EMC® NetWorker®
Release 7.4 Service Pack 1
Multiplatform Version

Cluster Installation Guide
P/N 300-005-509

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

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

Audience
This document is part of the NetWorker documentation set, and is intended for use by system administrators during the installation and setup of NetWorker software in a cluster environment.

Related documentation
For more information about NetWorker software, refer to this documentation:

◆ *EMC NetWorker Release 7.4 Service Pack 1, Administration Guide*

◆ *EMC NetWorker Release 7.4, Release 7.4 Service Pack 1 Multiplatform Version, Installation Guide*

◆ *EMC NetWorker Release 7.4 Service Pack 1 Multiplatform Version Release Notes*

◆ *EMC Information Protection Software Compatibility Guide*

Conventions used in this guide
EMC uses the following conventions for notes, cautions, and important notices.

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

⚠ **CAUTION**
A caution contains information essential to avoid data loss or damage to the system or equipment.

⚠ **IMPORTANT**
An important notice contains information essential to operation of the software.

Typographical conventions

EMC uses the following style conventions in this guide:

Normal	Used in running (nonprocedural) text for: • Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus) • Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, filenames, functions, utilities • URLs, pathnames, filenames, directory names, computer names, links, groups, service keys, file systems, notifications
Bold:	Used in running (nonprocedural) text for: • Names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system call, man pages Used in procedures for: • Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus) • What user specifically selects, clicks, presses, or types
Italic:	Used in all text (including procedures) for: • Full titles of publications referenced in text • Emphasis (for example a new term) • Variables
`Courier:`	Used for: • System output, such as an error message or script • URLs, complete paths, filenames, prompts, and syntax when shown outside of running text
`Courier bold:`	Used for: • Specific user input (such as commands)
`Courier italic:`	Used in procedures for: • Variables on command line • User input variables
< >	Angle brackets enclose parameter or variable values supplied by the user
[ ]	Square brackets enclose optional values
|	Vertical bar indicates alternate selections - the bar means "or"
{ }	Braces indicate content that you must specify (that is, 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 for information about EMC products, licensing, and service, go to the EMC Powerlink website (registration required) at:

http://Powerlink.EMC.com

Technical support — For technical support, go to EMC Customer Service on Powerlink. To open a service request through Powerlink, you must have a valid support agreement. Please contact your EMC sales representative for details about obtaining a valid support agreement or to answer any questions about your account.

Your comments

Comments and suggestions about our product documentation are always welcome.

To provide feedback:

1. Go to:

   http://Powerlink.EMC.com

2. Click the **Feedback** link.

Introduction

This chapter includes these sections:

About the NetWorker product

The EMC® 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 that contains the software and electronic documentation for several related NetWorker 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 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 on each volume

NetWorker storage nodes and the NetWorker server can use different operating systems. To use a NetWorker storage node on a Linux operating system with a NetWorker server that is running another operating system, the storage node's enabler on the server must be of the same edition as the base enabler for the NetWorker server.

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 the functions the NetWorker server controls, such as autochanger modules, and additional client connections.

◆ 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.

NetWorker de-duplication node

Data de-duplication is a method of backup that identifies redundant data segments at the source and backs up only unique segments, thereby reducing the time required to perform backups and both the network bandwidth and storage space used for backups. The NetWorker software uses EMC Avamar® technology to provide de-duplication.

A NetWorker de-duplication node is an EMC Avamar server that stores de-duplicated backup data. The initial backup to a de-duplication node should be a full backup. During subsequent backups, the Avamar infrastructure identifies redundant data segments at the source and backs up only unique segments. This reduces the time required to perform backups, as well as both the network bandwidth and storage space used for backups.

Avamar server installation is separate from NetWorker installation, and is performed by EMC Professional Services. The Avamar server must be configured as a NetWorker de-duplication node. The Avamar server must be available when:

◆ A de-duplication client resource is created.

◆ The Avamar server receives backup data from NetWorker de-duplication clients.

The Avamar server must have the NetWorker client software installed in order to function as a de-duplication node. The installation of NetWorker client software on the Avamar server must be performed by EMC Professional Services.

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.

To administer NetWorker servers, the Console must be:

◆ Installed on an AIX, HP-UX, Linux, Solaris, or Microsoft Windows host.

◆ Accessed through a graphical user interface on the host with a web-enabled browser that has the specified version of Java Runtime configured.

The Console provides reporting, managing, and monitoring capabilities for all NetWorker servers and clients. 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.

You must install the 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.

NetWorker License Manager

The NetWorker License Manager provides a central location for managing the licenses of all the NetWorker clients and servers. Instead of managing licenses separately, all NetWorker licenses can be maintained from a single computer. Installation of the NetWorker License Manager software is an option when installing the NetWorker software.

The NetWorker License Manager Installation and Administration Guide and the NetWorker License Manager Release Notes provides information about the NetWorker License Manager.

Mac OS X Client software

Currently, only the NetWorker client software is available for the Mac OS X operating system. You must use the Mac OS X client in conjunction with a supported UNIX, Linux, or Windows version of the NetWorker server.

The Mac OS X client software provides the following features:

◆ Full compatibility with NetWorker server and storage nodes on UNIX, Linux and Windows platforms, for NetWorker release 6.1.2 or later.

◆ HFS/HFS+ metadata awareness. This compatibility ensures the proper backup and restore of Mac OS X field metadata including resource forks, catalog information and 10.4 extended file attributes and access control files.

The following limitations apply to the Mac OS X client software:

◆ There is no graphical user interface (GUI) for this release, however there is full support of the command line interface (CLI).

◆ NetWorker software does *not* support recovery of Mac OS X save sets to non-Mac OS X clients.

◆ NetWorker software does *not* support recovery of Mac OS X 10.4 save sets to Mac OS X 10.3 clients.

Supported devices

NetWorker software supports a variety of media types and devices, either stand-alone or in an autochanger or silo tape library. Devices can be attached to a NetWorker server or designated storage node.

The term *autochanger* refers to a variety of backup devices:

◆ Autoloader

◆ Carousel

◆ Datawheel

◆ Jukebox

◆ Library

◆ Near-line storage

The EMC Information Protection Software Compatibility Guide provides the latest list of supported devices.

Enabler codes

Enabler codes (licenses), which activate the functionality of NetWorker software are sold separately. The section "Licensing and Enabling the Software" on page 143 provides information.

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EMC AutoStart for Microsoft Windows Installation

This chapter includes these sections:

Software installation roadmap

Use the following roadmap when installing the NetWorker software:

1. Review "Installation requirements" on page 20 and note the default directory location.

2. Install the required NetWorker software by following one of these procedures::

   • "Installing a NetWorker virtual server" on page 22
   • "Installing only the NetWorker client software in a cluster" on page 27

3. Enable and register all of the NetWorker products. Chapter 10, "Licensing and Enabling the Software," provides detailed information.

Installation requirements

This section specifies the software and hardware required to install and configure the NetWorker server or client software within an AutoStart^{TM} cluster environment.

The EMC Information Protection Software Compatibility Guide provides the most up-to-date software and hardware requirements.

Software requirements

The following software must be installed on each node in the cluster.

Cluster server

This software must be installed on the cluster server:

◆ Windows 2000 Server/Advanced Server (latest Service Pack installed) or later
◆ EMC AutoStart release 5.1 or later
◆ Dedicated shared disk to be used as the NetWorker storage disk (for the nsr folder) connected to all the nodes within the cluster
◆ Device with local affinity for the local bootstrap backup

Note: Ensure that the most recent cluster patch for the operating system is installed.

Cluster client

This software must be installed on the private disk of each node in the cluster:

◆ Windows 2000 Server/Advanced Server (latest Service Pack installed) or later
◆ EMC AutoStart release 5.1 or later

Hardware requirements

There are no hardware requirements for the cluster client. The following hardware requirements must be met for server installation only:

◆ Dedicated shared disk that is used as the NetWorker storage disk (for the /nsr directory) is connected to all the nodes within the cluster.
◆ Device with local affinity for the local bootstrap backup is connected to all the nodes within the cluster.

Configuration options

The NetWorker Administration Guide provides information on how to configure:

◆ Tape libraries with a NetWorker virtual server

◆ Remote physical storage node with a NetWorker virtual server

System information requirements

Figure 1 on page 21 and Table 1 on page 21 illustrate the system information needed to install NetWorker software within an AutoStart environment.

Different platforms use different terms for the same cluster concepts. AutoStart refers to:

◆ Physical hosts as nodes

◆ Virtual server as a resource group (application service)
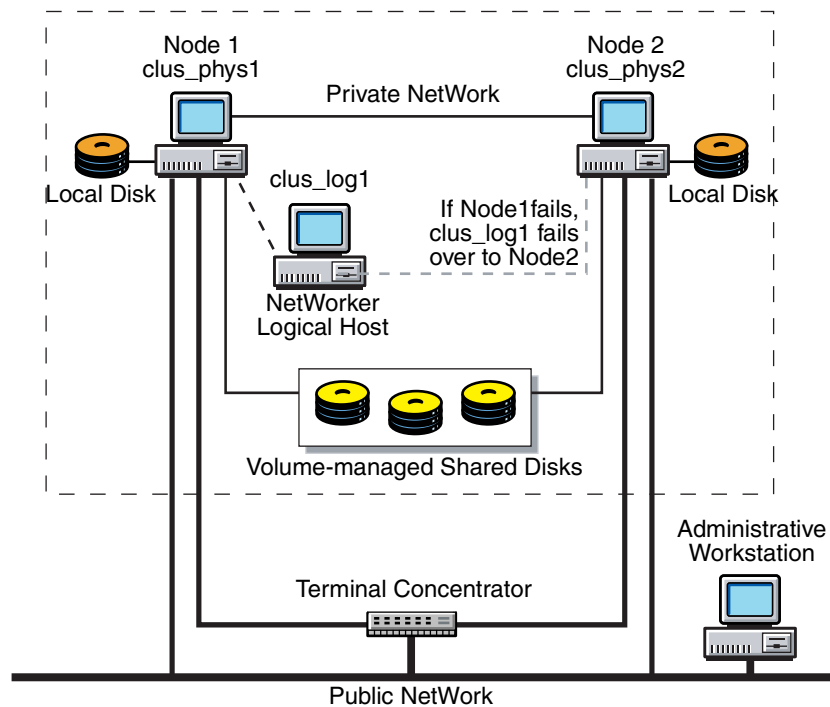
Figure 1   **Sample cluster configuration**

Table 1   **Information required during NetWorker virtual server installation (1 of 2)**

Required information	Example
Pathname for the shared nsr directory	s:\nsr
Server name of the NetWorker virtual server	jupiter
Server netmask	255.255.255.0

Table 1   Information required during NetWorker virtual server installation (2 of 2)

Required information	Example
Domain name for the AutoStart server (Domain names are case-sensitive)	galaxy
Installation directory pathname	C:\Program Files\Legato\ AAM\galaxy
Server names of first and second physical hosts in the AutoStart Cluster. Server names must not exceed fifteen characters in length.	mars saturn

Updating the NetWorker software

To update the NetWorker server software in an AutoStart environment:

1. Start the **EMC AutoStart Console** and take the NetWorker server Cluster resource group offline.

2. Rename the NetWorker.clustersvr file to NetWorker.nocluster.

   This file is typically located in %SystemDrive%\Program Files\Legato\nsr\bin.

3. Upgrade the NetWorker software. The NetWorker Installation Guide provides instructions.

4. Stop the **NetWorker Backup and Recover Server** service.

5. Open the **NetWorker Backup and Recover Server** service properties and change the **Startup** type from **Automatic** to **Manual**.

6. Rename the NetWorker.nocluster file back to NetWorker.clustersvr.

7. Repeat steps 2 through 6 on the second node of the cluster.

8. Bring the NetWorker server cluster resource group back online.

Installing a NetWorker virtual server

To install and configure the NetWorker software as a highly available service in a cluster, complete these tasks:

- "Task 1: Ensure that the EMC AutoStart software is installed" on page 23
- "Task 2: Install the NetWorker software in a cluster" on page 23
- "Task 3: Promote at least one secondary cluster node to primary" on page 23
- "Task 4: Create the resource that will become the managed shared disk" on page 23
- "Task 5: Define the NetWorker server as highly available" on page 24
- "Task 6: Configure the NetWorker virtual server" on page 25
- "Task 7: Configuring the clients of the NetWorker cluster server" on page 26
- "Task 8: Register NetWorker licenses for cluster server failover" on page 27

Task 1: Ensure that the EMC AutoStart software is installed

Ensure that the AutoStart software is installed. The AutoStart documentation provides detailed installation instructions.

For EMC AutoStart Release 5.1.2, you must install this patch:

ftp://ftp.legato.com/pub/cluster/patches/5.1/windows
/A_WIN_HF_5.1.2_79520.exe

Task 2: Install the NetWorker software in a cluster

On each node in the cluster, install NetWorker server software in the same location on a private disk, for example, in %SystemDrive%\Program Files\Legato\nsr.

To install the NetWorker software:

1. Log in as **administrator** on one node.

2. Install this NetWorker software on each node in the cluster:

   - NetWorker client
   - Storage node
   - NetWorker server

   Detailed instructions are provided in the *EMC NetWorker Installation Guide*.

3. Obtain the NetWorker hostid:

   a. Launch the **NetWorker Management Console** software.

   b. From the **Administration** windows, select **Registration** from the **Configuration** menu.

   c. Right-click **NetWorker/10 Eval** and select **Properties**.

   The value that is displayed in the HostID field is the hostid for the node on which NetWorker server is running. You will need this HostID later in the installation.

4. Repeat steps 1 through 3 on the second node.

Task 3: Promote at least one secondary cluster node to primary

You must always run two primary controllers. Promote at lease one secondary node to the primary by using the AutoStart Console. If one node fails, the other can be brought online automatically with all data.

The AutoStart documentation provides detailed instructions.

Task 4: Create the resource that will become the managed shared disk

On one of the cluster nodes, create a folder that you can later use as the managed, shared disk. For example, create the folder s:\nsr.

Note: Do not share the folder at this point. If you do, the installation will fail. If the AutoStart software is already installed and a managed shared disk already exists, remove the share property now.

Task 5: Define the NetWorker server as highly available

To define the NetWorker server as a highly-available application, run the **lc_config** script on each node. By configuring the NetWorker server as a highly-available application, you create a NetWorker cluster group resource. This allows the NetWorker server to run in cluster mode (that is, with failover capability).

To run the **lc_config** script:

1. Log in as **administrator**.

2. Ensure that all node names to be used in the cluster, both the physical nodes and the virtual nodes, can be resolved using DNS.

   To verify that the node names can be resolved by using DNS, type:

   nslookup *node_name*

3. Start the **NetWorker Backup and Recover Server** services.

   Note: If you are upgrading NetWorker software or reinstalling after a partial uninstall of the NetWorker software, the **lc_config** script prompts you to type a command to keep, rename or delete each of the old server configuration files. It is safe to delete the old files.

   To delete a file, type **d** when prompted. After you finish typing your choices for each of the old configuration files, continue with step 5.

4. Run the **lc_config** script.

   When the **lc_config** script runs, you are prompted to type the information listed in Table 1 on page 21.

   ```
   lc_config
   C:\Program Files\Legato\nsr\bin>lc_config
   Checking for C:\Program
   Files\Legato\nsr\bin\lcmap.bat
   Checking for C:\Program Files\Legato\nsr\bin\NetWorker.clustersvr
   Enter shared nsr dir:s:\nsr
   Enter the Legato Cluster domain name:galaxy
   Enter the directory in which your Legato Cluster software is
   installed (typically something like C:\galaxy):
   C:\Program Files\Legato AAM\galaxy
   ```

5. Type **y** to confirm that the information is correct.

   If you need to make corrections, type **n**. The **lc_config** script runs again so that you can retype your information.

   ```
   You entered the following data:
   Nsr Dir = s:\nsr,
   Legato Cluster domain = galaxy
   Legato Cluster software location = C:\Program Files\Legato
   AAM\galaxy
   Is this OK [y/n]y
   ```

6. Stop the **NetWorker Backup and Recover Server** services.

7. Edit the nw_nt.aam5.imp file and modify these fields:

   • Virtual hostname

   • Physical cluster node names

   • Shared drive letter

   The *#NW customise label* tag appears before each field that requires modification.

8. On one node only, go to %SystemDrive%\Program Files\Legato\nsr\bin and run the following command. For example, if the AutoStart domain name is galaxy, type:

"C:\Program Files\Legato AAM\galaxy\bin\ftcli" -d galaxy -c "import nw_nt.lc.imp"

The screen displays this information:

```
C:\Program Files\Legato\nsr\bin>"C:\Program Files\Legato
AAM\galaxy\bin\ftcli" -domain galaxy -c "import nw_nt.aam5.imp"IP
Address "guiro" Created
Process Class "nsrd" Created
Process "NSRserver" Created
Configuration "NSRserver" Created
Process Class "nsrexecd" Created
Process "NSRexecd" Created
Configuration "NSRexecd" Created
Data Source "networker_ds" Created
Resource Group "networker" Created
OK
```

9. Use the **AutoStart Console** to:

   a. Verify that the NetWorker Server resource was created.

   b. Share the managed shared disk (for example, *s:*\nsr).

   c. Bring the NetWorker virtual server online.

   d. Select the disk to be used for NetWorker virtual server storage and set the disk to be managed as a shared storage for each physical node in the cluster.

