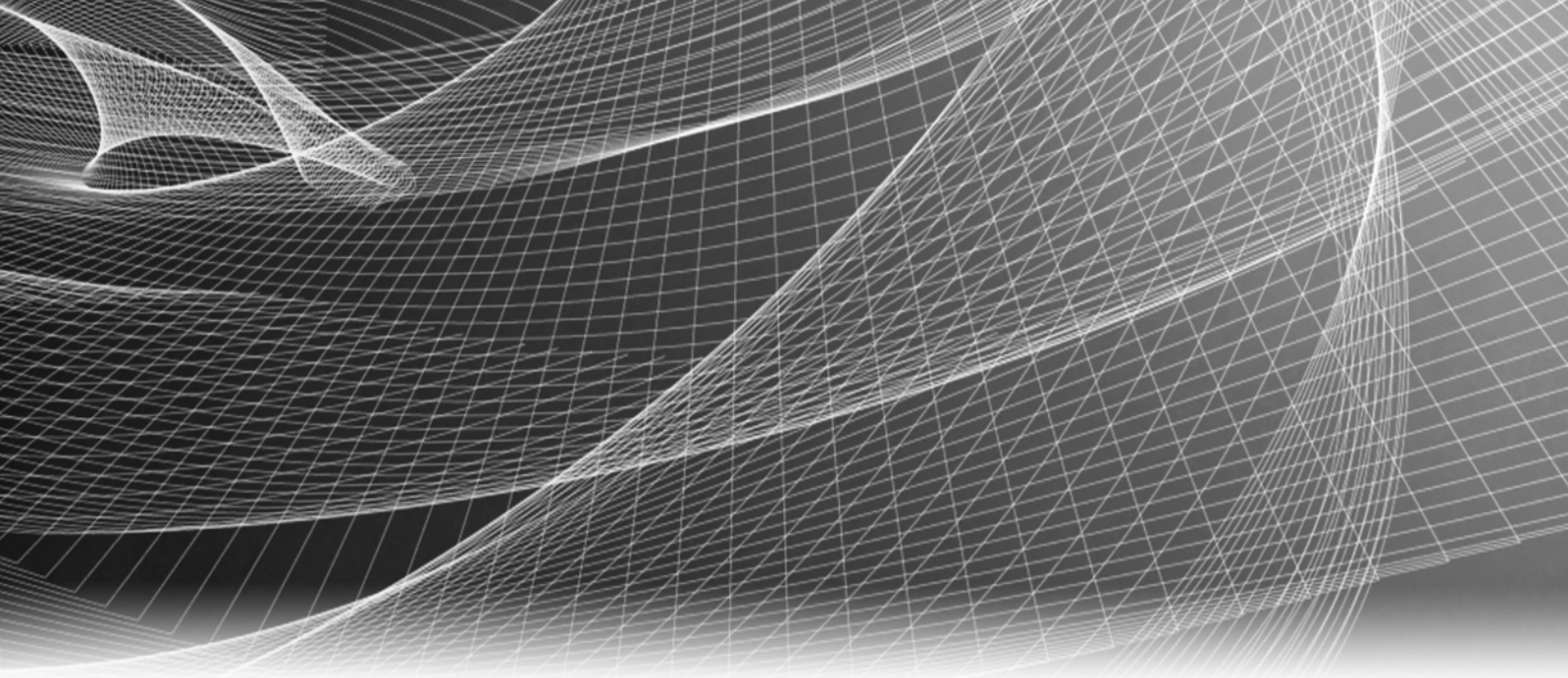




EMC[®] NetWorker[®] HP OpenVMS Version

Release 8.0

Installation Guide

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REV 01

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PREFACE

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

Contact your EMC technical support professional if a product does not function properly or does not function as described in this document.

Note: This document was accurate at publication time. Go to EMC Online Support (<https://support.emc.com>) to ensure that you are using the latest version of this document.

Purpose

This document provides planning, practices, and configuration information for the use of the EMC NetWorker HP OpenVMS features within an EMC NetWorker backup and storage management environment.

Audience

This document is intended for the host system administrators.

Related documentation

The following EMC publications provide additional information:

- ◆ *EMC NetWorker Software Compatibility Guide*
- ◆ *EMC NetWorker Release 8.0 HP OpenVMS Version Release Notes*
- ◆ *EMC NetWorker Release 8.0 HP OpenVMS Version Administration Guide*
- ◆ *EMC NetWorker Release 8.0 Multiplatform Version Administration Guide*
- ◆ *EMC NetWorker Error Message Guide*
- ◆ *EMC NetWorker Command Reference Guide*

Conventions used in this document

EMC uses the following conventions for special notices:

NOTICE

NOTICE is used to address practices not related to personal injury.

Note: A note presents information that is important, but not hazard-related.

Typographical conventions

EMC uses the following type style conventions in this document:

Bold	Use for names of interface elements, such as names of windows, dialog boxes, buttons, fields, tab names, key names, and menu paths (what the user specifically selects or clicks)
<i>Italic</i>	Use for full titles of publications referenced in text
<code>Monospace</code>	Use for: • System output, such as an error message or script • System code • Pathnames, filenames, prompts, and syntax • Commands and options
<code>Monospace italic</code>	Use for variables.
Monospace bold	Use for user input.
[]	Square brackets enclose optional values
	Vertical bar indicates alternate selections — the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information omitted from the example

Where to get help

EMC support, product, and licensing information can be obtained as follows:

Product information — For documentation, release notes, software updates, or information about EMC products, go to EMC Online Support at:

<https://support.emc.com>

Technical support — Go to EMC Online Support and click Service Center. You will see several options for contacting EMC Technical Support. Note that to open a service request, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

Online communities — Visit EMC Community Network at <https://community.EMC.com> for peer contacts, conversations, and content on product support and solutions. Interactively engage online with customers, partners, and certified professionals for all EMC products.

Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to:

BRS.Documentation@emc.com

CHAPTER 1

Introduction

This chapter provides background information on the EMC® NetWorker® software and supported devices. Where appropriate, differences between the NetWorker for HP OpenVMS and other NetWorker client and storage node software are noted. The following sections are included in this chapter:

- ◆ [About the NetWorker product](#) 8
- ◆ [Supported devices](#) 10
- ◆ [Licensing](#) 10

About the NetWorker product

The NetWorker product is a suite of storage management software that provides backup, recovery, and other services to computers with a wide variety of operating systems and data types. NetWorker products for different operating systems are interoperable. This provides the flexibility to design a storage management system that works best with the current computing environment.

The NetWorker software is distributed in these formats:

- ◆ In a media kit of CD-ROMs that contains the software and electronic documentation for several related EMC products
- ◆ As a downloadable archive file from the EMC website

The NetWorker product has five major components:

- ◆ NetWorker client
- ◆ NetWorker storage node
- ◆ NetWorker server
- ◆ NetWorker Management Console
- ◆ NetWorker License Manager

NetWorker client

The NetWorker client software communicates with the NetWorker server and provides recover and ad-hoc (manual) backup functionality. The NetWorker client software is installed on all computers that are backed up to the NetWorker server.

NetWorker clients do not have to be running the same operating system as the NetWorker server. However, to back up clients that are running other operating systems, the NetWorker server must have an EMC ClientPak[®] enabler for that client.

For example, to have a NetWorker server that is running Microsoft Windows back up NetWorker clients that are running NetWorker for HP OpenVMS, a separate ClientPak enabler for the OpenVMS operating system must be purchased and entered on the NetWorker server.

NetWorker storage node

Data can be backed up directly to devices that are attached to a NetWorker server or to a NetWorker storage node. A storage node controls storage devices such as tape drivers, autochangers, and silos.

Storage nodes depend on the NetWorker server for these functions:

- ◆ Control over which clients use the storage node's devices for backups
- ◆ License management
- ◆ Management of the client file indexes that track each client's data
- ◆ Management of the media database that tracks the data contained on each volume

NetWorker storage nodes and the NetWorker server can use different operating systems. For example, you can use a NetWorker storage node that is running on the HP OpenVMS operating system with a NetWorker server that is running on an HP-UX operating system.

NetWorker server

The NetWorker server software provides control and scheduling for NetWorker operations. It enables you to:

- ◆ Enter the enabler licenses for the NetWorker server and all of the functions it controls, such as autochanger modules, additional client connections, and ClientPak licenses.
- ◆ Define the clients, devices, and media that the NetWorker server controls.
- ◆ Define the schedules for backups and other operations.
- ◆ Monitor the results of backups and other operations.
- ◆ Manage the client file indexes that track each client's data.
- ◆ Manage the media database that tracks the data contained on each volume.

Note: NetWorker server software is not available for the HP OpenVMS operating system.

NetWorker Management Console

All NetWorker servers and clients are managed from the NetWorker Management Console. The Console replaces the NetWorker Administration program (**nwadmin**), which is no longer available.

The Console provides reporting, managing, and monitoring capabilities for all NetWorker servers and clients. The Console must be installed on a host that is running one of the following operating systems in order to administer the NetWorker servers:

- ◆ AIX
- ◆ HP-UX
- ◆ Linux
- ◆ Solaris
- ◆ Microsoft Windows

The Console is accessed through a graphical interface that has a web-enabled browser with the specified version of Java Runtime environment configured. Multiple users can access the Console server concurrently from different browser sessions. A computer that hosts the web-enabled browser can also be a NetWorker client, server, or storage node, provided it is running one of the aforementioned operating systems.

You must install the NetWorker Management Console software on one computer in your datazone to manage and monitor the NetWorker server. Only one installation of the Console is required to manage multiple NetWorker servers and to take full advantage of the Console's consolidated reporting feature.

