
debug logs 62
deinstallation
server 22
Device Configuration Wizard 2, 23, 52
Device Monitor 33
different client restore 5
Direct Access Recovery (see DAR)
drive
   add to Media Manager 35
   adding, for NDMP-attached host 31
duplex mode and performance 60

E
environment variables, in Backup Selections
   list 38
exclude
   files, using SET directive 38
   list, using 38

F
fail over 43
file list 38
file names (not allowed in Backup Selections
   list) 38, 60

H
High Availability 3, 43

I
ICMP protocol 60
installation 19
   deinstallation 22
   load from media 20
   prerequisites 19
instant recovery 3

J
jnbSA 56

L
LEVEL (NDMP backup) 62
log directories 62, 63, 64

M
Media Manager
   configuring 28
   storage units 46
   troubleshooting 63, 64

N
NAS snapshot 3, 23, 24, 37, 47, 55
nbjm 61
nbpem 61
nbrb 61
NDMP
   access web info x
   backup, manual 56
   client type 37
   client, definition of 4
   host name, entering 30
   host, definition of 4
   LEVEL, related to NetBackup
   backups 62
   policy
      adding 37
      attributes 37
      clients 37
      files 38
      schedules 38
      policy storage unit attribute
         configuration 37
      policy type
         configuration 37
         overview 10
      protocol 4, 6, 60
      restore 57
      restrictions 60
      server application, definition of 4
      storage unit, adding 35
      storage unit, definition of 5
      to media server 4, 27, 37, 46
         how to configure 47
ndmp logging 61
NDMP to media server 2, 9
ndmp_end_notify script
   UNIX 74
   Windows 76
ndmp_end_path_notify script
   UNIX 83
   Windows 84
ndmp_moving_path_notify script
   UNIX 87
   Windows 88
ndmp_start_notify script
   UNIX 70
   Windows 72
ndmp_start_path_notify script
   UNIX 78
   Windows 80
ndmpagent
   legacy debug log 62
   unified logging 61
NetBackup Administration Console 56
NetBackup for NDMP
configuration 23
definition 1
features 2
installation 19
server, definition 4
troubleshooting 61
network interface cards 60
NIC cards and full duplex 60
notification scripts 69

O
on demand storage unit 36
operating notes and restrictions 60
Override policy storage unit, setting 38
overwriting files 57

P
password
  verifying 27, 34
path length limit 60
path-based history 3
peripherals (latest info on web) x
ping 60
point-in-time snapshots 3
policy
  attributes 37
port 10000 (used by NDMP) 60
protocol supported (NDMP) 2, 23

R
remote NDMP 46
reserved environment variables 38
restart
  device manager 30
  Media Manager 32
restore
  local vs. three-way 5, 8, 14
  overview 16
  overwriting files 57
  procedure 57
  three-way 16
  to different client 5, 10
restrictions
  NetBackup for NDMP 60
robot
  adding 28
  robotic control 29
  supported types 11
  test device configuration 67
robot connection
verifying 34
Robot Control Host, for volume 33

S
schedules 38
scripts
  notification 69
  SET directive 39
Shared Storage Option (see SSO) 2
snapshots 3
SnapVault 3, 37
SSO 2
  configuration overview 51
storage devices
  auto discovery 2, 23
storage unit
  adding 35
  media manager type 46
  NDMP type, overview 11
  specify for NDMP policy 37
support web site (VERITAS) x
supported robots 11

tape libraries supported 11
terminology, NetBackup for NDMP 4
testing configuration 44
three-way backup 5
  configuring for 27
tl8test 67
tldtest 67
tlhtest 67, 68
tpautoconf 34, 51
troubleshooting 59
type
  of backup allowed 38
  of policy 37
  of storage unit 36

U
unified logging 61
uninstalling NetBackup 22
user-directed
  backups and archives 10
  backups and archives, not allowed 56
  restores, not allowed 57

V
variables, environment 38
vendors (latest info on) x
verifying NDMP password 27
version supported (NDMP) 2, 23
volumes, add to Media Manager 33
vxlogview 61

W
web access to product info x
web access to recent Advanced Client info x
wildcards, in Backup Selections list 38, 60
Windows control panel 63