10. For each physical node in the cluster, ensure that the **AutoStart Console** user account, NT AUTHORITY\SYSTEM is included in the valid user list with administrator access.

11. Ensure that the value of the environment variable for the administrator user FT_DOMAIN is set to the AutoStart domain name.

12. From one node in the cluster:

    a. Log in as **administrator**.

    b. Ensure that the data source for the NetWorker virtual server is managed by the **AutoStart Management Console**.

       The data source for the NetWorker virtual server is defined as **networker_ds** in the NetWorker resource group.

    c. Run this script from the directory where the NetWorker software was installed:

       nwinst.bat

The AutoStart documentation provides instructions on using the AutoStart Console.

Task 6: Configure the NetWorker virtual server

To configure the NetWorker server:

1. Log in as **administrator** on the cluster node that is currently running the NetWorker server resource group.

2. Start the **NetWorker Console software**.

3. From the **Administration** window, select **Properties** from the **File** menu.

    a. For the Administrator attribute, add entries for any cluster nodes that are not already listed. For example:

       `root@hostname`

    b. Click **OK**.

Note: To restrict the set of NetWorker servers that can back up a particular client, edit the nsr\res\servers file and add the NetWorker virtual host as well as each cluster node to the list of servers.

Task 7: Configuring the clients of the NetWorker cluster server

To configure each client under the NetWorker server:

1. (Optional) Define save groups.

Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical client within the cluster a client of the NetWorker server.

    For each physical client in the cluster:

    a. Create a new NetWorker client.

    b. For the **Name** attribute, type the name of the physical client.

3. Make each virtual client within the cluster a client of the virtual NetWorker server.

    For each virtual client in the cluster:

    a. Create a new NetWorker client.

    b. For the **Name** attribute, type the name of the virtual client.

    c. For the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

       `root@clus_phys1`

    d. For the **Group** attribute, select a group.

    The first time the NetWorker application runs, it creates the **Client** resource for the NetWorker virtual server. The NetWorker Administration Guide provides information.

4. Verify that the Client and Group resources have been properly configured by running a test probe. On the node where the NetWorker server resides, run this command:

    `savegrp -pv -c `*`client_name group_name`*

    If this test does *not* display the expected scheduled backups and index, create an empty file named **pathownerignore** in the directory where the NetWorker **savefs** command is installed. This allows a valid save set on a NetWorker client to be scheduled for backup. For example:

    On each node of the cluster, type:

    `echo NUL: NetWorker_bin_dir\pathownerignore`

> **Note:** A NetWorker scheduled save might use a default rather than a specified client index name. To override this default, run a manual save with the **-c** option:
> `save -c `*`client_name`*
> To restrict the set of NetWorker servers that can back up a particular client, edit the **%SystemDrive%\Program Files\Legato\nsr\res\servers** file and add the NetWorker virtual host as well as each cluster node to the list of servers.

After the client configuration is complete:

◆ The NetWorker cluster server uses the IP address of the NetWorker virtual host regardless of which cluster node currently masters the NetWorker virtual server.

◆ The NetWorker cluster server takes the identity of the NetWorker virtual server's hostname regardless of which cluster node is currently running the NetWorker service.

◆ The first time NetWorker software runs, it creates the client resource for the NetWorker virtual host. Client resources must be created manually for any cluster node to be backed up by the NetWorker virtual host.

Task 8: Register NetWorker licenses for cluster server failover

To register NetWorker licenses for cluster failover:

1. Ensure that the NetWorker virtual server is defined as part of a cluster.

2. Ensure that the **NetWorker** service is running.

3. Log in to the cluster node on which the NetWorker virtual server is running.

4. Create a file named **hostids** in the nsr\res directory.

5. Open the **hostids** file and add one line. For hostid values, use the NetWorker hostids values that were derived in "Task 2: Install the NetWorker software in a cluster" on page 23.

   `hostid1:hostid2`

6. Restart the NetWorker virtual server by taking it offline and then bringing it back online.

7. Register the NetWorker software for permanent use. Chapter 10, "Licensing and Enabling the Software," explains how to register NetWorker software.

Installing only the NetWorker client software in a cluster

To install NetWorker cluster client, read and follow the procedures for these tasks:

◆ "Task 1: Install the NetWorker cluster client software" on page 28

◆ "Task 2: Configure NetWorker client software as highly available" on page 28

> **Note:** Make sure the NetWorker client software is installed on every node to be backed up in the cluster.

Task 1: Install the NetWorker cluster client software

To install the NetWorker client software on each node in the cluster:

1. Ensure that the operating system is updated with the most recent cluster patch.

2. For AutoStart Release 5.1.2, you must install patch **A_WIN_HF_5.1.2_79520.exe** available on Powerlink.

3. Install the NetWorker client software on the physical disk of each node in the cluster to be backed up. Chapter 10, "Licensing and Enabling the Software," explains how to register NetWorker software.

Task 2: Configure NetWorker client software as highly available

To configure the NetWorker server:

1. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the physical client.

   Note: If a physical Client is backed up to a NetWorker server outside the cluster, the name of any virtual service that can run on the physical node must be added to the Remote Access list of the physical Client resource.

2. Make each virtual client within the cluster a client of the NetWorker server. For each virtual client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the NetWorker server.

   c. For the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

   ```
   root@clus_phys1
   ```

   d. For the **Group** attribute, select a group.

3. Schedule backups by using the NetWorker application.

4. On each node in the cluster, run the cluster configuration program **lc_config**.

   a. Log in as **administrator** on each node.

   b. Run the **lc_config** program:

   ```
   lc_config
   ```

   Note: When prompted for the shared nsr directory, you can leave the field blank.

   c. Type **y** to confirm the information.

5. For each physical node in the cluster, ensure that the AutoStart Console user account, NT AUTHORITY\SYSTEM is included in the valid user list with administrator access.

Uninstalling the NetWorker software

To uninstall the NetWorker software from an AutoStart environment:

1. Take the **NetWorker Resource Group** offline.

2. Select and delete the **NetWorker Resource Group** from the **Current Resource Group** list.

3. Select and delete the **NSRserver** and the **NSRexecd** services.

4. Select and delete the **networker_ds** resource.

5. Select and delete the NetWorker virtual server IP Address.

6. Uninstall the NetWorker Server software from each node. The NetWorker Installation Guide provides instructions.

Note: If the NetWorker software will be reinstalled to the same location, ensure that the following files are deleted from the /bin subdirectory: **NetWorker.clustersvr**, **lcmap.bat** and **winst.bat**.

Configuring the NetWorker virtual server with a backup device

The NetWorker virtual server must be configured with storage node backup devices. The storage nodes that are used by the NetWorker virtual server can be devices attached to a remote system (external to the cluster). They can also be devices connected locally to any of the physical nodes in the cluster. A storage node device can be a stand-alone tape device or an autochanger. The NetWorker Administration Guide provides information about how to configure storage nodes.

The NetWorker server requires a local backup device to save the bootstrap and the server indexes. With release 6.0 or later, the NetWorker virtual server bootstrap and indexes can be also saved to a storage node. The storage node device, in such a case, must be attached to the cluster node on which the NetWorker virtual server is currently running.

This is the recommended device configuration for a NetWorker virtual server, release 6.0 or later, that is running in a two-node AutoStart cluster:

◆ Each cluster node must be defined as a storage node for the NetWorker virtual server.

◆ In the AutoStart Console, the **Preferences\'Storage Nodes** attribute in the NetWorker virtual server Client resource lists the storage nodes that are enabled to store data for the client.

Each of the storage nodes must be listed before you can list the nsrserverhost:

a. One cluster node

b. The other cluster node

c. The nsrserverhost

Note: The *nsrserverhost* must always be listed last in each client's storage node list.

NetWorker software does *not* allow the configuration of a storage node on a cluster node that is running the NetWorker server binaries. Consequently, before configuring a cluster node as a storage node, you must move the NetWorker virtual server to another node in the cluster.

Troubleshooting

These sections contain troubleshooting tips for NetWorker software in an AutoStart environment.

Setting the shutdown wait timeout values

To prevent timing problems during failover, perform this procedure to increase the shutdown wait timeout value for the **NSRserver** service.

1. Start the **EMC AutoStart Console** and select the domain.

2. Select **Resource Groups**>**NetWorker Resource** group.

3. Select the **Settings** tab.

4. Select **NSRserver** from the list box and click **Edit**.

5. Increase the value for the **Wait until service is stopped** item.

NetWorker virtual server fails to start nsrmmd

If the NetWorker virtual server fails to start **nsrmmd** on a NetWorker storage node, the following error messages are sent to the NetWorker server daemon log:

```
06/08/00 10:00:11 nsrmon #217: connect to nsrexec prog 390113 vers
1 on `uranus' failed: RPC error: Remote system error
06/08/00 10:00:11 nsrd: media notice: check storage node: uranus
(RPC error: Remote system error)

06/08/00 10:00:11 nsrd: media info: restarting nsrmmd #1 on uranus
in 2 minute(s)
06/08/00 10:02:12 nsrd: media info: restarting nsrmmd #1 on uranus
now
06/08/00 10:02:42 nsrmon #183: connect to nsrexec prog 390113 vers
1 on `
```

The error might be caused by the **NetWorker Remote Exec** service not running on the storage node. If the service is *not* running, do the following to restart the service:

1. Select **Services** from the **Control Panel** on the storage node.

2. Restart the service.

NetWorker server fails to back up a virtual cluster client

If a NetWorker server fails to backup a virtual cluster client, an error message could appear.

In this example, the following names appear:

◆ *charon* — Virtual cluster client running on pluto

◆ *pluto* — Physical cluster node

◆ *neptune* — NetWorker server

```
06/19/00 12:56:57 nsrd: savegroup alert: test completed, 1 client(s)
   (charon Failed) charon:Q:\: No save sets with this name were found
   in the media database; performing a full backup
   * charon:Q:\ save: RAP error: Unable to extract resource info for
   client pluto.legato.com.
   * charon:Q:\ save: Cannot open save session with neptune.legato.com
   * charon:Q:\ 1 retry attempted
   * charon:Q:\: No save sets with this name were found in the media
   database; performing a full backup
   * charon:Q:\ save: RAP error: Unable to extract resource info for
   client pluto.legato.com.
   * charon:Q:\ save: Cannot open save session with neptune.legato.com
   06/19/00 12:56:57 nsrd: runq: NSR group test exited with return code
   1.
```

This error might be occur because the NetWorker Client resources for each of the physical nodes in the cluster are missing.

In such cases, perform the following to correct the error:

1. Create a Client resources for each physical node in the cluster that is allowed to own the virtual cluster client.

2. Rerun the backup.

Rolling back changes to the cluster configuration file

To roll back changes to the cluster configuration file (lc_config):

1. Take the **NetWorker Resource Group** offline.

2. Stop the **NetWorker Remote Exec** service.

3. Delete or rename these files from the NetWorker installation directory:

    *   NetWorker.clustersvr
    *   lcmap.bat
    *   nwinst.bat.

4. From the **AutoStart Console**, select and delete:

    *   NetWorker Resource Group
    *   NSRserver
    *   NSRexecd services
    *   networker_ds data source
    *   NetWorker virtual server IP address

EMC AutoStart for UNIX Installation

This chapter includes these sections:

Software installation roadmap

An EMC AutoStart cluster consists of multiple nodes in a networked configuration and provides additional security with the failover capability. Failover allows another node in the cluster to take over operations from the first node. For information, refer to the AutoStart documentation.

Use the following roadmap to follow when installing NetWorker software:

1. Review "Installation requirements" on page 34 and note the default directory location.

2. Install the required NetWorker software by following one of these procedures:
   - "Installing a NetWorker virtual server" on page 36
   - "Installing a virtual NetWorker Console server" on page 43
   - "Installing only the NetWorker client software in a cluster" on page 45

3. Enable and register all of the NetWorker products. Chapter 10, "Licensing and Enabling the Software" provides detailed information.

Installation requirements

This section specifies the software and hardware required to install and configure the NetWorker server or client software within an AutoStart cluster environment.

The EMC Information Protection Software Compatibility Guide provides the most up-to-date information about software and hardware requirements.

Software requirements

The following software must be installed on each node in the cluster:

- AIX release 5.1 or later
- HP-UX release 11.*x*
- Red Hat Enterprise Linux AS2
- Solaris version 2.7 or later
- FullTime AutoStart release 5.1 or later
- NetWorker release 7.3

Note: Ensure that the most recent cluster patch for the operating system is installed. FullTime AutoStart is supported on the Linux for the Intel x86 platform. It is not supported on other NetWorker Linux platforms.

Hardware requirements

The following hardware requirements must be met for server installation only:

- Dedicated shared disk that is used as the NetWorker storage disk (for the /nsr directory) is connected to all the nodes within the cluster.
- Device with local affinity for the local bootstrap backup is connected to all the nodes within the cluster.

Configuration options

The *EMC NetWorker Administration Guide* provides information on how to configure:

◆ Tape libraries with a NetWorker virtual server.

◆ Remote physical storage node with a NetWorker virtual server.

System information requirements

illustrates a sample cluster configuration and displays the system information needed to install NetWorker software within an AutoStart environment.

Different operating systems use different terms for the same cluster concepts. AutoStart refers to:

◆ Physical hosts as nodes

◆ Virtual server as a resource group (application service*)*
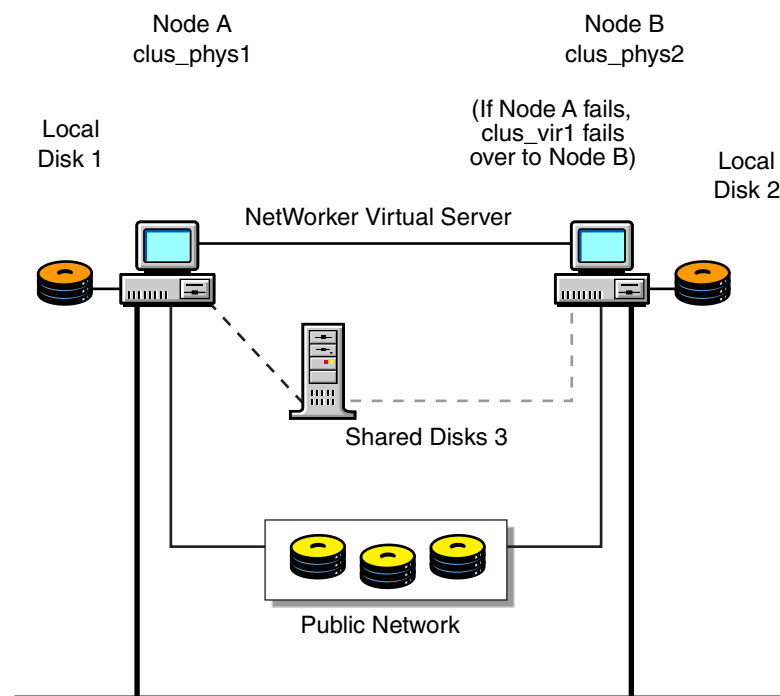
Figure 2   **Sample cluster configuration**

Table 2   **Required system information (1 of 2)**

Information required	Example
NetWorker virtual hostname with an IP address	**clus_vir1** 192.168.1.10
NetWorker package mount point for virtual volume	/nsr_shared_mnt_pt

Table 2   Required system information (2 of 2)

Information required	Example
Shared storage disk virtual volume	• AIX: /dev/lv1 • HP-UX: /dev/dsk/c5t2d0, /dev/vg03/1vol1 (for Logical Volume Manager) • Linux: /dev/sdc1 • Solaris: /dev/dsk/c1t3d0s0
NetWorker control script	• AIX: /usr/bin/nw_ux.lc • HP-UX: /opt/networker/bin/nw_ux.lc • Linux: /usr/sbin/nsr/nw_ux.lc • Solaris: /usr/sbin/nw_ux.lc
File containing the hostids of all the cluster members	• AIX: /nsr/res/hostids • HP-UX: /nsr/res/hostids • Linux: /nsr/res/hostids • Solaris: /nsr/res/hostids
NetWorker monitor script	• AIX: /usr/bin/nw_ux.lc • HP-UX: /opt/networker/bin/nw_ux.lc • Linux: /usr/sbin/nsr/nw_ux.lc • Solaris: /usr/sbin/nw_ux.lc
NetWorker Console virtual hostname	• Linux: **clus_vir2** 192.168.1.11 • Solaris: **clus_vir2** 192.168.1.11
NetWorker Console database mount point	• Linux: **nmc_shared_mnt_pt** • Solaris: **nmc_shared_mnt_p**t

Installing a NetWorker virtual server

Use this roadmap to install and configure the NetWorker software as a highly available service in a cluster:

Task 1: Ensure that the AutoStart software is installed

Ensure that the AutoStart software is installed.