Supported devices

NetWorker software supports a variety of media types and devices, either stand-alone or in an autochanger or silo tape library. The term *autochanger* is a general term that refers to a variety of storage devices, including:

- ◆ Autoloader
- ◆ Carousel
- ◆ Datawheel
- ◆ Jukebox
- ◆ Library
- ◆ Near-line storage

The NetWorker for HP OpenVMS supports the use of any tape and robotic device supported by the OpenVMS SCSI driver or any mounted file systems. Devices can be connected to a NetWorker server or storage node.

Licensing

Licensing for NetWorker is provided by enabler codes that activate the functionality of NetWorker software and other EMC software beyond the temporary evaluation period. The *EMC NetWorker Licensing Guide* or an EMC sales representative can provide licensing details.

CHAPTER 2

Installing the Software

This chapter explains how to install the NetWorker software for HP OpenVMS. It includes the following sections:

◆ Software installation roadmap	12
◆ Installation requirements	12
◆ Updating from a previous NetWorker release	15
◆ Installing the NetWorker software	17
◆ Adding, removing, or reconfiguring NetWorker components.....	20
◆ Removing the NetWorker software	22

Software installation roadmap

Use the following roadmap when installing the NetWorker software:

1. Ensure that the computer on which you are installing the NetWorker software meets the requirements described in [“Installation requirements” on page 12](#).
2. If the computer where you are installing the NetWorker software is running a previous release of NetWorker software, see one of the following sections for preinstallation considerations:
 - [“Considerations for updating NetWorker software for HP OpenVMS” on page 15](#)
 - [“Considerations for updating NetWorker OpenVMS Client software” on page 15](#)
3. Access the NetWorker software installation kit and install the NetWorker software as described in [“Installing the NetWorker software” on page 17](#).
4. Configure the NetWorker software as described in [Chapter 3, “Postinstallation Configuration.”](#)
5. Enable and register all of your NetWorker products as described in [“Licensing” on page 10](#).
6. If you need to change an existing NetWorker installation (to add support for Oracle or Oracle Rdb database backup, for example), see [“Adding, removing, or reconfiguring NetWorker components” on page 20](#) for instructions.

Installation requirements

The NetWorker software for HP OpenVMS installation requirements differ depending upon the components being installed. The PCSI installation file includes four components:

- ◆ NetWorker client software (required)
- ◆ NetWorker storage node software (optional)
- ◆ NetWorker Module for Oracle (optional)
- ◆ NetWorker Module for Oracle Rdb (optional)

The NetWorker client software is installed in all cases. Installation of one or more of the other components is optional. The default installation options install the NetWorker client and storage node software during an initial installation.

These sections describe the requirements for each component:

- ◆ [“Client software requirements” on page 12](#)
- ◆ [“Additional requirements for storage nodes” on page 14](#)
- ◆ [“Additional requirements for Oracle and Oracle Rdb Modules” on page 14](#)

Client software requirements

The *EMC NetWorker Software Compatibility Guide* provides the definitive list of client, server, storage node, and layered products supported by the EMC information protection software versions.

Note: OpenVMS shows the NetWorker release number with a hyphen rather than a second period due to PCSI restrictions associated with version numbering. For example, NetWorker release 7.3.2 is identified as V7.3-2 on OpenVMS. For any discrepancies between the following version information and the SCG, the SCG takes precedence:

NetWorker server:

NetWorker release 8.0

Alpha platform:

- ◆ OpenVMS Version 7.3-2 or later
- ◆ HP AXPVMS SSL Version 1.4 or later
- ◆ TCP/IP software

Use of one of these products and versions is recommended:

- TCP/IP Services for OpenVMS (UCX) Version 5.1 or Version 5.1 with ECO-3
- MultiNet Version 5.4
- TCPware Version 5.9

Integrity platform:

- ◆ OpenVMS Version 8.2-1 or later
- ◆ HP I64VMS SSL Version 1.4 or later
- ◆ TCP/IP software

Use of one of these products and versions is recommended:

- TCP/IP Services for OpenVMS (UCX) Version 5.7-13ECO1
- MultiNet Version 5.4
- TCPware Version 5.9

For the latest information on the SSL (Secure Socket Layer) software, visit the following HP website :

<http://h71000.www7.hp.com/openvms/products/ssl/ssl.html>

The recommended TCP/IP products and versions have been tested and verified for use with NetWorker software for HP OpenVMS. However, any TCP/IP software that supports the BGDRIVER (UCX emulation) should suffice.

Installation destination considerations

When deciding where to install the NetWorker client software, consider the following requirements and restrictions:

- ◆ The **nsrexecd** daemon bypasses any disk quotas that may be established on the installation destination drive. If this behavior is unacceptable for a particular device in your environment, install the NetWorker software on an alternate device where disk quotas are not critical.

- ◆ When installing NetWorker software in a mixed cluster of Alpha and Integrity, be sure to specify a different destination on each platform unless you are installing the software on the system disk in both cases. The two versions of NetWorker software cannot share a common NSR\$SYSTEM—that is, they cannot be installed on a common disk in the same directory.
- ◆ If you are updating an existing NetWorker client, the original installation destination is used. To change it, you must remove the previous version of NetWorker software.

“Installing the NetWorker software” on page 17 explains how to specify the installation destination in the **PRODUCT INSTALL** command.

Additional requirements for storage nodes

The installation procedure for NetWorker software for HP OpenVMS installs the storage node software by default. A storage node must have at least one storage device attached and installed according to the manufacturer’s instructions. See the relevant HP OpenVMS Operating System Software Product Description (SPD) for a list of supported storage devices. SPDs are available online (as of publication date) at:

<http://h71000.www7.hp.com/doc/spd.html>

Note: The generic SCSI pass-through driver, GKDRIVER, must be enabled for all SCSI magazine loaders or tape changers that will be controlled by an OpenVMS storage node. “Configuring the autochanger” on page 32 provides more information.

Additional requirements for Oracle and Oracle Rdb Modules

The Oracle and Oracle Rdb modules enable you to use NetWorker software to back up and recover Oracle and Oracle Rdb databases, respectively. Installation of either or both of these modules is optional. The installation requirements associated with each module are described in the sections that follow.

NetWorker Module for Oracle

The NetWorker Module for Oracle allows you to back up online Oracle databases by using NetWorker software in tandem with the Oracle Media Management API (SBT interface) and Oracle’s Recovery Manager (RMAN). The system where you install this optional NetWorker module must be running one of the following minimum versions of Oracle software:

Alpha platform:

Oracle 9i Release 2 (9.2)

Integrity platform:

Oracle 10g

NetWorker Module for Oracle Rdb

The NetWorker Module for Oracle Rdb allows you to back up online Oracle Rdb databases by using NetWorker software in tandem with the Oracle Media Management API (SBT interface) and Rdb/VMS Management Utility (RMU). The system where you install this optional NetWorker module must be running one of the following minimum versions of Oracle Rdb software:

Alpha platform:

Oracle Rdb Version 7.1.4.0 or higher

Integrity platform:

Oracle Rdb Version 7.2

You can download the latest Oracle Rdb releases (for both Alpha and Integrity) from the following Oracle website (subject to change without notice):

<http://www.oracle.com/technology/software/products/rdb7/index.html>

Updating from a previous NetWorker release

Before updating NetWorker client or storage node software, verify that the system on which you are installing the new release meets the requirements specified in [“Installation requirements” on page 12](#). Also, review the *EMC NetWorker Release 7.3.2 HP OpenVMS Version Release Notes*.

The following sections describe additional preinstallation and, in some cases, postinstallation considerations and tasks according to the update type:

- ◆ [“Considerations for updating NetWorker software for HP OpenVMS” on page 15](#)
- ◆ [“Considerations for updating NetWorker OpenVMS Client software” on page 15](#)

Considerations for updating NetWorker software for HP OpenVMS

When installing the NetWorker software for HP OpenVMS release 8.0 on a system that is running a previous version of NetWorker software for OpenVMS (6.0.1 or later), note the following:

- ◆ Removal of the existing NetWorker software before installing release 8.0 is not required unless you want to change the installation destination.
- ◆ When updating from NetWorker release 6.0.1-C or earlier, some obsolete directories may remain on the computer. [“Removing obsolete directories” on page 27](#) explains how to remove them.

Proceed to [“Installing the NetWorker software” on page 17](#) for further instructions.

Considerations for updating NetWorker OpenVMS Client software

To update from NetWorker OpenVMS Client (NOC) software (produced by WumpusWare) to NetWorker software for HP OpenVMS release 8.0, perform the following tasks:

1. Remove the NOC software as described in [“How to remove the NOC software” on page 16](#).
2. Install the NetWorker software for HP OpenVMS as described in [“Installing the NetWorker software” on page 17](#).

3. After the installation, convert the existing online file index (which resides on the NetWorker server) to the format supported by NetWorker software. This conversion allows the current NetWorker client and storage node software to interpret the index values written by the older (NOC) client. Conversion instructions are provided in [Chapter 3, “Postinstallation Configuration.”](#)

How to remove the NOC software

Before you run the uninstall program that was supplied by the NOC software:

1. Verify that there is no active save in progress.

You can do this from the **Monitoring** window of the NetWorker Management Console or by using the **nsrwatch** command, which is described further in the *EMC NetWorker Release 7.3.2 HP OpenVMS Version Administration Guide*.

Note: The uninstall program will terminate any active **save** processes.

2. Copy any files that you want to retain from the SYS\$SYSROOT:[NSR] directory tree to another location. Files that you may want to save include any pre- and postprocessing files that reside in the SYS\$SYSROOT:[NSR.RES] directory, and the SERVERS.; file, which contains the settings for contacting the NetWorker server. These files can be reused with the NetWorker release 8.0 software.

To remove the NOC software, run the NSR\$DEINSTALL.COM command procedure as shown in [Example 1 on page 16](#). This procedure is supplied by the NOC kit and resides in SYS\$SYSROOT:[NSR] by default.