For AutoStart Release 5.1.2, install this patch: *ftp.legato.com/pub/cluster/patches/5.1/unix*

Task 2: Install the NetWorker software in a cluster

To install the NetWorker software:

1. Ensure that the most recent cluster patch for the operating system is installed.

2. Install these NetWorker software packages on each node in the cluster:

   a. Client

   b. Storage Node

   c. Server

   d. Man pages

   The NetWorker Installation Guide details the installation instructions.

Task 3: Define the NetWorker server as highly available

To define and configure the NetWorker server as highly available:

1. Log in as root.

2. Ensure that the /etc/hosts file on each cluster node contains the name of the virtual host. The virtual hostname can be published in the Domain Name System (DNS) or Network Information Services (NIS).

3. Set and export the **FT_DIR**, **FT_DOMAIN**, and the **FT_CONSOLE_DIR** environment variables.

   Table 3 on page 37 lists the environmental variables that you would type from the Bourne shell:

Table 3   NetWorker server high availability environment variables

Operating System	Command	Variable description
AIX	FT_DIR=/usr/lpp/LGTOaam51 FT_CONSOLE_DIR=$FT_DIR/console FT_DOMAIN=***domain_name*** export FT_DIR FT_DOMAIN FT_CONSOLE_DIR	*domain_name* is the AutoStart domain
HP-UX	FT_DIR=/opt/LGTOaam***xx*** FT_CONSOLE_DIR=$FT_DIR/console FT_DOMAIN=***domain_name*** export FT_DIR FT_DOMAIN FT_CONSOLE_DIR	• *xx* is set to 50 for AutoStart version 5.x • *domain_name* is the AutoStart domain name
Linux	FT_DIR=/opt/LGTOaam***xx*** FT_CONSOLE_DIR=$FT_DIR/console FT_DOMAIN=***domain_name*** export FT_DIR FT_DOMAIN FT_CONSOLE_DIR	• *xx* is set to 50 for AutoStart version 5.x • *domain_name* is the AutoStart domain name
Solaris	FT_DIR=/opt/LGTOaam***xx*** FT_CONSOLE_DIR=$FT_DIR/console FT_DOMAIN=***domain_name*** export FT_DIR FT_DOMAIN FT_CONSOLE_DIR	• *xx* is set to 50 for AutoStart version 5.x or 51 for AutoStart version 5.1 • *domain_name* is the AutoStart domain name

4. Perform the following from each node in the cluster that will run the NetWorker server process:

a. Run the cluster configuration script, **networker.cluster**, from the appropriate operating system directory. Table 4 on page 38 provides details:

Table 4   Operating system directory for networker.cluster script

Operating system	Directory
AIX	`/usr/bin/`
HP-UX	`/opt/networker/bin/`
Linux	`/usr/sbin/`
Solaris	`/usr/sbin/`

b. Type this information:

– Location of the local NetWorker database directory provided during the installation procedure:

/nsr

– Published virtual hostname:

clus_vir1

– Shared *nsr* mount directory:

/nsr_shared_mnt_pt

Note: Any configuration errors can be undone by running the **networker.cluster -r** option.

5. From one node in the cluster:

a. Log in as **administrator**.

b. Customize the necessary file from the appropriate operating system directory.

Table 5 on page 38 provides details. This file can be used to create the NetWorker resource group and its dependant objects.

Note: In the file, there are multiple instances of the **NW Customize** comment, ensure that all entries are replaced with the appropriate cluster configuration values.

Table 5   Operating system directory for cluster configuration files

Operating system	Directory
AIX	`/usr/bin/nw_ux.lc.imp`
HP-UX	`/opt/networker/bin/nw_ux.lc.aam5.imp`
Linux	`/opt/lgtonmc/bin/nw_ux.lc.aam5.imp`
Solaris	`/opt/LGTOnmc/bin/nw_ux.lc.aam5.imp`

c. Follow the instructions in the comments at the beginning of the file to customize the default values listed in Table 6 on page 39 based on the cluster configuration.

Table 6   Cluster configuration default values

Operating system	Filename	Environmental variable	Value
AIX	/usr/bin/nw_ux.lc.imp	Virtual host's IP address: Physical hostnames: Shared disk file system: Device name:	192.168.1.10 clus_phys1, clus_phys2 /nsr_shared_mnt_pt /dev/1v1
HP-UX	/opt/networker/bin/nw_ux.lc.aam5.imp	Virtual host's IP address: Physical hostnames: Shared disk file system:	192.168.1.10 clus_phys1, clus_phys2 /dev/vg03/lvol1, /vg_nsr hfs
Linux	/opt/lgtonmc/bin/nw_ux.lc.aam5.imp	Virtual host's IP address: Physical hostnames*:* Shared disk file system: Device name:	192.168.1.10 clus_phys1, clus_phys2 /nsr_shared_mnt_pt /dev/dsk/c1t3d0s0
Solaris	/opt/LGTOnmc/bin/nw_ux.lc.aam5.imp	Virtual host's IP address: Physical hostnames: Shared disk file system: Device name:	192.168.1.10 clus_phys1, clus_phys2 /nsr_shared_mnt_pt /dev/dsk/c1t3d0s0

    d. Type the appropriate command from .

Table 7   NetWorker server commands

Operating System	Command
AIX	$**FT_DIR/bin/ftcli -c "import/usr/bin/nw_ux.lc.aam5.imp"**
HP-UX	$**FT_DIR/bin/ftcli -c "import /opt/lgtonmc/bin/nw_ux.lc.aam5.imp"** **Note:** If the LVM software is being used, the AutoStart application requires two data sources—one to activate the volume group (*/dev/vg03*) and one to mount the shared mount point (*/vg_nsr* on */dev/vg03/lvol1*).
Linux	$**FT_DIR/bin/ftcli -c "import /usr/sbin/nsr/nw_ux.lc.aam5.imp"**
Solaris	$**FT_DIR/bin/ftcli -c "import /opt/LGTOnmc/bin/nw_ux.lc.aam5.imp"**

    e. Use the AutoStart Management Console to verify that the NetWorker resource group was imported correctly.

    f. Run the appropriate script from .

Table 8   NetWorker server scripts

Operating System	Script
AIX	**/usr/bin/nwinst.sh**
HP-UX	**/opt/networker/bin/nwinst.sh**

Table 8   NetWorker server scripts

Operating System	Script
Linux	**/usr/bin/nwinst.sh**
Solaris	**/usr/sbin/nwinst.sh**

Task 4: Grant access to the NetWorker virtual server

Before a NetWorker server can back up a client, the server must have access to the client. Access is granted by editing the /nsr/res/servers file.

Note: If the /nsr/res/servers file is empty or does *not* exist, any NetWorker server is authorized to:
- Access and back up the client.
- Perform a directed recovery to the client.

To grant access to the NetWorker virtual server:

1. On each node in the cluster:

   a. Shut down the NetWorker services.

   b. Edit or create the /nsr.Networker.local/res/servers file:

      – Add the set of NetWorker servers, one per line, that require access to this client.

      – For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

      clus_vir1

      clus_phys1

      clus_phys2

   c. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option. If the **-s** option exists, remove all occurrences of the following in the file:

      -s *server_name*

2. On one node in the cluster, start the NetWorker service by using the cluster management software:

   a. Use the AutoStart Management Console to bring the NetWorker Resource Group online.

   b. Edit or create the /nsr/res/servers file:

      – Add the set of NetWorker servers, one per line, that require access to this client.

      – For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

      clus_vir1

      clus_phys1

      clus_phys2

3. If required, grant access to each NetWorker client that is outside of the cluster:

   a. Shut down the NetWorker processes and verify that all NetWorker services have stopped.

   b. Edit or create the /nsr/res/servers file:

     – Add the set of NetWorker servers, one per line, that require access to this client.

     – For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

      clus_vir1

      clus_phys1

      clus_phys2

Task 5: Configure the NetWorker server

To configure the NetWorker server:

1. Log in as root on the cluster node that is currently running the NetWorker server resource group.

2. Start the **NetWorker Console** software.

3. From the **Administration** window, select **File>Properties**.

   a. For the **Administrator** attribute, add entries for any cluster nodes that are not already listed. For example:

     `root@hostname`

   b. Click **OK**.

Task 6: Configure clients under the NetWorker virtual server

When the **networker.cluster** script runs, it creates a symbolic link named **/nsr** that points to a local disk. It also creates a second link points to the local NetWorker directory. For example, if the local NetWorker directory was created in /var/nsr, each client member has these links:

◆ AIX, HP-UX, Solaris

   • /nsr->/nsr.NetWorker.local

   • /nsr.NetWorker.local->/var/nsr

◆ Linux

   • /nsr->/nsr.NetWorkerBackup.local

   • /nsr.NetWorkerBackup.local->/var/nsr

To configure each client under the NetWorker server:

1. (Optional) Define savegroups.

Note: In order for their save sets to restart after a virtual client or NetWorker server failover savegroups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical client within the cluster a client of the NetWorker virtual server. For each physical client in the cluster:

   a. Create a new NetWorker client.

   b. For the **Name** attribute, type the name of the physical client.

3. Make each virtual client within the cluster a client of the NetWorker virtual server. For each virtual client in the cluster:

   a. Create a new NetWorker client.

   b. For the **Name** attribute, type the name of the virtual client.

   c. For the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

   root@clus_phys1

   d. For the **Group** attribute, select a group.

   The first time the NetWorker application runs, it creates the Client resource for the NetWorker virtual server. The *EMC NetWorker Administration Guide* provides more more information.

4. For AIX only, on each node that the logical volume can be attached, check that the /etc/filesystems file contains the same mount point for the logical volume as the one specified in the **FullTime AutoStart Resource** group.

   To change the entry for the logical volume mount point in the /etc/filesystems file, type:

   chfs -n *new_mountpoint old_mountpoint*

5. Run a test probe to verify that the **Client** and **Group** resources have been properly configured.

   Type the following command on the node on which the NetWorker server resides:

   savegrp -pv -c *client_name group_name*

   The *EMC NetWorker Administration Guide* provides information on how to troubleshoot if the test probe does not display the correct scheduled backups and index.

Task 7: Register NetWorker licenses for virtual server failover

To register a NetWorker server in a cluster environment:

1. Ensure that the NetWorker virtual server is defined as a part of the cluster.

2. Ensure that the NetWorker service is running.

3. For each physical node in the cluster:

   a. Relocate, sequentially, the NetWorker server to this node.

   b. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

4. Log in to the system that is running the NetWorker virtual server and create the /nsr/res/hostids file. This file contains the host IDs of all the cluster nodes.

   Use this syntax:

   `hostid1:hostid2:hostid3:...`

   For example:

   `12345678:87654321`

5. Restart the server by taking the NetWorker virtual server offline and then putting it back online.

6. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

7. Register the NetWorker software.

Installing a virtual NetWorker Console server

To install and configure the NetWorker Console software as a highly available service in a cluster, read and follow the procedures for these tasks:

◆ "Task 1: Install the NetWorker Management software in a cluster" on page 43

◆ "Task 2: Define the NetWorker Console server as highly available" on page 43

Note: A highly available NetWorker Console Server in only supported on the Linux and Solaris platforms.

Task 1: Install the NetWorker Management software in a cluster

To install the NetWorker software on each node in the cluster:

1. Ensure that the most recent cluster patch for the operating system is installed.

2. Ensure that the $HOME environment variable is set to the home directory of the root user:

   `$HOME`

3. Install the **NetWorker Console** server software on each node in the cluster.

   • Linux: **lgtonmc**
   • Solaris: **LGTOnmc**

The NetWorker Installation Guide provides detailed installation instructions.

Task 2: Define the NetWorker Console server as highly available

To define and configure the NetWorker Console server as a highly available application on each node in the cluster:

1. Log in as root.

2. Ensure that the /etc/hosts file on each cluster node contains the name of the virtual host. The virtual hostname can be published in the Domain Name System (DNS) or Network Information Service (NIS).

3. Set and export the **FT_DIR**, **FT_DOMAIN** and the **FT_CONSOLE_DIR** environment variables. For example, from the Bourne shell type these commands:

```
FT_DIR=/opt/LGTOaamxx
FT_CONSOLE_DIR=$FT_DIR/console
FT_DOMAIN=domain_name
export FT_DIR FT_DOMAIN FT_CONSOLE_DIR
```

where:

- *xx* is set to 5.0 for AutoStart version 5.0 or 5.1 for version 5.1
- *domain_name* is set to AutoStart domain

4. From each node in the cluster that will run the NetWorker Console server process:

   a. Run the appropriate cluster configuration script as listed in :

Table 9   Cluster configuration scripts

Under this operating system	Run this script
Linux	**/opt/lgtonmc/bin/gst_ha.cluster**
Solaris	**/opt/LGTOnmc/bin/gst_ha.cluster**

   b. Type this information:

      – Published logical hostname: clus_vir1

      – Shared nmc mount directory: /nmc_shared_mnt_pt

      Note: Any changes to the configuration can be undone by running the **gst_ha.cluster -r** option.

5. From one node in the cluster, customize the appropriate file listed in .

Table 10   Cluster file customization

Under this operating system	Customize this file
Linux	/opt/lgtonmc/bin/gst_ha_ux.aam5.imp
Solaris	/opt/LGTOnmc/bin/gst_ha_ux.aam5.imp

This file is used to create the NetWorker Console resource group and its dependant objects in one step.

Note: In the **gst_ha_ux.aam5.imp** file, there are multiple instances of the "NW Customize" comment. Ensure that all entries are replaced with the appropriate cluster configuration values.

Follow the instructions listed in the comments at the beginning of the g**st_ha_ux.aam5.imp** file to customize these NetWorker Console default values based on the cluster configuration:

- Virtual host's IP address: **192.168.1.10**
- Physical hostnames: **clus_phys1**, **clus_phys2**

- Shared disk file system: **/nmc_shared_mnt_pt**
- Device name: **/dev/dsk/c1t3d0s0**

Table 2 on page 35 lists the sample values.

6. Type the appropriate command from Table 11 on page 45. The NetWorker Console resource group is automatically created.

Table 11   **Cluster configuration scripts**

Under this operating system	Run this script
Linux	**$FT_DIR/bin/ftcli -c "import /opt/lgtonmc/bin/gst_ha_ux.aam5.imp**
Solaris	**$FT_DIR/bin/ftcli -c "import /opt/LGTOnmc/bin/gst_ha_ux.aam5.imp"**

7. Verify that the **NetWorker Console** resource group was imported by using the **FullTime AutoStart Console**.

Installing only the NetWorker client software in a cluster

Complete these tasks to install NetWorker cluster client:

- "Task 1: Install the NetWorker cluster client software" on page 45
- "Task 2: Configure the NetWorker client software as highly available" on page 45
- "Task 3: Define the list of trusted NetWorker servers" on page 46
- "Task 4: Configure clients under the NetWorker server" on page 47

Note: Install the NetWorker client software on every node in the cluster to be backed up.

Task 1: Install the NetWorker cluster client software

To install the NetWorker client software on each node in the cluster:

1. Ensure that the operating system is updated with the most recent cluster patch.
2. Install the NetWorker client software on every node in the cluster to be backed up.

Task 2: Configure the NetWorker client software as highly available

To define and configure a NetWorker client as highly available:

1. Log in as root on each node where the NetWorker software was installed.
2. Ensure that the **/etc/hosts fi**le on each cluster node contains the name of the virtual host. The virtual hostname can be published in a the Domain Name System (DNS) or the Network Information Service (NIS).
3. Set and export the **FT_DIR**, **FT_DOMAIN** and the **FT_CONSOLE_DIR** environment variables. Table 3 on page 37 lists the environmental variables that you would type from the Bourne shell

4. For each node in the cluster:

a. Run the **networker.cluster** configuration script**,** located as indicated in Table 12 on page 46.

Table 12 **Cluster configuration scripts**

Under this operating system	Run this cluster configuration script
AIX	**/usrbin/**
HP-UX	**/opt/networker/bin/**
Linux	**/usr/sbin/**
Solaris	**/usr/sbin/**

b. When prompted to configure the NetWorker server, type **No**.

Note: Any configuration errors can be undone by running the **networker.cluster -r** option.

Task 3: Define the list of trusted NetWorker servers

Before a NetWorker server can back up a client, the client must grant the server access. Access is granted by editing the /nsr/res/servers file.

Note: If the /nsr/res/servers file is empty or does not exist, any NetWorker server is authorized to:
- Access and back up the client.
- Perform a directed recovery to the client.

To define the list of trusted NetWorker servers, perform the following steps on each node in the cluster:

1. Shut down the NetWorker processes and verify that all NetWorker services have stopped.

2. Edit or create the /nsr/res/servers file:

a. Add the set of NetWorker servers, one per line, that require access to this client.

b. For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

– clus_vir1
– clus_phys1
– clus_phys2

3. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option.

If the **-s** option exists, remove all occurrences of the following:

`-s server_name`

Task 4: Configure clients under the NetWorker server

To configure each client under the NetWorker server:

1. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

    a. Create a new NetWorker client.

    b. For the **Name** attribute, type the name of the physical client.

    Note: If a physical Client is backed up to a NetWorker server outside the cluster, the name of any virtual service that can run on the physical node must be added to the **Remote Access** list of the physical Client property sheet.

2. Make each virtual client within the cluster a client of the NetWorker virtual server. For each virtual client in the cluster:

    a. Create a new client.

    b. For the **Name** attribute, type the name of the virtual client.

    c. For the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

        root@clus_phys1

    d. For the **Group** attribute, select a group.

3. Schedule backups by using the NetWorker software.

Note: The NetWorker server might reside outside of the cluster.

Uninstalling the NetWorker software

To uninstall the NetWorker software from a cluster environment:

1. If necessary, use the cluster management software to stop services on the NetWorker server.

2. Shut down the client services on the node where the NetWorker software is being removed:

    nsr_shutdown

    A list of NetWorker services appears.

3. Ensure that these environment variables are set:

    - *$FT_DIR*
    - *$FT_DOMAIN*

4. Run the appropriate command as indicated in .

Table 13   **Cluster configuration scripts**

Under this operating system	Run this cluster configuration script
AIX	**/usr/bin/networker.cluster -r**

Table 13   Cluster configuration scripts

Under this operating system	Run this cluster configuration script
HP-UX	/opt/networker/bin/networker.cluster -r
Linux	/usr/sbin/networker.cluster -r
Solaris	/usr/sbin/networker.cluster -r

5. Complete one of these procedures to remove the existing version of NetWorker software:

   - "AIX Version" on page 48
   - "HP-UX version" on page 48
   - "Linux version" on page 49
   - "Solaris version" on page 49

AIX Version

To uninstall individual NetWorker software packages or all of the NetWorker packages at the same time, use the **SMIT** utility:

1. Log in as root on the computer where the software is being removed.

2. Type this command to remove the NetWorker software:

    `smitty remove`

3. Select **F4**=**List** to display a list of NetWorker software packages.

4. Select the NetWorker software packages to remove, as indicated in Table 14 on page 48:

Table 14   Removing NetWorker software packages

For this NetWorker software package	Remove this file
Client software	LGTOnw.clnt.rte
Storage node	LGTOnw.node.rte
Server	LGTOnw.serv.rte
Man pages	LGTOnw.man.rte
NetWorker License Manager	LGTOnw.licm.rte

5. Press **Return** to uninstall the NetWorker software.

HP-UX version

To uninstall individual NetWorker software packages or all of the NetWorker packages simultaneously:

1. To check which NetWorker packages have been installed, type:

    `swlist | grep LGTO`

2. Remove the existing version of NetWorker software.

Linux version

To uninstall a single NetWorker software package or all of the NetWorker packages simultaneously, type:

rpm -e *lgtoman-x.x.x lgtolicm-x.x.x lgtoserv-x.x.x lgtonode-x.x.x lgtoclnt-x.x.x*

where *x.x.x* identifies the specific NetWorker release

Solaris version

To uninstall a single NetWorker software package or all of the NetWorker packages simultaneously, type:

pkgrm LGTOman LGTOserv LGTOnode LGTOnmc LGTOlicm LGTOclnt

Configuring an external client to back up to a virtual server

Use this procedure to configure and back up an external client to a NetWorker virtual server.

Before a NetWorker server can back up a client, the client must grant the server access. Access is granted by editing the /nsr/res/servers file.

Note: If the /nsr/res/servers file is empty or does not exist, any NetWorker server is authorized to:
- Access and back up the client.
- Perform a directed recovery to the client.

On each NetWorker client that is outside of the cluster:

1. Shut down the NetWorker processes and verify that all NetWorker services have stopped.

2. Edit or create the /nsr/res/servers file:

    a. Add the set of NetWorker servers, one per line, that require access to this client.

    b. For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

        – clus_vir1
        – clus_phys1
        – clus_phys2

Defining ownership of a raw partition for virtual clients

To back up the raw partitions of a NetWorker virtual client, use the **IPOverride** option in the AutoStart Management Console:

1. Open the **AutoStart Console** and select **Resource Group**. The **Resource Group Editor** window appears.

2. Select **Edit View** and then select **Attributes** from the **Edit** menu. The **Define Resource Group Attributes** dialog box appears.

3. Add the following line in the **Define Resource Group Attributes** window:

   IPOverride=*IP_address=raw_partition_path*

   For example: **IPOverride=135.69.103.149=/dev/rdsk/c1t3d0s1**

   Note: The **IPOverride** attribute does not add to the normal list of virtual client-owned paths, but completely overrides them. In the previous example, if the virtual client also owns the **/share/web** filesystem, set this path:

   IPOverrride=*135.69.103.149=/dev/rdsk/c1t3d0s1, /share/web*

HACMP for AIX Installation

This chapter includes these sections:

Software installation roadmap

Use the following roadmap to follow when installing NetWorker software:

1. Review "Installation requirements" on page 52 and note the default directory locations.

2. Install the required NetWorker software by following one of these procedures:

   • "Installing a NetWorker virtual server" on page 54
   • "Installing only the NetWorker client software in a cluster" on page 59

3. Enable and register all of the NetWorker products. Chapter 10, "Licensing and Enabling the Software," provides detailed information.

Installation requirements

This section specifies the software and hardware required to install and configure the NetWorker server or client software within an HACMP for AIX environment.

The EMC Information Protection Software Compatibility Guide provides the most up-to-date information about software and hardware requirements.

Software requirements

The following software must be installed on each node in the cluster:

◆ AIX release 4.3.*x* or later

◆ HACMP for AIX release 4.5 or later (this requires a persistent IP address for each physical node)

◆ NetWorker release 7.0 or later

Hardware requirements

The following hardware requirements must be met:

◆ A dedicated shared volume group and file system used as the NetWorker storage area (for the /nsr directory) must be connected to all the nodes within the cluster (for server installation only).

◆ A device with local affinity for the local bootstrap backup connected to all the nodes within the cluster (for server installation only).

◆ For clusters configured with IP address takeover (IPAT), must be connect to a computer through its boot address if a resource group is not defined. Service addresses are associated with a resource group, not physical nodes.

   The output of the **hostname** command on a machine must correspond to an IP address that can be pinged. The machine hostname must also be set to the name equivalent to the address that is used by the physical client's dedicated NIC. Configure this NIC as the primary network adapter, for example, en0. An extra NIC outside of the control of HACMP for AIX is *not* required to enable a highly available NetWorker server.

Configuration options

The *EMC NetWorker Administration Guide* provides details about the following optional configurations:

◆ Tape libraries with a NetWorker virtual server

◆ Remote physical storage nodes with a NetWorker virtual server

System information requirements

Figure 3 on page 54 illustrates a sample cluster configuration and Table 15 on page 53 displays the system information needed to install NetWorker software within an HACMP for AIX cluster environment.

These terms are used to define HACMP for AIX cluster concepts:

◆ Node name — The HACMP for AIX defined name for a physical node.

◆ Boot address — The address used by a node when it boots up, but before HACMP for AIX starts.

◆ Service address — The address used by highly available services in an HACMP for AIX environment.

◆ Virtual client — The client associated with a highly available resource group. The file system defined in a resource group belongs to a virtual client. The virtual client uses the service address.

The HACMP for AIX resource group must contain an IP service label to be considered a NetWorker virtual client.

◆ Physical client — The client associated with a physical node. For example the / and /usr file systems belong to the physical client.

◆ Physical host address (physical hostname) — The address used by the physical client. For HACMP for AIX 4.5, this is equivalent to a persistent IP address.

Table 15   Required cluster information

Required information	Example
NetWorker virtual name with an IP addresses	clus_vir1, 191.168.1.10
Physical address for Node 1	191.168.1.20
Physical address for Node 2	191.168.1.30
NetWorker package mount point for virtual volume	/nsr_shared_mnt_pt
NetWorker control script	/usr/bin/nw_hacmp.lc
File containing the hostids of all the cluster members	/nsr/res/hostids
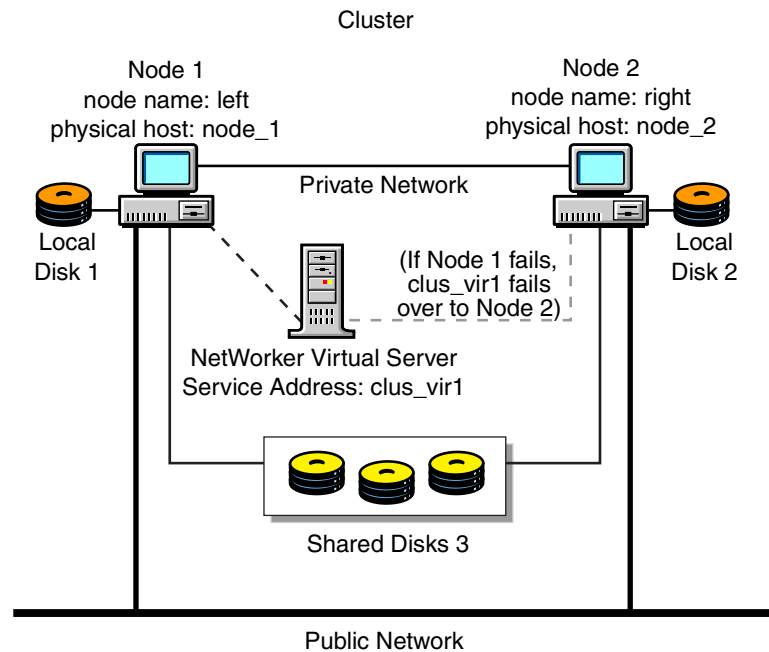
Figure 3   **Sample cluster configuration with private network**

Installing a NetWorker virtual server

Use this roadmap to install and configure the NetWorker software as a highly available service in an HACMP for AIX environment:

◆ "Task 1: Install the NetWorker software in a cluster" on page 54

◆ "Task 2: Define the server as highly available" on page 55

◆ "Task 3: Define an HACMP for AIX NetWorker server" on page 55

◆ "Task 4: Grant access to the NetWorker virtual server" on page 56

◆ "Task 5: Configure the NetWorker cluster server" on page 57

◆ "Task 6: Configure clients under the NetWorker cluster server" on page 57

◆ "Task 7: Register NetWorker licenses for virtual server failover" on page 58

Task 1: Install the NetWorker software in a cluster

To install the NetWorker software in a cluster:

1. Ensure that the most recent HACMP for AIX patch is installed.

2. Install these NetWorker software packages on each node in the cluster:

   • Client

   • Storage node

   • Server

The NetWorker Installation Guide provides installation instructions.

Task 2: Define the server as highly available

To define and configure the NetWorker server as highly available:

1. Log in as root.

2. Ensure that the /etc/hosts file on each cluster node contains the name of the virtual host. The virtual hostname in the DNS or NIS can be published.

3. From each node in the cluster that will run the NetWorker server process:

   a. Run the cluster configuration script, **networker.cluster**, located in the /usr/bin/ directory.

   b. Type the following information:

      – Location of the local NetWorker database directory provided during the installation procedure:

         /nsr

      – Published virtual hostname:

         clus_vir1

      – Shared *nsr* mount directory:

         /nsr_shared_mnt_pt

      Note: Any configuration can be undone by running the **networker.cluster -r** option.

4. Verify that these values are set:

   NSR_SERVERHOST = *virtual hostname (clus_vir1)*

   NSR_SHARED_DISK_DIR = *shared nsr mount directory (/nsr_shared_mnt_pt)*

Task 3: Define an HACMP for AIX NetWorker server

To define an HACMP for AIX NetWorker server:

1. Create a shared file system.

2. Define a service IP label.

3. Define a NetWorker application service:

   a. Type this command as root:

      smit hacmp

   b. From the main window, select these options:

      Cluster Configuration>Cluster Resource>Define Application Server>Add an Application Server

   c. Complete the following as shown:

      Server name: networker

      Start script: /usr/bin/nw_hacmp.lc start

      Stop script: /usr/bin/nw_hacmp.lc stop

      This application server will be used by the NetWorker resource group.

4. Configure a NetWorker resource group.

The HACMP for AIX documentation provides instructions on defining and monitoring a resource group in an HACMP for AIX environment.

Task 4: Grant access to the NetWorker virtual server

Before a NetWorker server can back up a client, the server must have access to the client. Granting access to the server is controlled by editing the /nsr/res/servers file.

If the /nsr/res/servers file is empty or does not exist, any NetWorker server can back up a client. Only servers listed in the /nsr/res/servers file can back up a client.

To grant access to the NetWorker virtual server:

1. Perform the following on each node in the cluster:

   a. Shut down the NetWorker processes and verify that all NetWorker daemons have stopped.

   b. Edit or create the /nsr.NetWorker.local/res/servers file:

      – Add the set of NetWorker servers, one per line, that require access to this client.

      – For each virtual NetWorker server, add an entry for each physical host and the NetWorker virtual server. For example:

      clus_vir1

      clus_phys1

      clus_phys2

   c. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option. If the **-s** option exists, remove all occurrences of the following in the file:

      -s *server_name*

2. Perform the following on one node in the cluster, start the NetWorker service by using the cluster management software:

   a. Use the HACMP for AIX software to bring the NetWorker resource group online.

   b. Edit or create the **/nsr/res/servers** file:

      – Add the set of NetWorker servers, one per line, that require access to the client.

      – For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

      clus_vir1

      clus_phys1

      clus_phys2

3. If required, grant access to each NetWorker client that is outside of the cluster:

   a. Shut down the NetWorker processes and verify that all NetWorker daemons have stopped:

      nsr_shutdown

      ps -ef | grep nsr

   b. Edit or create the **/nsr/res/servers** file:

      – Add the set of NetWorker servers, one per line, that require access to the client.

– For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

```
clus_vir1
clus_phys1
clus_phys2
```

Task 5: Configure the NetWorker cluster server

To configure the NetWorker server:

1. Log in as root on the cluster node that is running the NetWorker virtual server.

2. Start the NetWorker Console software.

   a. From the **Console** window, click **Enterprise**.

   b. From the left pane, select the **Enterprise** icon.

      The NetWorker server appears in the right and left panes.

   c. From the left pane, select the NetWorker server.

   d. From the right pane, select the NetWorker application.

   e. From the **Enterprise** menu, select **Launch Application**.

      The **Administration** window launches.

3. From the **Administration** window, click **Configuration**.

   a. In the left pane, select the NetWorker server.

   b. From the **File** menu, select **Properties**. The **Properties** dialog box appears.

      – For the **Administrator** attribute, add entries for any cluster nodes that are not already listed. For example:

      `root@hostname`

      – Click **OK**.

Task 6: Configure clients under the NetWorker cluster server

When the **networker.cluster** script runs, it creates a symbolic link named /nsr that points to a local disk. It also creates a second link named nsr.NetWorker.local that points to the local NetWorker directory. For example, if the local NetWorker directory was created in /var/nsr, each client member has these links:

◆ /nsr->/nsr.NetWorker.local

◆ /nsr.NetWorker.local->/var/nsr

To configure clients under the NetWorker cluster server:

1. (Optional) Define savegroups.

   Note: In order for their save sets to restart after a virtual client or NetWorker server failover, savegroups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new NetWorker client.

   b. Type the name of the physical client for the **Name** attribute.

   c. Add the boot adaptor name in the **Aliases** list.

3. Make each virtual client within the cluster a client of the virtual NetWorker server. For each virtual client in the cluster:

   a. Create a new client.

   b. Type the name of the service address for the **Name** attribute.

   c. For the **Remote Access** attribute, the user must be the root user for the boot address.

   d. Add entries for each service, boot, and physical address defined within the cluster. For example:

      ```
      root@clus_phys1
      ```

   e. For the **Group** attribute, select a group.

4. Run a test probe to verify that the **Client** and **Group** resources have been properly configured.

   On the node on which the NetWorker server resides, type:

   ```
   savegrp -pv -c client_name group_name
   ```

5. If the test probe does not display the scheduled backups and index, see "Tracking scheduled saves" on page 62.

Task 7: Register NetWorker licenses for virtual server failover

To register a NetWorker server in a cluster environment:

1. Ensure that the NetWorker virtual server is defined as a part of the cluster.

2. Ensure that the NetWorker service is running.

3. For each physical node in the cluster:

   a. Relocate, sequentially, the NetWorker server to this node.

   b. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

4. Log in to the system that is running the NetWorker virtual server and create the **/nsr/res/hostids** file. This file contains the host IDs of all the cluster nodes.

   Use this syntax:

   ```
   hostid1:hostid2:hostid3:...
   ```

   For example:

   ```
   12345678:87654321
   ```

5. Restart the server by taking the NetWorker virtual server offline and then putting it back online.

6. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

7. Register the NetWorker software.

Installing only the NetWorker client software in a cluster

Use this roadmap to install a NetWorker cluster client:

◆ "Task 1: Install the NetWorker cluster client software" on page 59
◆ "Task 2: Configure the NetWorker client software as highly available" on page 59
◆ "Task 3: Define the list of trusted NetWorker servers" on page 59
◆ "Task 4: Configure clients under the NetWorker server" on page 60

Note: Ensure that the NetWorker client software is installed on every node in the cluster that needs to be backed up.