Note: The uninstall program removes all files and directories in the SYS\$SYSROOT:[NSR] directory tree except those created after the original installation. Those files and their directories must be deleted manually.

Example 1 Removing the NOC software

This example shows how to remove existing NOC software from an OpenVMS client computer prior to installing the current release of NetWorker software for HP OpenVMS. The SYSTEM-F-DIRNOTEMPTY warnings shown in this example are normal and can be ignored. The confirmation message shown at the end of the example indicates that the NOC software has been successfully removed.

@SYS\$SYSROOT: [NSR] NSR\$DEINSTALL.COM

This procedure will stop any running NSR\$EXECD process on the local node and will remove all files and libraries associated with the NSR OpenVMS software.

```
Are you sure you want to execute this procedure? [NO]: yes
%DELETE-W-FILNOTDEL, error deleting SYS$SYSROOT:[NSR]LOGS.DIR;1
-RMS-E-MKD, ACP could not mark file for deletion
-SYSTEM-F-DIRNOTEMPTY, directory file is not empty
%DELETE-W-FILNOTDEL, error deleting SYS$SYSROOT:[NSR]RES.DIR;1
-RMS-E-MKD, ACP could not mark file for deletion
-SYSTEM-F-DIRNOTEMPTY, directory file is not empty
%DELETE-W-FILNOTDEL, error deleting SYS$SYSROOT:[NSR]TMP.DIR;1
-RMS-E-MKD, ACP could not mark file for deletion
-SYSTEM-F-DIRNOTEMPTY, directory file is not empty
%DELETE-W-FILNOTDEL, error deleting SYS$COMMON:[NSR]RES.DIR;1
-RMS-E-MKD, ACP could not mark file for deletion
-SYSTEM-F-DIRNOTEMPTY, directory file is not empty
```

NSR installation has been removed.

Installing the NetWorker software

The following sections explain how to access and install the NetWorker software:

- ◆ “Task 1: Access the installation files” on page 17
- ◆ “Task 2: Execute the PCSI procedure” on page 18

Task 1: Access the installation files

There are two PCSI installation files for this release of NetWorker software:

- ◆ For the Alpha platform:

`LGTO-AXPVMS-SNCLNT-V0800-0-1.PCSI`

- ◆ For the Integrity platform:

`LGTO-I64VMS-SNCLNT-V0800-0-1.PCSI`

The NetWorker PCSI installation files are available on CD-ROM or as self-extracting archives that can be downloaded from EMC Powerlink® at:

<http://Powerlink.EMC.com>

Registration is required.

The procedure for accessing the PCSI installation file for your platform type differs depending on how you received the kit. See one of the following sections for instructions:

- ◆ “How to extract the installation file from a self-extracting archive (.EXE)” on page 17
- ◆ “How to access the installation file on the CD-ROM distribution” on page 18

How to extract the installation file from a self-extracting archive (.EXE)

If you received the NetWorker software as a self-extracting archive (you downloaded the kit from the EMC website, for example), extract the PCSI installation file from the self-extracting archive as follows:

1. On an OpenVMS system, copy the executable image to a directory in which you have write access.
2. Run the self-extracting archive as shown in the following example, which extracts the PCSI for OpenVMS Alpha:

```
run lgto-axpvms-sncInt-v0800-0-1.exe
Archive: disk:[dir]lgto-axpvms-sncInt-v0703-2-1.exe;1
inflating: lgto-axpvms-sncInt-v0703-2-1.pcsi
```

3. If you extracted the PCSI to an ODS-5 volume, rename the PCSI file to the same name with all uppercase letters. (All lowercase letters are used by default.)

For example:

```
rename lgto-axpvms-sncInt-v0800-0-1.pcsi -
LGTO-AXPVMS-SNCLNT-V0800-0-1.PCSI
```

Otherwise, the OpenVMS **PRODUCT** utility cannot locate the file.

How to access the installation file on the CD-ROM distribution

To access the NetWorker PCSI installation file on the CD-ROM:

1. Insert the CD-ROM into the computer's CD-ROM drive.
2. Type the following command to mount the CD-ROM:

```
mount device: -
/override=identification -
/media_format=CDROM -
/undefined_fat=fixed:none:8192
```

Messages similar to the following appear:

```
%MOUNT-I-WRITELOCK, volume is write locked
%MOUNT-I-CDROM_ISO, NETWORKER_VOL_2:NETWORKER_VOL_2 (1 of 1),
mounted on NODE$DQB0:
```

3. Locate the appropriate PCSI installation file on the CD-ROM:

```
[OPENVMS.ALPHA] LGTO-AXPVMS-SNCLNT-V0800-0-1.PCSI
[OPENVMS.INTEGRITY] LGTO-I64VMS-SNCLNT-V0800-0-1.PCSI
```

Task 2: Execute the PCSI procedure

To execute the PCSI procedure for the NetWorker software for HP OpenVMS, type the **PRODUCT INSTALL** command at the DCL prompt. Specify **snclnt** as the name of the product to install and include the appropriate command qualifiers (**/SOURCE** and **/DESTINATION**), as shown in [Example 2](#).

Example 2 Installing a NetWorker client and storage node

This example shows the messages, prompts, and sample user input for a NetWorker software installation during which the NetWorker client and storage node components are installed. Explanations for the numbered callouts that appear in parentheses on the right side of this example are provided in [Table 1 on page 20](#).

```
product install snclnt/source=SYS$SYSDEVICE:[KITS] - (1)
/destination=disk$oracle1:[networker]
```

The following product has been selected:

```
LGTO AXPVMS SNCLNT V8.0-0 Layered Product
```

Do you want to continue? [YES] **y**

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for any products that may be installed to satisfy software dependency requirements.

```
LGTO AXPVMS SNCLNT V8.0-0: NetWorker Storage Node and Client for OpenVMS
```

```
Copyright @ 2003-2013 EMC Corporation. All Rights Reserved.
```

```
This product must be licensed on the EMC NetWorker Server
```

```
Do you want the defaults for all options? [YES] y (2)
```

Do you want to review the options? [NO] **n**

Execution phase starting ...

The following product will be installed to destination:
 LGTO AXPVMS SNCLNT V8.0-0 DISK\$ORACLE1:[NETWORKER.]

Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%

If you are installing NetWorker in a cluster, specify a name that NetWorker will associate with this OpenVMS cluster. The cluster alias name must be associated with a TCP/IP address and available in DNS. Use a comma-separated list to specify multiple names that resolve to the same address.

For example: cookie
 or
 cookie,cookie.mycorp.com

The name you specify defines the logical name NSR\$CLUSTER_ALIAS_NAME, which is defined at NetWorker startup.

Enter the cluster alias name [not a cluster]:

(3)

The client-side nsrexecd program restricts access to a select set of NetWorker servers. Please enter the names of each computer running a NetWorker server that will back up this client, one name at a time. If a computer has more than one network interface, please enter each interface's name (one at a time).

Enter the first NetWorker server's name [no more]: **cider.mycorp.com**

(4)

Enter the next NetWorker server's name [no more]:

The SERVERS file contains the following list of server names:

cider.mycorp.com

Is this list correct [Y]: **y**

Insert the following lines in SYS\$MANAGER:SYSTARTUP_VMS.COM:
 @sys\$startup:nsr\$startup.com
 Insert the following lines in SYS\$MANAGER:SYSHUTDOWN.COM:
 @sys\$manager:nsr\$shutdown.com

%NSR-I-START, NetWorker Startup...

%NSR-S-STARTED, Started nsrexecd, process id = 0000E43C

...100%

The following product has been installed:
 LGTO AXPVMS SNCLNT V8.0-0 Layered Product

Table 1 Installation example callouts

Callout	Description
1	The PRODUCT INSTALL command shown in Example 2 on page 18 specifies the following: • snclnt — The name of the product kit to install. • /source=SYS\$SYSDEVICE:[KITS] — The location (device name and directory) of the NetWorker PCSI file. If you omit the optional /SOURCE qualifier, the PCSI utility searches the current directory for the specified product kit. • /destination=disk\$oracle1:[networker] — The location (device name and directory) where the NetWorker software will be installed. If you omit the device name (disk\$oracle1: in the example), the PCSI utility uses the current default device. If you omit the directory name ([networker] in the example), PCSI uses the [VMS\$COMMON] directory as the default directory. “Installation destination considerations” on page 13 provides more information on choosing an installation destination.
2	The installer typed y[es] to accept the default options, which install the NetWorker client and storage node. To install the NetWorker client only, or a combination of components other than client and storage node, you would type n[o] and then respond to individual option prompts. The following example shows the available options and the appropriate responses to install the NetWorker client, storage node, and Oracle Rdb options: <pre> Do you want the defaults for all options? [YES] n Add Storage Node Capability [YES] y Add Oracle/Rdb Database Backup Capability [NO] y Add Oracle Database Backup Capability [NO] n Do you want to review the options? [NO] y LGTO AXPVMS SNCLNT V8.0-1: NetWorker Storage Node and Client for OpenVMS Add Storage Node Capability: YES Add Oracle/Rdb Database Backup Capability: YES Add Oracle Database Backup Capability: NO Are you satisfied with these options? [YES] y </pre>
3	No cluster alias name was specified in this example because the node on which the NetWorker software is being installed is not a member of a cluster. However, when configuring a cluster node, you would enter a cluster alias name that is a registered IP hostname. The name you specify does not have to match the DECnet node name. You can specify multiple names, separated by commas, provided they all resolve to the same IP address. For example: <pre> Enter the cluster alias name [not a cluster]: cookie, cookie.mycorp.com </pre> The NetWorker software defines the NSR\$CLUSTER_ALIAS_NAME logical name with the names that you specify for cluster alias name. It also creates root directories for the cluster node in the NetWorker directory tree. Additional postinstallation tasks are required to complete the cluster configuration as described in “Configuring NetWorker client software in a cluster environment” on page 27.
4	In this example, the name of a single NetWorker server, cider.mycorp.com, is specified. The installer pressed Enter in response to the second prompt to indicate that there are "no more" servers. If you have multiple NetWorker servers, you can specify them one at a time in response to subsequent prompts.