Task 1: Install the NetWorker cluster client software

To install the NetWorker client software on each node in the cluster:

1. Ensure that the most recent HACMP for AIX patch is installed.

2. Install the NetWorker client software on every node in the cluster to be backed up.

The NetWorker Installation Guide provides detailed installation instructions.

Task 2: Configure the NetWorker client software as highly available

To define and configure a NetWorker client as highly available:

1. Log in as root on each node where the NetWorker software is being installed.

2. Ensure that the **/etc/hosts** file on each cluster node contains the name of the virtual host. The virtual hostname in a DNS or NIS can be published.

3. For each node in the cluster:

    a. Run the cluster configuration script, **networker.cluster**.

    b. When prompted to configure the NetWorker server, type **No**.

Note: If the configuration is not correct, any configuration can be undone by running the **networker.cluster -r** option. For an example of the script, see "Exit the SMIT program." on page 61.

Task 3: Define the list of trusted NetWorker servers

Before a NetWorker server can back up a client, the client must grant the server access. Granting access is controlled by the /nsr/res/servers file. If this file does not exist, any NetWorker server can back up this client. If this file does exist, only the specific servers listed in it can back up the client.

To define the list of trusted NetWorker servers, perform these steps on each node in the cluster:

1. Shut down the NetWorker processes and verify that all NetWorker daemons have stopped.

2. Edit or create the /nsr/res/servers file:

    a. Add the set of NetWorker servers, one per line, that require access to this client.

    b. For each NetWorker virtual server, add an entry for each physical host and the NetWorker virtual server. For example:

    clus_vir1

    clus_phys1

    clus_phys2

3. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option. If the **-s** option exists, remove all occurrences of the following in the file:

    -s *server_name*

Task 4: Configure clients under the NetWorker server

To configure the NetWorker server:

1. Make each physical client within the cluster a client of the NetWorker server.

    For each physical client in the cluster:

    a. Create a new client.

    b. Type the name of the physical client for the **Name** attribute.

    c. Add the boot adaptor name in the **Aliases** list.

    Note: If a physical Client is backed up to a NetWorker server outside the cluster, the name of any virtual service that can run on the physical node must be added to the **Remote Access** list of the physical Client property sheet.

2. Make each virtual client within the cluster a client of the NetWorker server.

    For each virtual client in the cluster:

    a. Create a new client.

    b. For the **Name** attribute, type the name of the NetWorker server.

    c. For the **Remote Access** attribute, add entries for each service, boot, and physical address defined within the cluster. For example:

    root@clus_phys1

    d. For the **Group** attribute, select a group.

3. Schedule backups by using NetWorker.

    Note: The NetWorker server might reside outside of the cluster.

Uninstalling the NetWorker software

To uninstall the NetWorker software from a cluster environment:

1. If necessary, use the cluster management software to stop the NetWorker server services.

2. Shut down the client services on the node with the NetWorker software to be removed:

   nsr_shutdown

   A list of NetWorker services appears and prompts you to continue with the **nsr_shutdown** command.

3. Run this command:

   /usr/bin/networker.cluster -r

4. Use **SMIT** to uninstall individual NetWorker software packages or all of the NetWorker packages at the same time.

5. To uninstall the NetWorker software, log in as root on the computer where the software is being removed.

6. Type this command to remove the NetWorker software:

   smitty remove

7. Select **F4=List** to display a list of NetWorker software packages.

8. Select the NetWorker software packages to remove, as indicated in Table 16 on page 61:

Table 16   **Removing NetWorker software packages**

For this NetWorker software package	Remove this file
Client software	LGTOnw.clnt.rte
Storage node	LGTOnw.node.rte
Server	LGTOnw.serv.rte
Man pages	LGTOnw.man.rte
NetWorker License Manager	LGTOnw.licm.rte

9. Press **[Return]** to uninstall the NetWorker software.

10. Exit the **SMIT** program.

Configuring an external client to a virtual server

If required, use this procedure to configure and back up an external client to a NetWorker virtual server.

Before a NetWorker server can back up a client, the client must grant the server access. Granting access is controlled by the /nsr/res/servers file. If this file does *not* exist, any NetWorker server can back up this client. If this file does exist, only the specific servers listed in it, can back up the client.

On each NetWorker client that is outside of the cluster:

1. Shut down the NetWorker processes and verify that all NetWorker daemons have stopped.

2. Edit or create the /nsr/res/servers file:

   a. Add the set of NetWorker servers, one per line, that require access to this client.

   b. For each virtual NetWorker server, add an entry for each physical host and the virtual NetWorker server. For example:

      clus_vir1

      clus_phys1

      clus_phys2

Scheduling saves for raw volumes

To enable NetWorker scheduled saves of raw volumes that are owned by a resource group (virtual client), flag the logical volume as follows:

1. Ensure that the volume group to which the logical volume belongs appears under Volume Groups in the resource group configuration.

2. Set the logical volume type to **raw** by using the **chlv** command. For example:

   chlv -t 'raw' *logical_volume_name*

   In this example, the logical volume **ha_rv**, that belongs to the volume group **havg**, will be used as a raw device:

   ```
   chlv -t'raw' ha_rv
   lsvg -l havg
   havg:
   ```

Note: The NetWorker software does *not* support raw volumes used for concurrent access.

Tracking scheduled saves

To verify that the Client and Group resources are properly configured, run a test probe for each client from the node where the NetWorker application is running:

   savegrp -pv -c *client_name group_name*

If the test probe does not display all the scheduled save sets:

◆ Check the cluster configuration by using the cluster management software. If necessary, reconfigure the cluster.

◆ Ensure that the save sets defined for the client are owned by that client. If necessary, redistribute the client save sets to the appropriate **Client** resources.

Note: Misconfiguration of the Cluster resources might cause scheduled save sets to be dropped from the backup. The *EMC NetWorker Administration Guide* provides more information.

◆ Type this command to override scheduled save rules (not path ownership rules):

    touch networker_bin_dir/pathownerignore

◆ Run a second test probe to verify the configuration.

    This command allows any path to be backed up for a client, whether it is owned by the virtual client or physical node. The *EMC NetWorker Administration Guide* provides more information.

If the **pathownerignore** command was used, check that the NetWorker scheduled save uses the correct client index. If the wrong index is used, the save sets can be forced to go to the correct index:

1. From the **NetWorker Administration** window, select a client and edit its properties.

2. For the **Backup Command** attribute, type the name of a backup script that contains
   save -c *client_name*

    The *EMC NetWorker Administration Guide* provides details about the **Backup Command** attribute.

EMC NetWorker Release 7.4 Service Pack 1 Multiplatform Version Cluster Installation Guide

5

MC/ServiceGuard and/or MC/LockManager Installation

This chapter includes the following sections:

Software installation roadmap

Use the following roadmap when installing the NetWorker software in an HP-UX MC/ServiceGuard or HP-UX MC/LockManager cluster environment.

1. Review "Installation requirements" on page 66 and note the default directory location.

2. Install the required NetWorker software by following one of these procedures:
   - "Installing a highly available NetWorker cluster-aware server" on page 68.
   - "Installing only the NetWorker client software in a cluster" on page 73

3. Enable and register all of the NetWorker products. Chapter 10, "Licensing and Enabling the Software," provides detailed information.

Installation requirements

This section specifies the software and hardware required for setting up NetWorker software as a highly available application within an HP-UX MC/ServiceGuard or HP-UX MC/LockManager cluster environment:

- "Software requirements" on page 66
- "Hardware requirements" on page 66
- "System information requirements" on page 67

The EMC Information Protection Software Compatibility Guide provides the most up-to-date information about software and hardware requirements.

Software requirements

The following software must be installed on each node in the cluster:

- HP-UX 10.20 or 11.*x*
- HP-UX MC/ServiceGuard, release 10.05 or later, HP-UX MC/ServiceGuard OPS Edition for HP-UX 11.*x*, or HP-UX MC/LockManager, release 10.06, 10.07, or 10.07.01
- NetWorker release 7.4 Service Pack 1

Hardware requirements

The following hardware requirements must be met:

- A dedicated shared disk used as the NetWorker storage area (for the /nsr directory) must be connected to all the nodes within the cluster (for server installation only).
- A device with local affinity for the local bootstrap backup (server installation only).

System information requirements

Figure 4 on page 67 and Table 17 on page 67 display the system information needed to install the NetWorker cluster server.

Private Network
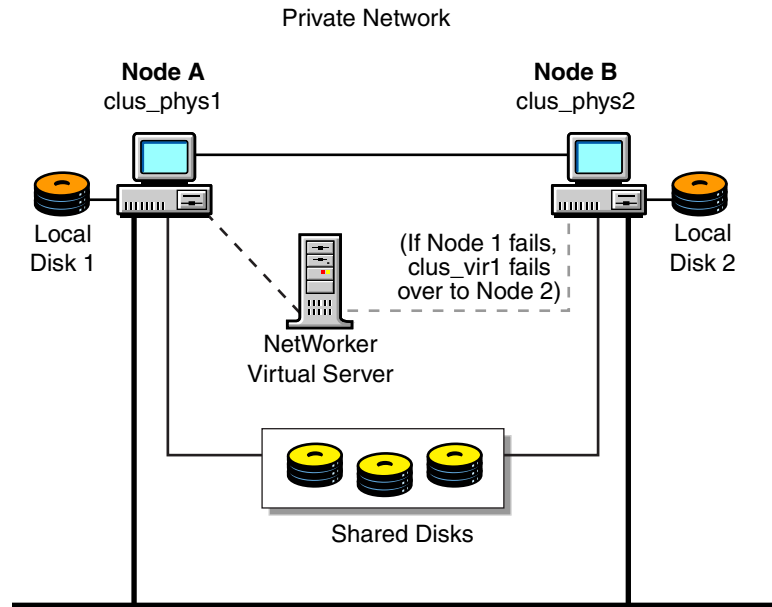
Figure 4   Sample cluster configuration

Table 17   Required Information

Required information	Example
NetWorker virtual name with one or more IP addresses	clus_vir1,192.168.109.41
NetWorker package mount point for logical volume	/vg011
Shared storage disk logical volume	/dev/vg01/lvol1
NetWorker control script (provided by EMC)	/etc/cmcluster/networker/legato.control
File containing the host IDs of all the cluster members	/nsr/res/hostids
NetWorker monitor script (provided by EMC)	/opt/networker/bin/legato.monitor
EMC *nsr* cluster file	/etc/cmcluster/.nsr_cluster

Note: In order to run HP-UX MC/LockManager within a cluster, the /etc/cmcluster/.nsr_cluster map file must be installed. "Task 3: Configure the .nsr_cluster file" on page 69 provides more information.

Different operating systems use different terms for the same cluster concepts. HP-UX MC/ServiceGuard and HP-UX MC/LockManager refer to:

◆   Physical hosts as nodes

◆   Virtual server as a package

Installing a highly available NetWorker cluster-aware server

Use the following roadmap to install and configure NetWorker as a highly available application in a cluster:

Task 1: Install the NetWorker software within a cluster

The NetWorker server software must be installed on all nodes in the cluster to provide failover support. Use the **swinstall** utility to install the NetWorker software within a cluster environment.

To install the NetWorker server software:

1. Log in as root.

2. Ensure that the latest HP-UX file descriptor patches are installed.

3. To ensure that the NetWorker software is operating with consistent and proper settings:

   a. Set the **nfile** value according to the following formula:

      The **nfile** setting + (*number of expected concurrent save times)*. The Number is a minimum of 50.

      For example:
      ```
      nfile = 1 X 50
      ```
      where *1* is the number of expected concurrent save sets.

   b. Increase the **maxfiles** and **maxfile_lim** values to the following:

      – *maxfiles* should be set at least 200.
      – *maxfile_lim* should be set at least 2,048.

      If the current values for these parameters are higher than the numbers stated, there is no need to adjust these parameters.

4. Change directories to the location of the NetWorker software distribution files:

   • If installing from a local or remote CD-ROM, mount the NetWorker CD-ROM, and then change directories to where it is mounted.

   • If installing from a downloaded web file, change to the directory from where the installation files from the download package are extracted.

   The NetWorker Installation Guide provides installation instructions.

5. Select the following packages from the NetWorker distribution CD-ROM:

    • **NWr-Client**

    • **NWr-Node**

    • **NWr-Server**

    > **Note:** To install the NetWorker server within a cluster, install the **NWR-Node** software. Installing the NetWorker software storage node does not, however, provide support for shared devices other than file devices on shared disks.

6. Select **Install** from the **Actions** menu to run an install analysis.

    To verify the status of the install analysis:

    a. Click **Logfile** to check the log file to verify that **swinstall** did not find errors.

    b. Correct any errors or problems before proceeding with the installation.

7. To proceed with the installation, click **OK** in the **Install Analysis** window, and then click **Yes** in the confirmation dialog box.

    The **Install** window displays the status of the installation when completed.

8. In the **Install** window, click **Logfile** to check the log file for error or warning messages generated during installation.

9. Type this command to start the NetWorker services:

    /opt/networker/bin/nsrexecd

10. Type this command to verify that the NetWorker services are running:

    ps -ef | grep nsr

    The **nsrexecd** daemon should be running.

Task 2: Create the NetWorker.clucheck file

In the /etc/cmcluster directory, create the following file:

NetWorker.clucheck

Task 3: Configure the .nsr_cluster file

The NetWorker client software must determine an owning host for any paths that it saves. The NetWorker software determines which mount points an MC/ServiceGuard or MC/LockManager package owns by the entries in the .nsr_cluster file, located in the /etc/cmcluster/ directory. The .nsr_cluster file should have an entry for the NetWorker shared mount point, which is owned by the NetWorker package.

To configure the .nsr_cluster file:

1. Add the name and path of each mount point to the file in the following format:

    pkgname:*published_ip_address***:***owned_path* **[:...]**

    where *published_ip_address* is the address assigned to the package owning a shared disk.

2. Ensure that the ownership and access permissions for the .nsr_cluster file are "read" for World.

3. Additional paths, preceded by colons, can be added as required. The following is an example of a typical .nsr_cluster file:

```
/etc/cmcluster/.nsr_cluster file. networker:192.168.109.41:/vg011

oracle:192.168.109.10:/vg021:/ora_data1:/ora_data2
```

Note: If an HP-UX MC/ServiceGuard package does not contain a disk resource, it does not require an entry in the .nsr_cluster file. However, if this diskless package is online and the only package on that cluster node, there might be **cmgetconf** messages generated in the var/admin message file during the backup.

To avoid these messages, allocate a file system that is mounted to a mount point and add this mount point along with the package name and IP address into the **.nsr_cluster** file in the format shown above. This file system is not backed up, but should be mountable on each cluster node that the diskless package might fail over to.

Task 4: Define NetWorker software as highly available

Note: Use the LVM to define the logical volumes or volume groups the NetWorker software will use. The HP-UX documentation provides more information regarding this procedure.

To define and configure the NetWorker software as highly available:

1. Run the **networker.cluster** script (located in the /opt/networker/bin directory) on one of the nodes where the NetWorker software is installed.

2. Follow the prompts to configure the NetWorker package.

   The **networker.cluster** script creates a **pkg.conf** file and a **legato.control** file on the physical host on which it is running.

3. Copy the **legato.control** file to all the nodes in the cluster and ensure that you set execute permissions.

4. After the **legato.control** file is copied to all the nodes in the cluster, run the **networker.cluster** script on the remaining nodes in the cluster. When the script prompts you to generate a **legato.control** file, type **n**.

5. Check each node to determine if the **nsrexecd** daemon is running:

   ```
   ps -ef | grep nsrexecd
   ```

6. Check each node to determine if the legato.control file was successfully installed on each node:

   ```
   cd /etc/cmcluster/networker
   more legato.control
   ```

7. On the node on which the **networker.cluster** script was initially run:

   a. Determine if the **pkg.conf** file was installed correctly:

      ```
      cd /etc/cmcluster/networker
      cmcheckconf -P pkg.conf
      cmapplyconf -P pkg.conf
      ```

   b. Run the package:

      ```
      cmrunpkg networker
      cmmodpkg -e networker
      ```

Task 5: Define the list of trusted NetWorker servers

To define the list of trusted NetWorker servers:

1. On one node in the cluster, shut down the NetWorker service by using the cluster management software.

2. On each node in the cluster:

   a. Edit or create the /nsr/res/servers file and add the set of NetWorker servers, one per line, that requires access to this client.

   b. Ensure that the first entry in this file is the virtual hostname for the NetWorker service. This entry becomes the default NetWorker server.

      Note: If the /nsr/res/servers file is empty or does not exist, any NetWorker server is authorized to:
      - Access and backup the client.
      - Perform a directed recovery to the client.

   c. Check the NetWorker boot-time startup file for **nsrexecd -s** arguments and delete any that exist. The **nsrexecd -s** argument supersedes the **/nsr/res/servers** file.

      For example, delete the arguments for **nsrexecd -s** in the following file:

      ```
      vi /sbin/init.d/networker
      nsrexecd -s venus -s mars
      ```

      The **nsrexecd** daemon named in the file should appear only as:

      ```
      nsrexecd
      ```

   d. Use the NetWorker boot-time startup file to stop and restart the NetWorker software, as follows:

      ```
      /sbin/init.d/networker stop
      /sbin/init.d/networker start
      ```

3. On one node in the cluster, start the NetWorker service by using the cluster management software.

4. On the node that is running the NetWorker server:

   a. Edit or create the /nsr/res/servers file and add the set of NetWorker servers, one per line, that requires access to this client.

   b. Ensure that the first entry in this file is the virtual hostname for the NetWorker service. This entry becomes the default NetWorker server.

   c. Shut down and restart the NetWorker service by using the cluster management software.

Task 6: Configure the cluster server

To configure the NetWorker cluster server:

1. Log in to the cluster node that is running the NetWorker package.

2. Modify the /etc/hosts file to add the following name as an alias to the virtual hostname of the NetWorker server:

   nsr host

   Repeat this step on all relevant nodes.

3. Publish this name in the DNS or NIS.

This ensures that the NetWorker software attempts to connect to the designated NetWorker server.

4. Modify the Server resource:

a. From the **Administration** window, select **File>Properties**.

b. For the **Administrator** attribute, add entries for any cluster nodes that are not already listed. For example:

   root@hostname

c. Click **OK**.

Task 7: Make a cluster node a client of the NetWorker cluster server

When the NetWorker client software is installed on a node, the installation creates a symbolic link, **/nsr.NetWorker.local**, that points to the directory containing the NetWorker configuration files. It also creates a link, /nsr, pointing to the **/nsr.NetWorker.local**. For example, if the local NetWorker directory was created in /var/nsr, each client member has the following links after the installation:

◆ /nsr->/nsr.NetWorker.local

◆ /nsr.NetWorker.local->/var/nsr

To make the cluster node a client of the NetWorker cluster server:

1. (Optional) Define save groups.

   Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical node within the cluster a client of the NetWorker virtual server:

   For each physical client in the cluster:

   a. Create a new NetWorker client.

   b. For the **Name** attribute, type the name of the physical client.

3. Make each virtual host within the cluster a client of the NetWorker virtual server.

   For each virtual client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the virtual client.

   c. In the **Remote Access** attribute, type the user@hostname of each physical node within the cluster. For example:

      root@clus_phys1

   d. For the **Group** attribute, select a group.

   The first time the NetWorker application runs, it creates the Client resource for the NetWorker virtual server.

4. Run a test probe to verify that the Client and Group resources have been properly configured.

    On the node on which the NetWorker server resides, run this command:

    savegrp -pv -c *client_name group_name*

    If the test probe does not display the scheduled backups and index, see "Tracking scheduled saves" on page 77 for more information.

Task 8: Register NetWorker licenses for cluster server failover

To register a NetWorker server in a cluster environment:

1. Ensure that the NetWorker virtual server is defined as a part of the cluster.

2. Ensure that the NetWorker service is running.

3. For each physical node in the cluster:

    a. Relocate, sequentially, the NetWorker server to this node.

    b. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

4. Log in to the system that is running the NetWorker virtual server and create a file named **/nsr/res/hostids** that contains the host IDs of all the cluster nodes.

    Use the following syntax:
    hostid1:hostid2:hostid3:...

    For example:
    12345678:87654321

5. Restart the server by taking the NetWorker virtual server offline and then putting it back online.

6. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

7. Register the NetWorker software.

Installing only the NetWorker client software in a cluster

Use the following roadmap to install the NetWorker cluster client:

◆ "Task 1: Install the NetWorker cluster client software" on page 74

◆ "Task 2: Create the NetWorker.clucheck file" on page 74

◆ "Task 3: Configure the .nsr_cluster file" on page 75

◆ "Task 4: Define the list of trusted NetWorker servers" on page 75

◆ "Task 5: Make a cluster node a client of the NetWorker server" on page 76

Note: Install the NetWorker client software on every node in the cluster that needs to be backed up.

Task 1: Install the NetWorker cluster client software

To install the NetWorker software on each node in the cluster:

1. Log in as root.

2. Ensure that the latest HP-UX file descriptor patches are installed.

   Note: To ensure that the NetWorker software is operating with consistent and proper settings:

   a. Set the **nfile** value according to the following formula:

   The **nfile** setting + (*number of expected concurrent save times*). The Number is a minimum of 50

   For example:
   ```
   nfile = 1 X 50
   ```

   where *1* is the number of expected concurrent save sets.

   b. Increase the **maxfiles** and **maxfile_lim** values to the following:

   – *maxfiles* should be set at least 200.
   – *maxfile_lim* should be set at least 2,048.

   If the current values for these parameters are higher than the numbers stated, there is no need to adjust these parameters.

3. Select only the **NW-Client** package.

4. Select **Install** (analysis) from the **Actions** menu to run an install analysis.

   To verify the status of the install analysis:

   a. Click **Logfile** to check the log file to verify that **swinstall** did not find errors.

   b. Correct any errors or problems before proceeding with the installation.

5. To proceed with the installation, click **OK** in the **Install Analysis** window, and then click **Yes** in the confirmation dialog box.

   The **Install** window displays the status of the installation. When the installation is finished, the **Status** field displays **Completed**.

6. Click **Logfile** to check the log file in the **Install** window, for error or warning messages generated during installation.

7. Type this command to start the NetWorker services:

   /sbin/init.d/networker start

8. Type the following command to verify that the NetWorker services are running:

   ps -ef | grep nsr

   The **nsrexecd** daemon should be running.

Task 2: Create the NetWorker.clucheck file

In the /etc/cmcluster directory, create the following file:

NetWorker.clucheck

Task 3: Configure the .nsr_cluster file

The NetWorker client software must determine an owning host for any paths that it saves. The NetWorker software determines which mount points an MC/ServiceGuard or MC/LockManager package owns by the entries in the .nsr_cluster file, located in the /etc/cmcluster/ directory.

Note: If an HP-UX MC/ServiceGuard package does not contain a disk resource, it does not require an entry in the .nsr_cluster file. However, if this diskless package is online and the only package on that cluster node, there might be cmgetconf messages generated in the **var/admin** message file during the backup.

To avoid these messages, allocate a file system that is mounted to a mount point and add this mount point along with the package name and IP address into the **.nsr_cluster** file in the format shown above. This file system is not backed up, but should be mountable on each cluster node that the diskless package might failover to.

To configure the .nsr_cluster file:

1. Add the name and path of each mount point to the file in the following format:

    pkgname:*published_ip_address***:***owned_path* **[:...]**

    where *published_ip_address* is the address assigned to the package owning a shared disk.

2. Ensure that the ownership and access permissions for the .nsr_cluster file are "read" for World.

3. Additional paths, preceded by colons, can be added as required. The following is an example of a typical **.nsr_cluster** file:

    ```
    /etc/cmcluster/.nsr_cluster file. networker:192.168.109.41:/vg011

    oracle:192.168.109.10:/vg021:/ora_data1:/ora_data2
    ```

Task 4: Define the list of trusted NetWorker servers

To define the list of trusted NetWorker servers, one each node in the cluster:

1. Edit or create the /nsr/res/servers file and add the set of NetWorker servers, one per line, that requires access to this client.

    Note: If the /nsr/res/servers file is empty or does not exist, any NetWorker server is authorized to:
    - Access and backup the client.
    - Perform a directed recovery to the client.

2. Check the NetWorker boot-time startup file for **nsrexecd -s** arguments and delete any that exist. The **nsrexecd -s** argument supersedes the **/nsr/res/servers** file.

    For example, delete the arguments for **nsrexecd -s** in the following file:

    vi /sbin/init.d/networker

    nsrexecd -s venus -s mars

    The **nsrexecd** daemon named in the file should appear only as:

    nsrexecd

3. Use the NetWorker boot-time startup file to stop and restart the NetWorker software, as follows:

```
/sbin/init.d/networker stop
/sbin/init.d/networker start
```

Task 5: Make a cluster node a client of the NetWorker server

When the NetWorker client software is installed on a node, the installation creates a symbolic link, **/nsr.NetWorker.local**, that points to the directory containing the NetWorker configuration files. It also creates a link, /nsr, pointing to the **/nsr.NetWorker.local**. For example, if the local NetWorker directory was created in /var/nsr, each client member has the following links after the installation:

- /nsr->/nsr.NetWorker.local
- /nsr.NetWorker.local->/var/nsr

To make the cluster node a client of the NetWorker server:

1. (Optional) Define save groups as required.

   Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the physical client.

   Note: If a physical client is backed up to a NetWorker server outside the cluster, the name of any virtual service that can run on the physical node must be added to the **Remote Access** list of the physical Client resource.

3. Make each virtual client within the cluster a client of the NetWorker server. For each virtual client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the NetWorker server.

   c. In the **Remote Access** attribute, type the user@hostname of each physical node within the cluster. For example:

   ```
   root@clus_phys1
   ```

   d. For the **Group** attribute, select a group.

   e. Define the remaining attributes in the **Client** window, and then click **Apply**.

4. Schedule backups by using the NetWorker application.

5. Run a test probe to verify that the Client and Group resources have been properly configured.

   On the node on which the NetWorker server resides, type:

   ```
   savegrp -pv -c client_name group_name
   ```

   If the test probe does not display the scheduled backups and index, see "Tracking scheduled saves" on page 77 for more information.

Uninstalling the NetWorker software

To remove the NetWorker software from a cluster environment:

1. Halt the NetWorker package:

   cmhaltpkg networker

2. Shut down the client services on each node from which the NetWorker software is being removed:

   `nsr_shutdown`

3. To keep the NetWorker server software in the cluster, migrate it to another node in the cluster, type:

   cmrunpkg -n *clus_phys1* **-v** *networker*

   To avoid running the NetWorker server software in the cluster, proceed to step 6.

4. Run this command:

   /opt/networker/bin/networker.cluster -r

5. Remove the following file from the /etc/cmcluster directory:

   NetWorker.clucheck

6. Remove the NetWorker package software. The *EMC NetWorker Installation Guide* provides information on how to uninstall the software.

Tracking scheduled saves

To verify that the Client and Group resources are properly configured, run a test probe for each client from the node where the NetWorker application is running:

   savegrp -pv -c *client_name group_name*

If the test probe does not display all the scheduled save sets:

◆ Check the cluster configuration by using the cluster management software. If necessary, reconfigure the cluster.

◆ Ensure that the save sets defined for the client are owned by that client. If necessary, redistribute the client save sets to the appropriate **Client** resources.

   Note: Misconfiguration of the Cluster resources might cause scheduled save sets to be dropped from the backup. The *EMC NetWorker Administration Guide* provides more information.

◆ Type this command to override scheduled save rules (not path ownership rules):

   touch networker_bin_dir/pathownerignore

◆ Run a second test probe to verify the configuration.

   This command allows any path to be backed up for a client, whether it is owned by the virtual client or physical node. The *EMC NetWorker Administration Guide* provides more information.

If the **pathownerignore** command was used, check that the NetWorker scheduled save uses the correct client index. If the wrong index is used, the save sets can be forced to go to the correct index:

1. From the **NetWorker Administration** window, select a client and edit its properties.

2. For the **Backup Command** attribute, type the name of a backup script that contains
   `save -c` *client_name*.

   The *EMC NetWorker Administration Guide* provides details about the **Backup Command** attribute.

Microsoft Cluster Server (MSCS) Installation

This chapter includes these sections:

Cluster terminology

NetWorker documentation uses the following cluster terminology:

◆ Node — A physical computer that is a member of a cluster.

◆ Private disk — A local disk on a cluster node. A private disk is not available to other nodes within the cluster.

◆ Shared disk — A disk that is shared by the cluster nodes.

◆ Failover — A means of ensuring application availability by relocating resources in the event of a hardware or software failure. Two-node failover capability allows operations to switch from one cluster node to the other. Failover capability can also be used as a resource management tool.

◆ Highly available application — An application that is installed in a cluster environment and configured for failover capability.

◆ Cluster-aware NetWorker server — A NetWorker server that can recognize cluster clients.

◆ Cluster client — A NetWorker client within a cluster; this can be either a virtual client, or a NetWorker Client resource that backs up the private data that belongs to one of the physical nodes.

◆ Virtual client — A NetWorker Client resource that backs up data that belongs to a highly available service or application within a cluster. Virtual clients can fail over from one cluster node to another.

◆ Stand-alone server — A NetWorker server that is running within a cluster, but *not* configured as a highly available application. A stand-alone server does not have failover capability.

◆ Virtual server — A NetWorker server that is configured to run as a highly available application. A virtual server can fail over from one cluster node to another.

Installation requirements

This section specifies the software and hardware required to install and configure the NetWorker server and client software within a MSCS environment. The MSCS software must be installed in a Microsoft certified hardware configuration.

All nodes must have one of the following installed:

◆ Microsoft Windows Server 2003, Standard, Enterprise, and Datacenter Editions, 32-bit version, two-node and four-node support, NetWorker server support

◆ Microsoft Windows Server 2003, Enterprise or Datacenter Edition, 32-bit version, two-node and four-node support, NetWorker client support

◆ Microsoft Windows 2000, Advanced Server or Datacenter with the latest service pack installed, two-node support, NetWorker server and client support

Note: If a Windows 2000 service pack earlier than SP3 is used, the Microsoft Gethostbyaddr( ) patch must be applied (available from Microsoft Product Support Services).

◆ Microsoft Windows NT 4.0 Server, Enterprise Edition, with MSCS and the latest service pack installed, NetWorker client support

◆ NetWorker software must always be installed on the private disk of a node.

Updating NetWorker software

Note: For more information about MSCS, and detailed procedures for using the Microsoft Management Console (MMC) Cluster Administrator snap-in, refer to the Microsoft documentation.

To update the NetWorker server software in an MSCS environment, on one node in the cluster:

1. In the **Cluster Administrator** program, take the **NetWorker** server Cluster resource group offline.

2. Rename the NetWorker_install_path>\bin\NetWorker.clustersvr file to NetWorker_install_path>\bin\NetWorker.nocluster.

3. Update the **NetWorker** software. The NetWorker Installation Guide provides instructions.

4. Stop the **NetWorker Backup and Recover Server** service.

5. Open the **NetWorker Backup and Recover Server Properties** dialog box and change the startup type from **Automatic** to **Manual**.

6. Rename the **NetWorker.nocluster** file **NetWorker.clustersvr**.

7. On the second node of the cluster:

   a. Rename the NetWorker_install_path>\bin\NetWorker.clustersvr file to NetWorker_install_path>\bin\NetWorker.nocluster.

   b. Update the NetWorker software.

   c. Stop the **NetWorker Backup and Recover Server** service.

   d. Open the **NetWorker Backup and Recover Server Properties** dialog box and change the startup type from **Automatic** to **Manual**.

   e. Rename the NetWorker.nocluster file back to NetWorker.clustersvr.

8. Bring the NetWorker server Cluster resource group back online.

NetWorker server installation

Microsoft documentation provides information about MSCS and detailed procedures for using the MMC Cluster Administrator snap-in.

Installing a NetWorker server for noncluster mode

To run the NetWorker server in noncluster mode within a cluster, the NetWorker server software must be installed as a stand-alone application. The NetWorker Installation Guide provides detailed installation instructions.

Note: If you install NetWorker software without rebooting, running the cluster administrator for the first time can result in an error due to the cluster administrator extension DLL not being reloaded. If this error occurs, close the cluster administrator interface and run the following from the command line to reload the the following:

```
regsvr32 /u nsrdresex.dll
```

In this configuration, the NetWorker server software is usually installed on only one of the nodes in the cluster, and the NetWorker client software is installed on each node in the cluster.

The following rules apply:

◆ No failover of the NetWorker server takes place.

◆ The NetWorker server does not have to be configured as a resource managed by the cluster.

◆ The cluster service might or might not be running.

Installing a NetWorker server for cluster mode

The following sections explain how to configure a NetWorker server as a highly available application in MSCS:

◆ "Task 1: Install the NetWorker software" on page 82

◆ "Task 2: Create and register the cluster resource type" on page 83

◆ "Task 3: Verify the NetWorker server resource type" on page 83

◆ "Task 4: Create an MSCS group resource and required components resource" on page 83

◆ "Task 5: Bring the NetWorker Server resource online" on page 85

◆ "Task 6: Configure the NetWorker virtual server" on page 86

◆ "Task 7: Configure clients on the NetWorker cluster server" on page 86

Task 1: Install the NetWorker software

On each node in the cluster, install NetWorker software in the same location on a private disk.

To install the software:

1. Log in as administrator to the node where you will install NetWorker software

2. On one node in the cluster, complete the installation. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

3. On the second node in the cluster:

   a. Complete the installation.

   b. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

The NetWorker Installation Guide provides detailed installation instructions.

Note: The host ID is needed for the procedure "Registering NetWorker licenses for cluster failover" on page 89.

Task 2: Create and register the cluster resource type

To create and register the cluster resource type:

1. Verify that NetWorker server software is installed in the same location on each node in the cluster.

2. On one of the cluster nodes, type:

   regcnsrd -c

   This creates the NetWorker Server cluster resource type. It also registers the resource extension module so the NetWorker Server resource type can be managed from this node.