Adding, removing, or reconfiguring NetWorker components

Use the **PRODUCT RECONFIGURE** command with product name **snclnt** to do any of the following:

- ◆ Add NetWorker components to a NetWorker client.
- ◆ Remove NetWorker components from a NetWorker client.
- ◆ Configure cluster nodes to use the NetWorker software.

IMPORTANT

Ensure that there are no active save processes before executing the **PRODUCT RECONFIGURE** command. This command terminates active processes and restarts the NetWorker software.

The **PRODUCT RECONFIGURE** command reruns the installation procedure, which issues the same prompts as those described in [Table 1 on page 20](#). When you are prompted whether to take the defaults for all options, consider the following:

- ◆ When adding or removing NetWorker components, answer **n[o]**. You will then be prompted whether to add each available NetWorker component. For example:

```
Do you want the defaults for all options? [YES] n
Add Storage Node Capability [YES]
Add Oracle/Rdb Database Backup Capability [NO]
Add Oracle Database Backup Capability [NO]
```

The initial default answer for each option indicates whether that option is installed on the computer. A default [YES] answer means that the option is already installed. A default [NO] indicates that it is not. The default answers in the preceding example indicate that the storage node capability is already installed but the Oracle and Oracle Rdb Modules are not. Your responses to these prompts determine which optional components are added or left in their current state *and* which are removed during product reconfiguration.

For example, if you answered **n[o]** to the Add Storage Node Capability prompt in the preceding example, storage node capability would be removed.

- ◆ When reconfiguring a cluster node to use the NetWorker software, you must select the same options that were selected when the NetWorker software was installed on the first node in the cluster. See [“Configuring NetWorker client software in a cluster environment” on page 27](#) for more details.

If you configure a cluster node with the **PRODUCT RECONFIGURE** command and then later decide to remove that node from the cluster, use the procedure described in [“Removing node-specific root directories” on page 28](#). Perform this procedure before removing the node from the cluster.

[Example 3](#) shows a sample product reconfiguration.

Example 3 Adding the Oracle Rdb Module to an existing NetWorker storage node

This abbreviated example shows how to add the Oracle Rdb module to an existing NetWorker storage node that is running OpenVMS on Alpha. The NetWorker PCSI installation file used in this example resides in SYS\$SYSDEVICE:[KITS] and is named LGTO-AXPVMS-SNCLNT-V0800-0-1.PCSI.

```
product reconfigure snclnt/source=sys$sysdevice:[kits]
.
.
.
Do you want the defaults for all options? [YES] n
```

```
Add Storage Node Capability [YES]
Add Oracle/Rdb Database Backup Capability [NO] y
Add Oracle Database Backup Capability [NO]
Do you want to review the options? [NO]
```

An affirmative response to the Oracle Rdb database backup capability prompt causes the NetWorker Module for Oracle Rdb to be added to this NetWorker storage node. No other software is added or removed.

Note: After your use the **PRODUCT RECONFIGURE** command, you must reapply the latest OpenVMS ECO kit, if available, to ensure that the NetWorker software uses the same ECO level as before the reconfiguration.

Removing the NetWorker software

To remove the NetWorker client software and all optional components, type the **PRODUCT REMOVE** command and specify product name **snclnt**. For example:

```
product remove snclnt
```

The PCSI utility automatically shuts down the NetWorker daemons and removes the NetWorker software.

IMPORTANT

The **PRODUCT REMOVE** command will not delete files from the NetWorker directory tree that were created after the installation. You must delete those files and the remaining NetWorker directory tree manually.

The *HP OpenVMS System Manager's Manual* provides more information about the PCSI utility.

CHAPTER 3

Postinstallation Configuration

This chapter describes postinstallation tasks that you need to perform to configure the NetWorker software for use. It includes the following sections:

- ◆ [NetWorker client configuration](#) 24
- ◆ [NetWorker storage node configuration](#) 31
- ◆ [NetWorker database modules configuration](#) 42

Note: The postinstallation tasks described in [“NetWorker client configuration”](#) on page 24 apply to *all* installations of NetWorker software for HP OpenVMS. Read that section first and perform the tasks that apply to your system or environment. If you installed optional components (storage node or one or more database modules) on the NetWorker client computer, see the related sections for additional postinstallation configuration tasks.

NetWorker client configuration

After you install the NetWorker client software on an OpenVMS client computer, configure the NetWorker client software for use by performing the following tasks:

1. Add startup and shutdown commands to the system startup and shutdown command files to ensure that the NetWorker software:
 - Is always running on this client
 - Will shut down efficiently when the client computer is shut down and restarted
 See [“Starting and stopping the NetWorker software” on page 24](#) for instructions.
2. Verify that the NSR\$EXECD account has the minimum quota settings listed in [“Verifying the NSR\\$EXECD account” on page 25](#).
3. Create a Client resource on the NetWorker server to allow a newly installed NetWorker client computer to use the NetWorker server for file backup and recovery. The *EMC NetWorker Multiplatform Version Administration Guide* explains how to create a Client resource and define its attributes.
4. Define the NetWorker commands for use on the OpenVMS operating system as described in [“Defining NetWorker commands” on page 25](#).
5. If you updated an existing NetWorker client computer to NetWorker release 7.3.2 software, you can remove leftover directories that are no longer used by the NetWorker software as described in [“Removing obsolete directories” on page 27](#).
6. If you saved any pre- or post-processing resource files from a previous installation of NetWorker software, copy those resource files into the new resource directory on the client computer: NSR\$COMMON:[NSR.RES].
7. If you installed the NetWorker software on a cluster node, perform the tasks described in [“Configuring NetWorker client software in a cluster environment” on page 27](#).
8. To allow nonprivileged users to back up and recover files, install NetWorker commands as described in [“Installing NetWorker commands” on page 31](#).

If you installed one or more of the optional NetWorker components (storage node, Oracle database module, or Oracle Rdb database module), see the following related sections for additional postinstallation configuration tasks:

- ◆ [“NetWorker storage node configuration” on page 31](#)
- ◆ [“NetWorker database modules configuration” on page 42](#)

Starting and stopping the NetWorker software

To ensure automatic startup and efficient shutdown of the NetWorker client software on an OpenVMS client computer, add the following entries to the system startup and shutdown command procedures:

1. Insert the following entry in SYS\$MANAGER:SYSTARTUP_VMS.COM:


```
@sys$startup:nsr$startup.com
```
2. Insert the following entry in SYS\$MANAGER:SYSHUTDOWN.COM:


```
@sys$manager:nsr$shutdown.com
```

IMPORTANT

If you fail to do this and the client computer is rebooted, the **nsrexecd** daemon will not restart and scheduled backups of this client computer may fail. If this client is a storage node, any storage node resources defined on this client will be unavailable.

If necessary, you can run the NetWorker startup procedure manually by executing **NSR\$STARTUP.COM** from a privileged account.

Verifying the NSR\$EXECD account

Check the NSR\$EXECD account after installation to ensure that it has the following minimum account quota settings:

Table 1 Minimum account quotas for NSR\$EXECD

Maxjobs: 0	Fillm: 1000	Bytlm: 1000000
Maxacctjobs: 0	Shrfillm: 0	Pbytlm: 0
Maxdetach: 0	BIOfm: 1000	JTquota: 4096
Prclm: 100	DIOfm: 1000	WSdef: 1000000
Prio: 4	ASTlm: 1000	WSquo: 1000000
Queprio: 4	TQElm: 130	WSextent: 1000000
CPU: (none)	Enqlm: 3000	Pgflquo: 1000000

Although the PCSI installation procedure attempts to create the NSR\$EXECD account with the settings described here, this account may inherit modified account settings on systems where the default AUTHORIZE account has been customized. Depending upon the customizations, the **nsrexecd** daemon may be unable to start or run upon creation.

Defining NetWorker commands

The NetWorker software for HP OpenVMS uses foreign commands. Because these commands are not recognized by the OpenVMS command interpreter as DIGITAL Command Line (DCL) commands, you must define these commands for use in the OpenVMS environment. The NetWorker software installation procedure does not define the commands by default.

You can use any of the following methods to define the NetWorker commands:

- ◆ Use automatic foreign commands instantiated with the DCL\$PATH logical name.
- ◆ Execute the NSR\$LOGIN.COM command procedure provided by the NetWorker installation.
- ◆ Use the **MCR** command interpreter to execute the programs directly.

Each method is described in the sections that follow.

Using automatic foreign commands

You can use automatic foreign commands to enable execution of NetWorker commands directly from the DCL level. This method causes DCL to search for a command procedure (.COM) or executable image (.EXE) and run it automatically.

To use automatic foreign commands, add NSR\$SYSTEM to the list of directories defined by the DCL\$PATH logical name. For example:

```
define dcl$path nsr$system  
nsradmin -s server
```

When you use this method to define NetWorker commands, the commands become the name of the executable image found in NSR\$SYSTEM. If command names interfere with existing DCL commands or symbols that you have defined, you may be able to resolve this by changing the order of the directories in the DCL\$PATH logical name definition.

Note: The *OpenVMS User's Manual* describes the restrictions associated with the use of automatic foreign commands.

Executing the NSR\$LOGIN command procedure

The NetWorker installation provides the file NSR\$LOGIN.COM to NSR\$SYSTEM. When you execute the NSR\$LOGIN.COM command procedure, it defines commands for all of the NetWorker programs found in NSR\$SYSTEM. (The installation does not execute this file by default.) A prefix of **nsr** or **nw** is added to all commands per OpenVMS conventions. For example, the **recover** command becomes **nsrrecover**.

The syntax for executing the NSR\$LOGIN command procedure is as follows:

```
@nsr$system:nsr$login <remove-flag> <impure-flag>
```

where:

- ◆ <remove-flag> indicates whether to establish the foreign commands (FALSE) or remove them (TRUE).
- ◆ <impure-flag> indicates whether to ensure that all command symbols start with **nsr** or **nw** (FALSE) or to create symbols that are the same as the filenames (TRUE).

If no arguments are specified, foreign commands are established and any commands that do not start with **nsr** or **nw** are modified to start with **nsr**. For example, **save** becomes **nsrsave**. Because this can cause commands that are available to other platforms to be renamed, you may want to override this behavior by specifying TRUE as the <impure-flag> when you invoke the NSR\$LOGIN command file.

Note: Procedures in the *EMC NetWorker HP OpenVMS Version Administration Guide* assume that the NSR\$LOGIN command procedure has been executed with default arguments (FALSE and FALSE).

Using MCR to execute NetWorker commands

Another way to execute NetWorker commands is to use the MCR command interpreter. Prefix the full file specification for the NetWorker command with **MCR**.

For example, to run the **mminfo** command, specify:

```
mcr nsr$system:mminfo -s server_name
```

Removing obsolete directories

A new directory structure was introduced in NetWorker release 6.0.1-D to accommodate arbitrary installation destinations. When you update a computer that is running an earlier release of NetWorker software, some old directories remain on the system after the update. The PCSI utility does not remove directories containing files that were created or updated after the original installation. This includes user-created files and files that were created or updated by the NetWorker software, such as log files. This typically applies to directories in the SYS\$SPECIFIC (system root) trees (SYS\$SYSDEVICE:[SYS0.NSR...], SYS\$SYSDEVICE:[SYS1.NSR...], and so on).

To remove obsolete NetWorker directories from an updated client computer:

1. To delete all leftover files and directories in the system root trees, type the following commands where *n* is replaced with the appropriate number for each system root (SYS0, SYS1, and so on):

```
delete SYS$SYSDEVICE:[SYSn.NSR...] *.*;*
delete SYS$SYSDEVICE:[SYSn]NSR.DIR;1
```

2. If leftover NetWorker files and directories still exist in the system common tree, type the following commands to delete those files and directories, respectively:

```
delete SYS$COMMON:[NSR...] *.*;*
delete SYS$COMMON:[000000]NSR.DIR;1
```

For more information on the directory structure used by the NetWorker software for HP OpenVMS, see the *EMC NetWorker HP OpenVMS Version Administration Guide*.

Configuring NetWorker client software in a cluster environment

If you installed the NetWorker client software in a cluster environment, complete the cluster configuration by performing the tasks described in the following sections:

- ◆ [“Task 1: Reconfigure other client nodes in the cluster” on page 27](#)
- ◆ [“Task 2: Configure Client resources and save group” on page 28](#)
- ◆ [“Task 3: Change default assignment of devices” on page 30](#)

Task 1: Reconfigure other client nodes in the cluster

After you have installed the NetWorker software for HP OpenVMS on the first node in a cluster, you must create root directories in the NetWorker directory tree for each of the other nodes in the cluster and define the cluster alias name on all cluster nodes.

To reconfigure cluster nodes to use the NetWorker software:

1. Log in to each cluster node and type the following command at the DCL prompt:

```
product reconfigure snclnt
```

This command reruns the NetWorker installation procedure.

2. When prompted to use the default options, verify that the options are the same as those used when the NetWorker software was installed on the first node in the cluster.

For example, answer **n[o]** so that you can view the current default answers.

```
Do you want the defaults for all options? [YES] n
Add Storage Node Capability [YES]
Add Oracle/Rdb Database Backup Capability [NO]
Add Oracle Database Backup Capability [NO]
```

These default options are correct if you installed the client and storage node software on the first node in the cluster but not the database modules.

Once you have verified that the default options are correct, you may answer **y[es]** to the default options prompt when reconfiguring subsequent client nodes.

3. When prompted for a cluster alias name, type the exact same names that you specified for the cluster alias name when you first installed the NetWorker software in the cluster. For example:

```
Enter the cluster alias name [not a cluster]:
cookie,cookie.mycorp.com
```

4. When prompted to confirm the NetWorker server's name, press **Enter** to confirm.

Removing node-specific root directories

Before removing a node from the cluster, delete the node-specific root directories with the NSR\$REMOVE_NODE.COM command procedure.

To remove node-specific root directories for a NetWorker client node that is being removed from the cluster:

1. Log in to the node and shut down NetWorker software. For example:

```
@sys$manager:nsr$shutdown
```

2. Type the following command to remove the node-specific root directories:

```
@sys$startup:nsr$remove_node
```

Task 2: Configure Client resources and save group

Define Client resources and a save group on the NetWorker server to configure cluster clients for scheduled backups.

1. Create a Client resource for each *physical node* in the cluster.
 - a. For the **Name** attribute, enter the name of the physical client.
 - b. Click the **Globals (2 of 2)** tab.
 - c. Use the following guidelines to define the **Storage nodes** attribute:
 - To specify the use of a storage node device (tape, library, or disk, for example) that is in the cluster but not shared among all cluster nodes, specify the name of a storage node that has direct access to that device.

For example, if a tape library is physically attached to node FUDGE but not node OREO, define the **Storage node** attribute as FUDGE.

 - To specify the use of a shared storage node device, do one of the following:

- To have this client direct its backup data to a local device (that is, a device on the same physical node), enter the Client resource name. This method prevents transfer of data over the network during backups. However, it may reduce the parallelism of backups running on multiple nodes if there is contention for resources (tape drives, for example).
 - Specify the Client resource name first, followed by additional storage nodes. This method maximizes the parallelism of backups but allows the possible transfer of data over the network.
- For example, for Client resource OREO, type OREO as the first storage node, followed by FUDGE, another storage node in the cluster. This configuration allows access from either node, but encourages local data transfer because OREO has a higher priority.

Note: Do not type "curphyhost" in the **Storage nodes** attribute of a Client resource for a physical node. This keyword is reserved for use in the virtual Client resource, as described in the next step. Also, do not type cluster alias name in the **Storage nodes** field. While this may appear to work under some circumstances, the resulting behavior is unreliable.

2. Define a save group for the cluster. (This task is optional but recommended.)
3. Create a virtual Client resource for the cluster alias.

- a. For the **Name** attribute, enter the cluster alias name that you specified on all nodes in the cluster. This name defines the NSR\$CLUSTER_ALIAS_NAME logical name. To view the name, type the following command:

```
show logical nsr$cluster_alias_name
```

- b. If you created a save group, select the group.
- c. For the **Remote Access** attribute, add an entry for each physical node in the cluster. Use the following format:

```
nsr$execd@node_name
```

For example, when creating the virtual Client resource for the COOKIE cluster, which is made up of two physical nodes (FUDGE and OREO), you would enter the following values in the **Remote Access** attribute:

```
nsr$execd@fudge
nsr$execd@oreo
```

- d. For the **Storage Nodes** attribute, specify "curphyhost." This directs backup data to the storage node on the physical host on which the backup is executing.

For example, virtual client backups that execute on physical client OREO will use OREO as the storage node.

However, if the storage node devices are only accessible from specific nodes in the cluster, specify those nodes in the **Storage nodes** attribute.

4. Run test probes to verify that the Client resources and save group are properly configured. You can run the probes from the NetWorker server by using the **savegrp** command or from the OpenVMS cluster client nodes by using the **savefs** command.

For example, to verify the cluster clients that belong to save group VMSCUSTER, you would enter the following command from the NetWorker server:

```
savegrp -pv -G vmscluster
```

To verify Client resources from the OpenVMS client nodes:

- a. On cluster client FUDGE, enter the following command (where **cider** is the name of the NetWorker server):

```
nsrsavefs -pv -s cider -c fudge
```

- b. Enter this command on cluster client OREO:

```
nsrsavefs -pv -s cider -c oreo
```

- c. Enter this command on either FUDGE or OREO:

```
nsrsavefs -pv -s cider -c cookie
```

Probes of individual physical client nodes (FUDGE and OREO) should return a list of devices that are local to the named node. However, these searches will return no save sets if no device is privately mounted by only one node, which may be fairly common in an OpenVMS cluster environment.

The probe of the virtual client node (the cluster alias) should return a list of devices that are available cluster-wide. In the preceding example, the probe of virtual client node COOKIE would return a list of devices that are available to both FUDGE and OREO.

Task 3: Change default assignment of devices

By default, the NetWorker software for HP OpenVMS uses the following logic when determining which devices are local and which are shared:

- ◆ Any device that is mounted on more than one node in the cluster is considered a shared device.
- ◆ All other devices are considered local devices and are associated with specific cluster members.

The default device assignment is sufficient in environments that do not include either of the following conditions:

- ◆ Several save sets that map to individual cluster nodes (because you upgraded from an older release of NetWorker that did not use the cluster alias)
- ◆ Devices that are shared on more than one but not all nodes

If either of these conditions exist, you must create a device map file. This file must reside in the following location and be named as shown:

```
NSR$COMMON:[NSR.RES]CLUSTER_DEVMAP.TXT
```

Use the following format within this file:

```
! = comment character
devicename nodename
```

The *devicename* and *nodename* values must be separated by at least one space. You may specify multiple device-to-node assignments as shown in the following example:

```
!   New device assignments as of Sept. 5, 2008
!
DISK$ALPHASYS:      fudge
DISK$USER1:         fudge
```

```
! Sample embedded comment
DISK$PROD:      oreo
DISK$DB1:  oreo !sample end of line comment
```

Shared devices that are not specified in the device map file are assigned to the cluster alias.