3. On the second cluster node, type:

   regcnsrd -r

   If prompted with the following, type **Y**:

   ```
   Is this machine a member of the cluster on which you want to
   register Resource Extension for NetWorker Server resource?
   ```

   This registers the resource extension module so the NetWorker Server resource type can be managed from this node.

Task 3: Verify the NetWorker server resource type

To verify that a **NetWorker Server** resource type exists:

1. In the **Cluster Administrator** program, select **Resource Type** under the **Cluster Configuration**.

2. Verify that **NetWorker Server** is listed as a resource type.

The resource types: IP Address and Network Name define the NetWorker server's virtual identity. The Physical Disk resource type is for the shared nsr directory.

Task 4: Create an MSCS group resource and required components resource

To create the NetWorker virtual server Group resource:

1. In the **Cluster Administrator** program, select the **Disk Group** in the **Groups** folder that contains the shared disk to associate with the NetWorker server. You can rename this **Disk Group**. For this procedure, the Disk Group was renamed to **NetWorker Group**.

   Note: The NetWorker server must have its own dedicated Shared Disk resource. The cluster service quorum disk cannot be used for this.

2. Select the **NetWorker Group** (Disk Group) that was identified in the previous step and create the following resources for the NetWorker Group:

   • "NetWorker IP Address resource" on page 84
   • "NetWorker Network Name resource" on page 84
   • "NetWorker Server resource" on page 85

   Note: Do not create multiple instances of the NetWorker Server resources. Creating more than one instance of a NetWorker Server resource interferes with how the existing NetWorker Server resources function.

NetWorker IP Address resource

To create a NetWorker IP Address resource:

1. In the **Cluster Administrator** program, select **File>New>Resource**.

2. Complete the following attributes:

   Name: **NSR_IP**

   Description: **NetWorker IP Address**

   Resource Type: **IP Address**

   Group: **NetWorker Group**

   Note: For the **Name** attribute, type any descriptive name (without spaces). For the **Description** attribute, type any descriptive text.

3. Click **Next**. In the **Possible Owners** dialog box, type the hostname of each required node in the cluster. For example:

   Possible Owners: uranus, pluto

4. Click **Next**. In the **Dependencies** dialog box, specify the shared disk you associated with the NetWorker virtual server. For example:

   Dependencies: Disk P:

5. Click **Next**. In the **TCP/IP Address Parameters** dialog box, type the IP address of the NetWorker virtual server. For example:

   10.0.0.4

NetWorker Network Name resource

To create a NetWorker Network Name resource:

1. In the **Cluster Administrator** program, select **File**>**New**>**Resource**.

2. Complete the following attributes:

   Name: **NSR_NetworkName**

   Description: **NetWorker Network Name**

   Resource Type: **Network Name**

   Group: **NetWorker Group**

   Note: For the **Name** attribute, type any descriptive name (without spaces). For the **Description** attribute, type any descriptive text.

3. Click **Next**. In the **Possible Owners** dialog box, type the hostname of each required node in the cluster. For example:

   Possible Owners: pluto, uranus

4. Click **Next**. In the **Dependencies** dialog box, type the name of the **NetWorker IP Address** resource. For example:

   Dependencies: NSR_IP

5. Click **Next**. In the **Network Name Parameters** dialog box, type the name of the NetWorker virtual server. For example:

   Name: neptune

NetWorker Server resource

To create a NetWorker Server resource:

1. In the **Cluster Administrator** program, select **File**>**New**>**Resource**.

2. Complete the following attributes:

   ```
   Name: NSR_Server

   Description: NetWorker Server Resource

   Resource Type: NetWorker Server

   Group: NetWorker Group
   ```

   Note: For the Name attribute, type any descriptive name (without spaces). For the Description attribute, type any descriptive text. For the Resource Type attribute, type the name of the resource type created in "Task 2: Create and register the cluster resource type" on page 83.

3. Click **Next**. In the **Possible Owners** dialog box, type the hostname of each required node in the cluster. For example:

   ```
   Possible Owners: pluto, uranus
   ```

4. Click **Next**. In the **Dependencies** dialog box, type the name of the NetWorker Network Name resource. For example:

   ```
   Dependencies: NSR_NetworkName
   ```

5. Click **Next**. In the **NetWorker Server Parameters** dialog box, complete the following attributes:

   ```
   Server Name: (leave blank)

   NsrDir: P:\nsr

   Additional Arguments: (leave blank)
   ```

   Note: The directory path entered for the NsrDir attribute must reside on the NetWorker server shared disk.

6. After completing these steps, a message appears indicating that the resource was successfully created. Verify that a new **NetWorker Server** type resource was created in the selected resource group.

   Note: The MSCS software provides an option to set up an application of the Generic Application type within a Group resource. Do not create a Generic Application resource for the NetWorker virtual server.

Task 5: Bring the NetWorker Server resource online

To bring the NetWorker Server resource online:

1. In the **Cluster Administrator** program, select the resource group where the NetWorker Server resource exists.

2. Select the **NetWorker Server** resource.

3. Select **Bring Online** from the **File** menu to bring the NetWorker server online. The state of the **NetWorker Server** resource changes to **Online Pending**.

4. Wait until the state of the **NetWorker Server** resource changes to **Online**.

These steps stop the **NetWorker Remote Exec** service and restart all of the NetWorker services.

Task 6: Configure the NetWorker virtual server

To configure the NetWorker virtual server:

1. Log in to the cluster node that is running the NetWorker virtual server.

2. From the **Administration** window, select **File>Properties**.

   a. For the **Administrator** attribute, add entries for any cluster nodes that are not already listed. For example:

   administrator@cluster_phy1

   b. Click **OK**.

   Note: To specify which NetWorker servers can back up a particular client, edit the NetWorker_install_path\res\servers file and add the NetWorker virtual host and each cluster node.

Task 7: Configure clients on the NetWorker cluster server

To configure a NetWorker client to back up the quorum data:

1. In the **Cluster Administrator** program, verify that the same physical node owns the cluster group and quorum disk.

2. Select the disk group that contains the quorum disk.

3. Drag the quorum disk to the cluster group.

To configure the NetWorker Client resource:

1. Log in to the cluster node that is running the NetWorker virtual server.

2. Add the NetWorker virtual server to the hosts file on each node (located in %SystemRoot%\system32\drivers\etc).

3. Start the **NetWorker Management Console** software.

   Make each physical node within the cluster a client of the NetWorker virtual server. For each physical node in the cluster:

   a. Create a new **Client** resource.

   b. For the **Name** attribute, type the name of the physical host.

   The *NetWorker Administration Guide* details how to create a Client resource.

4. Make each virtual server within the cluster a client of the NetWorker virtual server. For each virtual node in the cluster:

   a. Create a new **Client** resource.

   b. For the **Remote Access** attribute, type the user@hostname of each physical node within the cluster.

5. Define one or more **NetWorker Group** resources to include the NetWorker virtual server and each of the physical nodes in the cluster:

   a. Create the necessary groups and define their attributes as appropriate.

   b. For each group, select **Enabled** for the **Autorestart** attribute.

   c. For each group, ensure that **Manual Restart** is *not* selected in the **Options** attribute (under the **Preferences** tab).

Note: The only save sets that restart after a virtual client failover are those that belong to a group in which **Autorestart** is enabled and **Manual Restart** is disabled.

6. Run a test probe to verify that the **Client** and **Group** resources are properly configured. On the node on which the NetWorker server resides, run this command:

    savegrp -pv -c *client_name group_name*

    If the expected scheduled backups and index do *not* appear, perform the following workaround:

    a. Create an empty file named **pathownerignore** in the directory where the NetWorker **savefs** command is installed (the default location is NetWorker_install_path\bin). This allows a valid save set to be scheduled for backup for a NetWorker client.

        This file must be created on each NetWorker server and NetWorker client host in the cluster.

    b. To bypass the default ownership scheduling rules, run this command:

        echo NUL: > NetWorker_install_path\bin\pathownerignore

        This command allows any path to be scheduled for backup for a NetWorker client.

        Note: A NetWorker scheduled save might use a client index name other than the one you want it to. To override this default, run a manual save with the **-c** option:
        save -c *client_name*
        To restrict the set of NetWorker servers that can back up a particular client, edit the **NetWorker_install_path\res\servers** file to add the NetWorker virtual host as well as each cluster node to the list of servers.

After the client configuration is complete:

◆ The NetWorker cluster server uses the IP address of the NetWorker virtual host, regardless of which cluster node currently masters the NetWorker virtual server.

◆ The NetWorker cluster server takes the identity of the NetWorker virtual server's hostname, regardless of which cluster node is currently running the NetWorker service.

◆ The first time NetWorker software runs, it creates the Client resource for the NetWorker virtual host. Client resources must be created manually for any cluster node that is to be backed up by the NetWorker virtual host.

Configuring a backup device for the NetWorker virtual server

The NetWorker virtual server must be configured with storage node backup devices. The storage nodes the NetWorker virtual server uses can be devices attached to a remote system (external to the cluster). They can also be devices connected locally to any of the physical nodes in the cluster. A storage node device can be a stand-alone tape drive or an autochanger.

The *NetWorker Administration Guide* details how to configure storage nodes.

Note: MSCS does not support shared tapes. You cannot configure the NetWorker virtual server with tape devices connected to a shared bus.

MSCS does support disk devices connected to a shared bus. However, it is strongly recommended that you *not* use file type devices connected to a shared bus.

The NetWorker virtual server requires a local backup device to save the bootstrap and the server indexes. With releases 6.0 and later, the NetWorker virtual server bootstrap and indexes can be also saved to a storage node. The storage node device, in such a case, must be attached to the cluster node on which the NetWorker virtual server is currently running.

A NetWorker virtual server running on a two-node cluster requires the following minimum device configuration:

◆ Each cluster node must be configured as a storage node for the NetWorker virtual server. For instructions, see "Defining a cluster node as a storage node" on page 88.

◆ The Storage Nodes attribute for the NetWorker virtual server (under the Preferences tab in the Client resource) must list the storage nodes enabled to store data for the client.

Each of the storage nodes must be listed before you can list the nsrserverhost:

a. One cluster node

b. The other cluster node

c. The nsrserverhos

Note: The nsrserverhost must be listed last in each client's storage node list.

You cannot configure a storage node on a cluster node that is running the NetWorker server software. Consequently, before you configure a storage node, you must move the NetWorker virtual server to another node in the cluster.

Defining a cluster node as a storage node

To define each cluster node as a storage node for the NetWorker virtual server:

1. Log in to a cluster node that does not currently own the NetWorker virtual server.

2. Configure the cluster node as a NetWorker storage node. The *NetWorker Administration Guide* provides detailed instructions.

3. In the **Cluster Administrator** program, move the NetWorker virtual server to another node in the cluster.

4. Once you have moved the NetWorker virtual server to the other node:

a. Log in to a cluster node that does not currently own the NetWorker virtual server.

b. Configure the cluster node as a NetWorker storage node.

Note: The **NetWorker Remote Exec** service must be running on each storage node within the cluster.

Moving the NetWorker server to another node

To move the NetWorker server from one node to another within the cluster, use the **Cluster Administrator** program to move the resource group that contains the NetWorker Server resource from one node to another:

1. Select the resource group where the **NetWorker Server** resource exists.

2. Select **Move Group** from the **File** menu to change the state of the resources in this group to **Offline Pending**.

   This brings all the resources in the current node offline. It also brings all the resources in the other node in the cluster online.

3. Wait until the state of all the resources in the group becomes **Online** again.

Registering NetWorker licenses for cluster failover

Note: To register NetWorker licenses for cluster failover, first complete all tasks under "Installing a NetWorker server for cluster mode" on page 82.

1. Ensure the NetWorker virtual server is online.

2. Log on to the cluster node on which the NetWorker virtual server is running.

3. Create a file named **hostids** in the NetWorker_install_path\res directory. The file name must not have a file extension.

4. Add one line to the **hostids** file, in the following format:

   hostid1:hostid2

   where the host ID are the NetWorker server host ID values obtained in: "Task 1: Install the NetWorker software" on page 82.

5. Restart the NetWorker virtual server by taking it offline and then bringing it back online.

   Note: The host ID now displayed in the **NetWorker Administrator** program (or by running the **lgtolic -i** command) is the composite hostid. This composite host ID is required for permanent registration in a clustered environment.

6. Register the NetWorker software for permanent use. Chapter 10, "Licensing and Enabling the Software" provides information on registering NetWorker software.

Restarting the NetWorker server services

Note: Start the NetWorker server manually in a cluster environment only if it is running as a stand-alone server.

If the NetWorker server is configured as a cluster group resource, then you must start or restart the NetWorker services through the cluster software.

"Task 5: Bring the NetWorker Server resource online" on page 85 describes how to start the NetWorker server within cluster mode. Use the **Cluster Administrator** program to restart the NetWorker server services in the current node by taking the server offline and bringing it back online.

Installing only the NetWorker client software in a cluster

To install the NetWorker client software as a highly available application:

1. Install the **NetWorker client** software on the private disk of each node in the cluster.

2. Configure each node in the cluster as a client of the NetWorker server. These are physical cluster clients.

   If the NetWorker server is configured as a **Cluster** resource, add the hostname and user of this NetWorker virtual server to the following **Client** resource attributes of the physical cluster clients:

   • Remote Access
   • Administrator

3. Configure each of the virtual servers in a cluster as a client of the NetWorker virtual server. These are virtual cluster clients.

4. Add the hostname and user of each node to the following **Client** resource attributes of the virtual clients:

   • Remote Access
   • Administrator

Uninstalling the NetWorker software from MSCS

If the NetWorker server is configured as a cluster resource, perform the following steps before removing the NetWorker software.

If the NetWorker server is installed as a stand-alone application (not cluster managed) or only the client software is installed, follow the standard uninstall procedure for NetWorker software. The NetWorker Installation Guide provides instructions on how to uninstall the software.

Note: Before uninstalling NetWorker software from a cluster node, close the **Cluster Administrator** program on the NetWorker server.

From all the nodes in the cluster

To uninstall NetWorker software from all the nodes in the cluster:

1. Unregister and remove the NetWorker Server resource:

   a. In the **Cluster Administrator** program, select **File>Take Offline** to bring the **NetWorker Server** resource **Offline**.

   b. Select **File>Delete** to delete the **NetWorker Server** resource from MSCS.

   c. Run the **regcnsrd -u** command on all but the last member of the cluster.

      If you are prompted with the following question, type **y**:

      ```
      Is this machine a member of the cluster on which you want to
      un-register Resource Extension for NetWorker Server resource?
      ```

   d. Run the **regcnsrd -d** command on the last member of the cluster.

2. Close the **Cluster Administrator** program on all the nodes where you plan to uninstall NetWorker software.

3. Uninstall the NetWorker software from all nodes.

From only one node in the cluster

Use the following procedure if the NetWorker server software is installed on more than one node and all these nodes are possible owners that can host the NetWorker Server resource.

To uninstall NetWorker software from only one node in the cluster:

1. From one node in the cluster, run the **regcnsrd -u** command.

   If you are prompted with the following message, type **y**:

   ```
   Is this machine a member of the cluster on which you want to
   un-register Resource Extension for NetWorker Server resource?
   ```

2. Log in to another node in the cluster that can host the NetWorker server.

3. Remove the node that you are uninstalling from the **Possible Owners** attribute in the **NetWorker Server** resource.

   Note: To determine the possible owners of the **NetWorker Server** cluster resource, review the properties of the **NetWorker Server** resource.

4. Close the **Cluster Administrator** program on the node where you plan to uninstall the **NetWorker** software.

5. Uninstall the **NetWorker** software from the node.

The NetWorker Installation Guide provides detailed instructions.

Troubleshooting NetWorker software in the MSCS environment

The following sections provide tips for troubleshooting problems with the NetWorker software in an MSCS environment.

NetWorker virtual server fails to start nsrmmd

If the NetWorker virtual server fails to start **nsrmmd** on a NetWorker storage node, the following error messages are written into the NetWorker server **daemon.log** file:

```
06/08/00 10:00:11 nsrmon #217: connect to nsrexec prog 390113 vers 1
on `uranus' failed: RPC error: Remote system error
06/08/00 10:00:11 nsrd: media notice: check storage node: uranus (RPC
error: Remote system error)
06/08/00 10:00:11 nsrd: media info: restarting nsrmmd #1 on uranus in
2 minute(s)
06/08/00 10:02:12 nsrd: media info: restarting nsrmmd #1 on uranus now
06/08/00 10:02:42 nsrmon #183: connect to nsrexec prog 390113 vers 1
on `
```

The error might be caused by the NetWorker Remote Exec service not running on the storage node.

If the NetWorker Remote Exec service is *not* running:

1. On the **Storage Node**, select **Services** from the **Control Panel**.

2. Right-click the **NetWorker Remote Exec** service name and select **Start**.

NetWorker server fails to back up a virtual cluster client

If a NetWorker server fails to backup a virtual cluster client, an error message could appear.