Installing NetWorker commands

Most NetWorker commands require nondefault privileges (that is, additional privileges beyond NETMBX and TMPMBX). These commands assume the appropriate privileges when executed by the **nsrexecd** daemon (that is, when they are invoked by a server-initiated request). To allow nonprivileged users to execute NetWorker commands, however, you must install the commands with privileges on the NetWorker client.

To permit unprivileged use of **save** and **recover** commands, install the **save_usr** and **restore_usr** images in **NSR\$SYSTEM** by typing the following commands:

```
install add/open/header nsr$system:save_usr -
/privilege=(readall, sysgbl, sysprv, syslck)
install add/open/header nsr$system:recover_usr -
/privilege=(readall, sysgbl, sysprv, syslck)
```

You must then equate the foreign commands for **save** and **recover** to these images. Nonprivileged users can now use **save** and **recover** commands to back up and recover files to which they would normally have access.

NetWorker storage node configuration

After you have installed the NetWorker client and storage node software and configured the client software, you are ready to configure the NetWorker storage node. Perform the tasks described in these sections:

- ◆ [“Task 1: Configure a storage device” on page 31](#)
- ◆ [“Task 2: Verify the storage node configuration” on page 40](#)
- ◆ [“Task 3: Load the library” on page 41](#)
- ◆ [“Task 4: Configure clients to use the storage node” on page 41](#)
- ◆ [“Task 5: Configure tape block size on the storage node” on page 41](#)

Task 1: Configure a storage device

The sections that follow explain how to configure the following device types:

- ◆ Autochanger (jukebox)
- ◆ Stand-alone tape device
- ◆ File type device or advanced file type device (AFTD)

Autochanger

Before configuring and testing an autochanger (jukebox), ensure that the following tasks have been completed:

- ◆ The NetWorker client and storage node components have been installed as described in [“Installing the NetWorker software” on page 17](#).
- ◆ You have confirmed (with a **SHOW SYSTEM/PROCESS=NSR*** command, for example) that the **nsrexecd** daemon is running on the OpenVMS client computer.
- ◆ You have physically connected the autochanger to the OpenVMS storage node and used the **SYSMAN IO AUTOCONFIGURE** command to perform necessary autoconfiguration tasks. The hardware manufacturer’s installation documentation and the *HP OpenVMS System Management Utilities Reference Manual* provide further instructions if needed.
- ◆ You have verified (with the **SHOW DEVICE** command) that the autochanger’s tape units are visible.

Configuring the autochanger

A SCSI device that is directly connected to an OpenVMS computer uses the GKDRIVER software to control the movement of the changer. The GKDRIVER is a standard OpenVMS device driver and does not require a separate installation. However, you must manually configure the device that OpenVMS associates with the changer.

The procedure for configuring the autochanger device varies. See one of the following sections for the instructions that pertain to your device type:

- ◆ [“Connecting DLT and DAT media loaders” on page 32](#)
- ◆ [“Connecting TL8nn automated libraries” on page 32](#)
- ◆ [“Connecting a Fibre Channel tape device” on page 33](#)
- ◆ [“Creating a robotic unit \(GK\) device” on page 33](#)

Connecting DLT and DAT media loaders

DLT and DAT tape loaders treat their robotic devices and tape devices as logical units of the device target ID (SCSI ID). The naming convention for this type of robotic loader has four parts:

- ◆ The name begins with a prefix of MK for the tape device and GK for the robotic device.
- ◆ The prefix is followed by a single letter that identifies the physical SCSI bus that the device is connected to. The letter A identifies the first bus (detected at boot time), B identifies the second, and so on.
- ◆ The next character is a number that corresponds to the SCSI target ID.
- ◆ The name ends with a two-digit number that corresponds to the SCSI target ID logical unit number (LUN). Because tape drives in a DLT or DAT media loader are always at logical unit 0, the last two digits for tape drives are always 00 (zero zero). The last two digits for the robotic device are 01.

For example, a tape device that is connected to the first SCSI bus that is detected at boot time at target ID 4 would be named MKA400. The name of the robotic unit that corresponds to that tape device would be GKA401.

Connecting TL8nn automated libraries

Unlike the DLT and DAT media loaders, the tape drives and robotic units for TL8nn tape libraries are treated separately—that is, they do not use the SCSI LUN association. The naming convention for a TL8nn tape library is as follows:

- ◆ The name begins with a prefix of MK for the tape device and GK for the robotic device.
- ◆ The prefix is followed by a single letter that identifies the physical SCSI bus that the device is connected to. The letter A identifies the first bus (detected at boot time), B identifies the second, and so on.
- ◆ The next character is a number that corresponds to the SCSI target ID.
- ◆ The name ends with 00 (zero zero), for both tape drives and robotic devices.

For example, in a TL892 library, the robotic unit that is connected to the second bus detected at boot time at target ID 5 would be named GKB500. The tape drives in this example would be named MKB n 00, where n is the SCSI ID assigned to each drive (for example, MKB200 and MKB300). Note that B n (the middle portion of the name) must be unique for all devices across all SCSI busses on the system.

Connecting a Fibre Channel tape device

The HP OpenVMS systems document titled *Guidelines for OpenVMS Cluster Configurations* describes how to configure a new tape or medium changer on Fibre Channel. This document is available from the following HP website (subject to change without notice):

<http://h71000.www7.hp.com/doc/82FINAL/6318/6318PRO.HTML>

Creating a robotic unit (GK) device

To create a tape robot unit for SCSI magazine loaders that are connected directly to a SCSI bus, enter the following SYSMAN command on the NetWorker storage node computer:

```
mcr sysman io connect GK $xnnn$ : -
/driver=sys$loadable_images:sys$gkdriver -
/noadapter
```

where GK $xnnn$ is the name of the loader unit, which breaks down as follows:

- ◆ GK is the prefix for robotic devices.
- ◆ x is replaced with a single letter that identifies the physical SCSI bus that the device is connected to (A is the first bus, B is the second, and so on).
- ◆ n (first of three) is replaced with a single-digit number corresponding to the SCSI target ID.
- ◆ nn (second and third of three) is replaced with 01 (the SCSI ID LUN for DLT and DAT tape loaders) or 00 (for TL8nn automated libraries).

For example, suppose your NetWorker storage node, named ALPHA, has a TZ877 magazine loader that consists of one TZ87 tape drive and an associated SCSI autochanger. Because the TZ877 is a magazine loader, the SCSI autochanger is at the same SCSI address, but is associated with LUN 1. A **SHOW DEVICE** command reveals that the tape device is on SCSI bus C at SCSI target ID 4. For example:

```
show device/full mk
```

```
Magtape ALPHA$MKC400:, device type TZ87, is online, file-oriented device,
available to cluster, error logging is enabled, loader present, controller
supports compaction (compaction disabled), device supports fastskip.
```

Error count	0	Operations completed	0
Owner process	" "	Owner UIC	[SYSTEM]
Owner process ID	00000000	Dev Prot	S:RWPL,O:RWPL,G:R,W

Reference count	0	Default buffer size	2048
Density	default	Format	Normal-11

Volume status: no-unload on dismount, position lost, odd parity.

Given the name of the drive, and knowing that the SCSI changer unit for a magazine loader is always on LUN 1, then the name of the SCSI changer device will be GKC401:. You can verify that the device is part of a magazine loader by checking the output of the **SHOW DEVICE/FULL** command for the "loader present" device characteristic. If the device is not associated with a magazine-style loader, this text does not appear.

The next command determines whether the GK device for this SCSI changer is present on the system:

```
show device gkc401:
%SYSTEM-W-NOSUCHDEV, no such device available
```

The command output shown here indicates that the device has not yet been created. The following commands create the SCSI changer device using the generic SCSI driver, SYS\$GKDRIVER:

```
mcr sysman io connect gkc401: -
/driver=sys$loadable_images:sys$gkdriver -
/noadapter
show device gkc401:
Device           Device           Error
  Name           Status           Count
GKC401:         Online           0
```

The TZ877 on storage node ALPHA is now configured. The tape drive unit is ALPHA\$MKC400: and the SCSI changer unit is GKC401:.

Making the autochanger known to the NetWorker software

You can use the NetWorker Management Console to autodetect and configure autochangers that return a serial number and are installed on standalone (noncluster) OpenVMS storage nodes. The *EMC NetWorker Multiplatform Version Administration Guide* provides instructions. If the device cannot be autoconfigured, the NetWorker Management Console displays the following messages:

```
Library is not auto-configurable.
Please use jbconfig to configure the library.
```

Note: You *must* use the **jbconfig** program to configure an autochanger within a cluster.

To define an autochanger to NetWorker by using the **jbconfig** utility:

1. Verify that the **nsrexecd** program is running on the storage node to which the autochanger is attached.
 - a. Type the following command at the DCL prompt:

```
show system/process=nsr*
```
 - b. If you do not see an **nsrexecd** process, enter the next command to start one:

```
@sys$startup:nsr$startup
```
2. Run the **jbconfig** utility on the storage node by typing the following command:

```
nsrjbconfig -s server
```

3. When prompted for a hostname, press **Enter** to take the default name, which is the hostname for the current storage node.
4. Type one of the following option numbers to indicate the type of jukebox that is being configured:

- 1) Configure an Autodetected SCSI Jukebox.
- 2) Configure an SJI Jukebox.

Type **1** (the default jukebox type) to configure a SCSI-based jukebox that is connected to a system that NetWorker can automatically detect. The **jbconfig** utility will print a list of jukeboxes it detects on the system and prompt you to select one. If only one jukebox is found, it is selected by default.

Type **2** to configure an SJI jukebox. The **jbconfig** program will print a list of known SJI jukeboxes and prompt you to choose one.

5. Respond to subsequent prompts as shown in [“Examples of jbconfig sessions that define autochangers to NetWorker” on page 36](#).

For a detailed explanation of each prompt, refer to the description of the **jbconfig** command in the *EMC NetWorker Command Reference Guide*.

When you use the **jbconfig** program to configure an autochanger a new device resource is created on the NetWorker server. You can view the new resource from the NetWorker Management Console.

Considerations for the OpenVMS cluster environment

When you configure an autochanger in a cluster, you must ensure that its robotics, which control such operations as loading and unloading, are controlled from a single node. This is necessary regardless of whether the robotics device is accessible from multiple nodes.

Configuration options are as follows:

- ◆ Physically connect the autochanger’s robotics to a NetWorker server or a virtual NetWorker server and run the **jbconfig** program, as described in the *EMC NetWorker Multiplatform Version Administration Guide* chapter on clusters. This configuration supports failover.
- ◆ Connect the robotics to one or more nodes in the OpenVMS cluster and control them from an OpenVMS storage node. If the robotics device is connected to a SAN or multiple SCSI paths and is available to multiple nodes in the cluster, create the robotics GK device on each node in the cluster. Choose one node in the cluster to control the robotics.

Note that this configuration does not support failover. If the controlling node fails, you must manually reconfigure the autochanger to use another node in the cluster to control its robotics.

With both configurations, you must answer Yes to the **jbconfig** prompt that asks if any drive will have more than one path defined. This allows the drives in the autochanger to be shared among the nodes in the OpenVMS cluster. When defining the device paths to **jbconfig**, enter a path for each physical node in the cluster that will share the drive. [Example 2](#) shows an example of these prompts and responses.

Note: Do not enter the cluster alias as a device path name.

Examples of jbconfig sessions that define autochangers to NetWorker

The examples that follow sample **jbconfig** sessions on a standalone OpenVMS storage node and an OpenVMS storage node in a cluster, respectively.

Note: On OpenVMS, the **jbconfig** utility reports the robot as a SCSI device (scsidev@b.t./ — SCSI device at (b)us, (t)arget, (l)un) rather than a GK device. For example, the robotic device GKB300: is reported as scsidev@2.3.0 in [Example 1](#).

Example 1 Running the jbconfig program on a standalone OpenVMS storage node

In this example, the SpectraLogic Jukebox on node WUMPUS is configured as a storage node device on the NetWorker server NETWORKER2.

nsrjbconfig -s networker2

On a storage node, the hostname is a prefix to the jukebox name.
Enter the hostname to use as a prefix? [wumpus] wumpus
Using 'wumpus' as the hostname prefix

Jbconfig is running on host wumpus (OpenVMS V8.3),
and is using networker2 as the NetWorker server.

- 1) Configure an Autodetected SCSI Jukebox.
- 2) Configure an SJI Jukebox.
- 3) Exit.

which activity do you want to perform? [1] 1
Installing 'Spectralogic' jukebox - scsidev@2.3.0. a while ...

What name do you want to assign to this jukebox device? SpectraLogic
using 'rd=wumpus:SpectraLogic' as jukebox device name

15814:jbconfig: Attempting to detect serial numbers on the jukebox and
drives ..

None of the methods tried returned drive serial number information
15815:jbconfig: Will try to use SCSI information returned by jukebox to
configure drives.

Turn NetWorker auto-cleaning on (yes / no) [yes]?

The following drive(s) can be auto-configured in this jukebox:

- 1> 8mm AIT @ 2.0.0 ==> \$1\$MKB0:
- 2> 8mm AIT @ 2.2.0 ==> \$1\$MKB200:

These are all the drives that this jukebox has reported.

To change the drive model(s) or configure them as shared or NDMP
drives,
you need to bypass auto-configure. Bypass auto-configure? (yes / no)
[no] no

14421:jbconfig:

A Dedicated Storage Node can backup only local data to its devices.
Should wumpus be configured as a Dedicated Storage Node? (yes / no)
[no] no

Jukebox has been added successfully

The following configuration options have been set:

```

> Jukebox description to the control port and model.
> Autochanger control port to the port at which we found it.
> NetWorker managed tape autocleaning on.
> Barcode reading to on.
> Volume labels that match the barcodes.
> Slot intended to hold cleaning cartridge to 30. Please insure that a
    cleaning cartridge is in that slot
> Number of times we will use a new cleaning cartridge to 12.
> Cleaning interval for the tape drives to 6 months.

```

You can review and change the characteristics of the autochanger and its associated devices using the NetWorker Management Console. Would you like to configure another jukebox? (yes/no) [no]no

Example 2 Running the jbconfig program on an OpenVMS cluster storage node

This example configures a SpectraLogic Jukebox that is physically connect to storage node WUMPUS and WARE through SCSI controllers on each system. The robotics are accessible from both nodes through device GKB300:. Node WUMPUS will control the robotics.

The SpectraLogic Jukebox consists of two tape drives. These drive are also accessible from both nodes as \$1\$MKB0: and \$1\$MKB200: using allocation class 1. Note that you have to bypass autoconfigure and configure the drives manually as shown in this example:

nsrjbconfig -s networker2

On a storage node, the hostname is a prefix to the jukebox name. Enter the hostname to use as a prefix? [WWCLUS.hq.storserver.local] wumpus Using 'wumpus' as the hostname prefix

Jbconfig is running on host wumpus (OpenVMS V8.3), and is using networker2 as the NetWorker server.

- 1) Configure an Autodetected SCSI Jukebox.
- 2) Configure an SJI Jukebox.
- 3) Exit.

which activity do you want to perform? [1] 2

Enter the number corresponding to the type of jukebox you are installing:

- | | | |
|-----------------------------|--|-----------------------------|
| 1) ADIC-1200c/ADIC-1200d | 20) Exabyte 690D | 39) HP-Optical |
| 2) ADIC-VLS | 21) Exabyte Jukebox | 40) Sony TSL-7000 |
| 3) ARC DiamondBack | 22) Hitachi ML010 Series | 41) Sony TSL-A500C |
| 4) Sun 20Gb 4mm Tape Loader | 23) HP-C1553A/Surestore 12000e | 42) Sony TSL-AIT |
| 5) Breece Hill Saguaro | 24) HP-C1557A/Surestore 12000e | 43) Digital 4mm DAT TLZ9L |
| 6) Breece Hill | 25) HP C5713A | 44) Digital 4mm DAT (TLZxx) |
| 7) Philips Blackjack | 26) Hewlett-Packard A4853A | 45) Digital TL800 Series |
| 8) DLI Libra Series | 27) Metrum (SCSI) | 46) Digital TL810 Series |
| 9) Quantum DLT/Digital DLT | 28) Qualstar | 47) Digital TL820 Series |
| 10) Exabyte 10e or 10h | 29) Spectralogic | 48) Digital TL893 |
| 11) Exabyte 10i | 30) STK 9704/Lago 340 | 49) Digital TL893 |
| 12) Exabyte 18D | 31) STK 9708/Lago 380 (SCSI) Datawheel | 50) Digital TL896 |
| 13) Exabyte 60 | 32) StorageTek 9730 | 51) Digital TL896 |
| 14) Exabyte 120 | 33) StorageTek 9738 | 52) Digital TL899 |
| 15) Exabyte 210 | 34) STK 9708/Lago 380 (SCSI) Datawheel | 53) Digital TL899 |
| 16) Exabyte 218 | 35) Dell PowerVault 130T | 54) Digital Optical |
| 17) Exabyte 220 | 36) IBM 3570 | 55) Digital TK Series |
| 18) Exabyte 230D | 37) IBM 7331/IBM 9427 | 56) Standard SCSI Jukebox |

```

19) Exabyte 400 Series      38) ATL/Odetics SCSI

Choice? 29
Installing an 'Spectrallogic' jukebox.

What name do you want to assign to this jukebox device? Spectrallogic
using 'rd=wumpus:Spectrallogic' as jukebox device name

39744:jbconfig: Enter the control port of the jukebox in the following format:

        scsidev@3.0.0

Pathname of the control port for the jukebox device? scsidev@2.3.0
using 'rd=wumpus:scsidev@2.3.0' as control port

15814:jbconfig: Attempting to detect serial numbers on the jukebox and drives ...

None of the methods tried returned drive serial number information
15815:jbconfig: Will try to use SCSI information returned by jukebox to configure d
rives.

Turn NetWorker auto-cleaning on (yes / no) [yes]? no
The drives in this jukebox cannot be auto-configured with the available
Is (any path of) any drive intended for NDMP use? (yes / no) [no]
Is any drive going to have more than one path defined? (yes / no) [no] yes

You will be prompted for multiple paths for each drive.
Pressing <Enter> on a null default advances to the next drive.

Please enter the device path information in one of the following formats:

device-name: --for local path or
host:device-path --for remote node or NDMP device(s) or
host:drive-letter:directory path --for Windows disk file
Drive 1, element 1
Device path 1 ? ware:$1$MKB0:
Device path 2 ? wumpus:$1$MKB0:
Device path 3 ?
Drive 2, element 2
Device path 1 ? ware:$1$MKB200:
Device path 2 ? wumpus:$1$MKB200:
Device path 3 ?

1) 3480          27) 9940          53) SAIT-1
2) 3570          28) 9940B         54) SAIT-2
3) 3590          29) adv_file       55) SD3
4) 3592          30) Atmos COS    56) sdlt
5) 4890          31) Data Domain    57) sdlt320
6) 4mm           32) dlt            58) sdlt600
7) 4mm 12GB      33) dlt vs160       59) SLR
8) 4mm 20GB      34) dlt-s4          60) T10000
9) 4mm 4GB       35) dlt-v4          61) T10000B
10) 4mm 8GB      36) dlt1            62) tkz90
11) 4mm DAT160   37) dlt7000         63) travan10
12) 4mm DAT72    38) dlt8000         64) TS1120
13) 8mm          39) dst (NT)       65) TS1130
14) 8mm 20GB     40) dtf             66) TS1140
15) 8mm 5GB      41) dtf2            67) tz85
16) 8mm AIT      42) file            68) tz86
17) 8mm AIT-2    43) hint            69) tz87
18) 8mm AIT-3    44) logical          70) tz88
19) 8mm AIT-4    45) LTO Ultrium     71) tz89
20) 8mm AIT-5    46) LTO Ultrium-2   72) tz90
21) 8mm Mammoth-2 47) LTO Ultrium-3   73) tzs20

```

```

22) 9490          48) LTO Ultrium-4          74) VXA
23) 9840          49) LTO Ultrium-5          75) VXA-172
24) 9840b        50) LTO Ultrium-6          76) VXA-2
25) 9840C        51) optical                77) VXA-320
26) 9840D        52) qic

```

```

Enter the drive type of drive 1? 17
Are all the drives the same model? (yes / no) [yes]
Enter the drive type of drive 1? 17
Are all the drives the same model? (yes / no) [yes]
14421:jbconfig:
A Dedicated Storage Node can backup only local data to its devices.
Should wumpus be configured as a Dedicated Storage Node? (yes / no) [no]
14421:jbconfig:
A Dedicated Storage Node can backup only local data to its devices.
Should ware be configured as a Dedicated Storage Node? (yes / no) [no]

```

Jukebox has been added successfully

The following configuration options have been set:

```

> Autocleaning off.
> At least one drive was defined with multiple paths. All such drives are
defined with a hardware identification as well as a path value to avoid
confusion by uniquely identifying the drive. The hardware identification
for all drives which have one is always 'autochanger_name - Drive #' where
"autochanger_name" is the name you gave to the autochanger that was
just defined, and the # symbol is the drive number.
> Barcode reading to on.
> Volume labels that match the barcodes.

```

You can review and change the characteristics of the autochanger and its associated devices using the NetWorker Management Console.
Would you like to configure another jukebox? (yes/no) [no]

Testing the autochanger

To test the autochanger connection:

1. Log in to a privileged account on the OpenVMS storage node computer.
2. Insert one volume into the first slot and a second volume into the last slot of the autochanger. Verify that the drives are empty.
3. Run the **jbexercise** program. Specify the control port pathname and the autochanger model type as shown in the following example:

```
nsrjbexercise -c scsidev@2.3.0 -m "SpectraLogic"
```

This command tests the SpectraLogic autochanger that was detected by the **jbconfig** command in [Example 1 on page 36](#).

You can obtain the autochanger model and control port pathname values from the output of the **jbconfig** command. For example:

```
Installing 'Spectralogic' jukebox - scsidev@2.3.0. a while ...
```

These values can also be obtained from **nsradmin** or the library dialog box in the NetWorker Management Console.

On OpenVMS systems, the control port for SCSI autochanger models is expressed in the form `scsidev@b.t/(SCSI device at (b)us, (t)arget, (l)un)`.

For more information on the **jbexercise** command and its options, refer to the *EMC NetWorker Release 7.3.2 Command Reference Guide*.

Stand-alone tape device

To configure a stand-alone tape device:

1. Use the **SHOW DEVICE** command to ensure that the tape unit is available.

If not, verify that the unit is physically connected and then use the following command to autoconfigure the device:

```
mcr sysman io autoconfigure
```

2. Define the stand-alone tape device to the NetWorker server. Instructions can be found in the *EMC NetWorker Multiplatform Version Administration Guide*.

When specifying the device path in the **Name** attribute, use the format shown in this example:

```
rd=alpha:ALPHA$MKA500:
```

where **rd=** specifies that the device is remote (that is, not attached to the server), **alpha** is the client node name, and **ALPHA\$MKA500** is the OpenVMS device name.

File type device or advanced file type device (AFTD)

Use the instructions in the *EMC NetWorker Multiplatform Version Administration Guide* for configuring a file type device or AFTD on UNIX and Linux. The only differences pertaining to OpenVMS are as follows:

- ◆ When specifying the device path in the **Name** attribute, use the format shown in the next example:

```
rd=ants:$1$DKB200:[AFTD]
```

where **rd=** indicates that the device is remote, **ants** is the client node name, **\$1\$DKB200:** is the disk name, and **[AFTD]** is the existing directory where the AFTD is located. (Case is insignificant.).

You may substitute a logical name for the disk name portion, but you must enter a directory name, enclosed in square brackets, as shown in the preceding example. The required syntax for remote OpenVMS storage devices is:

```
rd=storage_node:{disk|logical_name}:[directory_spec]
```

- ◆ Before implementing an AFTD on OpenVMS, disable the file highwater mark (FHM) volume attribute for any volume on which an AFTD is located. For example:

```
SET VOLUME/NOHIGHWATER $1$DKB200:
```

Task 2: Verify the storage node configuration

To verify the configuration of an OpenVMS storage node:

1. Insert a volume into the newly configured storage device.
2. Use the Default label template to label the volume.
3. Mount the volume in the drive.

4. Create a test group and place the newly defined client in the test group.
5. Modify the client's properties to make the **Save Set** attribute a particular disk and directory path. This limits the backup of files to the specified directory and its subdirectories. For example:

DISK\$TEST:[TEST_FILES]
6. Modify the **Storage Node** attribute for this client to put the newly installed storage node at the top of the list.
7. Run the test group backup.
8. View the client file index entries that were made for the server during the test backup.

The *EMC NetWorker Multiplatform Version Administration Guide* explains how to perform these tasks from the NetWorker server.

Task 3: Load the library

Load the library with tapes and begin initializing them.

Task 4: Configure clients to use the storage node

To configure NetWorker clients to use the new OpenVMS storage node, add the new storage node to each client's list of storage nodes and reorganize the list as appropriate. You can do this from the **Administration** window of the NetWorker Management Console, as described in the *EMC NetWorker Multiplatform Version Administration Guide*.

Note: When modifying the **Storage Node** attribute of a Client resource, do not use a TCP/IP cluster alias name to identify a storage node. Enter the physical client node name of the node on which the storage node software is running.

Task 5: Configure tape block size on the storage node

The NetWorker storage node on OpenVMS has a default tape block size of 32 KB (32,768 bytes). The maximum tape block size supported by the OpenVMS MKDRIVER is 64 KB-1 (65,535 bytes). The **nsrmmd** command uses block sizes that are a multiple of 1 KB. Therefore, the maximum size for the tape block size on an OpenVMS storage node is 63 KB, or 64,512 bytes. For this reason, you should associate the OpenVMS storage node with its own media pool. To share tapes among storage nodes on other platforms, you must ensure that the tape block size is within the range of 32 to 63 KB, inclusive. Otherwise, the OpenVMS storage node will be unable to read the tape.

Changing tape block size

To change the block size that is used by a particular tape device, define logical name NSR\$BLOCK_SIZE_*devname*, where *devname* is the name of the tape device. The *devname* portion of the logical name must match the local tape device portion of the Tape resource name, minus the leading node name (rd=*node*) and trailing colon (:).

For example, the following command changes the tape block size of tape unit ALPHA\$MKC400: from its default of 32 KB to the maximum of 63 KB:

```
define/system nsr$block_size_alpha$mkc400 63
```

Tapes initialized after this change will have 63 KB block sizes.

IMPORTANT

Although you may specify values larger than 63 KB, the value is compared to 63 KB and the minimum value is used. Specification of values lower than 32 may cause the nsrmmid program to label the tape media incorrectly.

The *EMC NetWorker HP OpenVMS Version Administration Guide* provides more information on `NSR$BLOCK_SIZE_devname` and other NetWorker logical names.

Once the NetWorker software has labeled the media, the block size is stored in the label record so a subsequent mount operation can determine the block size that was used to label and initialize the tape media.

Verifying tape block size

You can verify the tape block size by using the DCL **SHOW DEVICE** command. The command output labels the tape block size "Default buffer size." After the NetWorker storage node has mounted a tape that was labeled with the nondefault block size, type the **SHOW DEVICE/FULL** command.

The following sample command verifies tape block sizes for the tape unit that was used in previous examples in this chapter:

```
show device/full alpha$mkc400:
```

```
Magtape ALPHA$MKC400:, device type TZ87, is online, record-oriented device,
file-oriented device, available to cluster, error logging is enabled, loader
present, controller supports compaction (compaction enabled), device supports
fastskip.
```

Error count	0	Operations completed	445
Owner process	" "	Owner UIC	[SYSTEM]
Owner process ID	00000000	Dev Prot	S:RWPL,O:RWPL,G:R,W
Reference count	0	Default buffer size	64512
Density	TK87	Format	Normal-11

```
Volume status: no-unload on dismount, odd parity.
```

Note that the default buffer size shown in the preceding example is 64,512 bytes (63 KB). Thus, the tape media was labeled with the nondefault buffer size specified with the `NSR$BLOCK_SIZE_devname` logical name.

NetWorker database modules configuration

The NetWorker software for HP OpenVMS includes the following two database modules, which can be installed during a NetWorker client installation:

- ◆ NetWorker Module for Oracle
- ◆ NetWorker Module for Oracle Rdb

When you install either of these modules on a NetWorker client computer, you must perform specific postinstallation tasks to configure the software for use. For example, if you installed the NetWorker Module for Oracle Rdb on an OpenVMS client, you must create

a script on the client computer that will back up your Rdb database. The appendixes in the *EMC NetWorker HP OpenVMS Version Administration Guide* provide complete instructions for configuring the two NetWorker database modules.