In this example, the following names appear:

◆ *charon* — Virtual cluster client running on pluto

◆ *pluto* — Physical cluster node

◆ *neptune* — NetWorker server

```
06/19/03 12:56:57 nsrd: savegroup alert: test completed, 1 client(s)
(charon Failed) charon:Q:\: No save sets with this name were found in
the media database; performing a full backup

charon:Q:\ save: RAP error: Unable to extract resource info for client
pluto.emc.com.
charon:Q:\ save: Cannot open save session with neptune.emc.com
charon:Q:\ 1 retry attempted
charon:Q:\: No save sets with this name were found in the media
database; performing a full backup
charon:Q:\ save: RAP error: Unable to extract resource info for client
pluto.emc.com.
charon:Q:\ save: Cannot open save session with neptune.EMC.com

06/19/03 12:56:57 nsrd: runq: NSR group test exited with return code 1
```

This error might occur because the NetWorker Client resources for each of the physical nodes in the cluster are missing.

To correct the error:

1. Create a **NetWorker Client** resource for each physical node that is allowed to own the virtual cluster client.

2. Rerun the backup.

NetWorker services fail to start in an MSCS environment

If the NetWorker services fail to start in an MSCS environment:

1. Check for a file named **NetWorker_install_path\bin\NetWorker.clustersvr**.

2. If the **NetWorker.clustersvr** file does not exist, create an empty file with that name.

3. Select **Services** from the **Control Panel**.

4. Right-click the **NetWorker Remote Exec** service name and select **Start**.

Sun Cluster Version 3.0 or 3.1 Installation

This chapter includes these sections:

Software installation roadmap

These tasks are a roadmap to follow when installing the NetWorker software:

1. Review "Installation requirements" on page 94 and note the default directory location.

2. Install the required NetWorker software by following one of these procedures:

   • "Installing a NetWorker virtual server" on page 97
   • "Installing a virtual NetWorker Console server" on page 106
   • "Installing only the NetWorker client software in a cluster" on page 108

3. Enable and register all of the NetWorker products. Chapter 10, "Licensing and Enabling the Software," provides detailed information.

Installation requirements

This section specifies the software and hardware required for installing and setting up the NetWorker server or client software within a Sun Cluster environment:

The EMC Information Protection Software Compatibility Guide provides the most up-to-date information about software and hardware requirements.

Software requirements

The following software must be installed on each node in the cluster:

◆ Solaris 8 or Solaris 9 operating environment is installed

◆ Sun Cluster version 3.0 or 3.1 is installed

◆ Volume Manager software (Solstice DiskSuite/Solaris Volume Manager)

Note: Highly available storage nodes are *not* supported.

Hardware requirements

The following hardware requirements must be met:

◆ A multihosted disk is used as a mount point for the global file systems. These contain the shared /nsr area.

◆ A device with local affinity for the local bootstrap backup that is connected to all the nodes within the cluster.

Configuration options

Refer to the *NetWorker Administration Guide* for information about:

◆ Tape libraries with a NetWorker virtual server

◆ Remote physical storage node with a NetWorker virtual server

System information requirements

Table 18 on page 95 and Figure 5 on page 95 display the system information needed to install highly available NetWorker software within a Sun Cluster environment.

Table 18   **System information**

Information Required	Example
NetWorker virtual hostname with an IP address in the same subnet as the cluster nodes	clus_vir1 192.168.1.10
NetWorker globally mounted configuration area	/global/nw
NetWorker cluster configuration script	/usr/sbin/networker.cluster
File containing the host ID of all the cluster members	/nsr/res/hostids
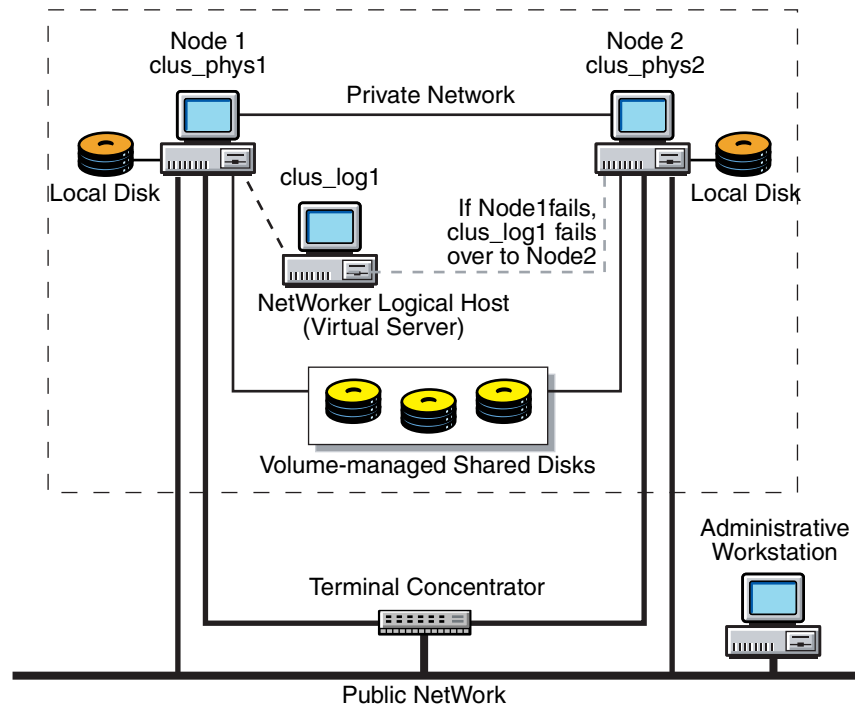
Figure 5   **Sample cluster configuration**

Updating from a previous release of NetWorker software

To update from NetWorker releases 6.1.*x* and 7.*x* to NetWorker release 7.3 in a Sun Cluster 3.0 or 3.1 environment:

1. Collect this NetWorker software system information:

   • The location of the NetWorker server global /nsr directory on the shared storage.

   • The location of the NetWorker client local /nsr directories.

2. List and save the cluster resource group configuration:

   ```
   scrgadm -pvv > scrgadm_pvv.out

   scconf -pvv > scconf_pvv.out
   ```

3. Use NetWorker software to back up the cluster. Ensure that you have a recent backup of the indexes and bootstrap by using the **savegrp -O** command.

4. Remove the NetWorker software cluster configuration files and uninstall the NetWorker software. Do not remove the global and local /nsr directories.

   For instructions on uninstalling the NetWorker software, see "Uninstalling the NetWorker software" on page 112.

5. If required, upgrade the Sun Cluster software. For instructions, refer to the Sun Cluster documentation.

6. Install and configure the NetWorker 7.4 Service Pack 1 software.

   Note: Do not relocate the NetWorker software. By default, the NetWorker is installed in the /usr directory.

7. Ensure that:

   • You specify the same local /nsr and global /nsr directories.

   • The NetWorker Client Type resource properties for Owned_paths and Clientname are the same as before the upgrade.

   • The NetWorker Config_dir resource contains the same values as before the upgrade.

   • The Network_resources_used property contains the same value that the Resource_dependencies property had before the upgrade.

Installing NetWorker software in a cluster

See these sections to install the NetWorker software in a Sun Cluster environment:

◆ "Installing a NetWorker virtual server" on page 97

◆ "Installing a virtual NetWorker Console server" on page 106

◆ "Installing only the NetWorker client software in a cluster" on page 108

Note: Do not relocate the NetWorker software. By default, the NetWorker is installed in the /usr directory.

Installing a NetWorker virtual server

To install and configure the NetWorker software as a highly available service in a cluster, perform these tasks:

Task 1: Install the NetWorker software

The NetWorker software must be installed on all nodes in the cluster that are required to run the NetWorker resource group.

> **Note:** Ensure that the following apply:
> - Solaris 8 operating environment and Sun Cluster 3.0 or 3.1 software are already installed on all nodes in the cluster and that those nodes boot in cluster mode.
> - PATH environment variable includes /usr/sbin and /usr/cluster/bin.

To install the NetWorker software on nodes that will be running the NetWorker resource group:

1. Access the NetWorker software from the distribution media. The NetWorker Installation Guide provides installation instructions.

2. Keep a copy of the current configuration. The NetWorker software installation script modifies the **/etc/rpc** and **/etc/syslog.conf** files during the installation process.

   Type these commands:

   ```
   cp /etc/rpc /etc/rpc.old
   ```

   ```
   cp /etc/syslog.conf /etc/syslog.conf.old
   ```

3. To install the software, type:

   ```
   pkgadd -d .
   ```

4. Press **Enter** to install all of the packages on the server. Start the NetWorker daemons only after the last NetWorker package is installed.

   Install selected software packages in this order:

   a. **LGTOclnt** (client software package)

   b. **LGTOnode** (storage node software package)

   c. **LGTOserv** (server software package)

   d. **LGTOman** (optional man pages)

5. Start the **NetWorker** daemons:

   /etc/init.d/networker start

6. Type **q** to exit.

   Note: Do not relocate the NetWorkersoftware. By default, the NetWorker is installed in the /usr directory.

Task 2: Define the NetWorker server as highly available

To define and configure the NetWorker server as highly available:

1. Log in as root.

2. Ensure that the /etc/hosts file on each cluster node contains the name of the logical host. The logical hostname can be published in the Domain Name System (DNS) or Network Information Services (NIS).

3. From each node in the cluster that will run the NetWorker server process:

   a. Run the cluster configuration script **networker.cluster** located in /usr/sbin.

      This script defines the LGTOserv and the LGTOclnt resource types that the NetWorker software requires.

   b. Type the information specified for each system prompt:

      ```
      Enter directory where local NetWorker database is installed
      [/nsr]?
      ```

      – Type the location of the local NetWorker database directory provided during the installation procedure. For example: **/space/nsr**

      ```
      Do you wish to configure for both NetWorker server and client?
      Yes or No [Yes]?
      ```

      – Type **Yes** to configure the server software. This also installs the client software by default.

      – Type **No** to configure only the client software.

      ```
      Do you wish to add now the site-specific values for:
      NSR_SHARED_DISK_DIR and NSR_SERVICE_ID
      Yes or No [Yes]?
      ```

      – Type **Yes** to ensure compatibility with other cluster environments.

      ```
      Enter the Logical Hostname to be used for NetWorker?
      ```

      – Type the published logical hostname to be used by the highly available NetWorker server. For example: clus_vir1

      ```
      In what path will this nsr directory be created/located?
      ```

      – Type the pathname of the globally mounted /nsr directory that will contain the configuration information for the highly available NetWorker server. For example: **/global/nw**

      Note: For more information, see "System information requirements" on page 95. To undo any changes to the configuration, run the **networker.cluster -r** script and then run the **networker.cluster** script again.

Task 3: Create an Instance of the NetWorker server resource group

A resource group must be created for the highly available NetWorker server. It must contain these resources:

◆ Logical hostname

◆ Globally mounted file system for the /nsr area

◆ LGTO.serv resource

◆ LGTO.clnt resource

◆ HAStoragePlus (optional)

To create an instance of the NetWorker Server resource group, perform these steps on one node in the cluster:

1. Create a resource group:

   ```
   scrgadm -a -g networker
   ```

2. Add the logical host resource:

   ```
   scrgadm -a -L -g networker -l clus_vir1
   ```

3. (Optional), create an instance of the SUNW.HAStoragePlus resource type:

   a. Determine if the HAStoragePlus resource type is registered within the cluster:

      ```
      scrgadm -p | egrep Type
      ```

   b. If required, register the HAStoragePlus resource type within the cluster:

      ```
      scrgadm -a -t SUNW.HAStoragePlus
      ```

   c. Create the SUNW.HAStoragePlus resource:

      ```
      scrgadm -a -g networker -j hastorageplus -t SUNW.HAStoragePlus \
      -x FilesystemMountPoints=/global/clus_vir1/nw,/global/clus_vir1/
      space
      -x AffinityOn=True
      ```

      Note: For more information on the SUNW.HAStoragePlus resource and the set up for locally mounted global systems, refer to the Sun Cluster 3.0 or 3.1 documentation.

4. Create an instance of the LGTO.clnt resource, type:

   ```
   scrgadm -a -j client -t LGTO.clnt -g networker \
   -x clientname=clus_vir1 \
   -x owned_paths=/global/clus_vir1/nw,/global/clus_vir1/space
   ```

   If the logical host resource name is different than the hostname it specifies, use this command to do the following:

   a. Set the client name to the virtual hostname.

   b. Set the optional network_resource property to the logical host resource name.

      For example:

      ```
      scrgadm -a -j client -t LGTO.clnt -g networker \
      -x clientname=virtual_hostname -x network_resource=clus_vir1 \
      -x owned_paths=/global/clus_vir1/nw,/global/clus_vir1/space
      ```

5. Create an instance of the LGTO.serv resource type:

   ```
   scrgadm -a -j server -t LGTO.serv -g networker \
   -y network_resources_used=clus_vir1 \
   -y Resource_dependencies=hastorageplus \
   -x config_dir=/global/clus_vir1/nw
   ```

If the logical host resource name is different than the hostname it specifies, set the optional servername property to the virtual hostname:

```
scrgadm -a -j server -t LGTO.serv -g networker \
-y network_resources_used=clus_vir1 \
-x servername=virtual_hostname \
-x config_dir=/global/clus_vir1/nw
```

Note: If you are using a HAStoragePlus resource, set resource_dependencies property to the HAStoragePlus resource name.

6. Start the NetWorker resource group:

```
scswitch -Z -g networker
```

Example 1   **A highly available NetWorker server**

In this example, a highly available NetWorker server uses the logical hostname *backup_server*. The highly available NetWorker server uses */global/networker* (globally mounted file system) as its configuration directory.

1. Create a resource group with the name *backups:*

```
scrgadm -a -g backups
```

2. Add the logical hostname resource type to the resource group created in the previous step:

```
scrgadm -a -L -g backups -l backup_server
```

3. Create an instance of the *LGTO.serv* resource type with the name *networker_server*. This resource belongs to the resource group *backups* and has a dependency on the logical host created in the previous step.

   Specify the configuration directory on the globally mounted file system */global/networker:*

```
scrgadm -a -j networker_server -t LGTO.serv -g backups \
-y network_resources_used=backup_server \
-x config_dir=/global/networker
```

4. The NetWorker logical host is also a client of the highly available NetWorker server. Create an instance of the LGTO.clnt resource type for the logical host *backup_server* within the resource group *backups*. The name of this resource is *networker_client:*

```
scrgadm -a -j networker_client -t LGTO.clnt -g backups \
-x clientname=backup_server -x owned_paths=/global/networker
```

5. Start the highly available service associated with the resource group *backups*.

```
scswitch -Z -g backups
```

Task 4: (Optional) add a HAStoragePlus resource

To add a SUNW.HAStoragePlus resource to an existing NetWorker server resource group:

1. Determine whether the HAStoragePlus resource type is registered within the cluster:

```
scrgadm -p | egrep Type
```

2. If required, register the HAStoragePlus resource type within the cluster:

    ```
    scrgadm -a -t SUNW.HAStoragePlus
    ```

3. Create the SUNW.HAStoragePlus resource:

    ```
    scrgadm -a -g networker -j hastorageplus -t SUNW.HAStoragePlus -x
    FilesystemMountPoints=/global/clus_vir1/nw,/global/clus_vir1/space
    -x AffinityOn=True
    ```

4. Enable the HAStoragePlus resource:

    ```
    scswitch -e -j hastorageplus
    ```

5. Set up a dependency for the NetWorker Server resource on the HAStoragePlus resource:

    ```
    scrgadm -c -j server -y Resource_Dependencies=hastorageplus
    ```

6. Verify that the resource dependencies are correctly set:

    ```
    scrgadm -pvv -j server | egrep strong
    ```

Task 5: Grant access to the highly available NetWorker server

Before a NetWorker server can back up a client, the client must grant the server access. Granting access is controlled by the **servers** file. For the node that is running the NetWorker Server resource group, this file is located in the globally mounted file system. Otherwise, this file is located on a local disk.

Note: If the **/nsr/res/servers** file is empty or does not exist, any NetWorker server is authorized to:
- Access and back up the client.
- Perform a directed recovery to the client.

To grant access to the highly available NetWorker server:

1. On one node in the cluster:

    a. Stop the NetWorker daemon by using the cluster management software, as follows:

    ```
    scswitch -F -g NetWorker
    ```

    b. Edit or create the servers file in the globally mounted /nsr area. For example, /global/nw/res/servers:

    –   Add the set of NetWorker servers, one per line, to be granted access to this client.

    –   Add an entry for the NetWorker logical hostname first.

    –   Add entries for each physical host that can run the NetWorker resource group.

        For example:

    ```
    clus_vir1
    ```

    ```
    clus_phys1
    ```

    ```
    clus_phys2
    ```

2. On each node in the cluster:

    a. Shut down the NetWorker processes and verify that all NetWorker daemons have stopped:

    ```
    nsr_shutdown
    ps -ef | grep nsr
    ```

b. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option.

If the **-s** option exists, remove all occurrences of **-s** *servername* in the file.

c. Edit or create the /nsr.NetWorker.local/res/servers file:

– Add the set of NetWorker servers, one per line, that require access to this client.

– Add an entry for the NetWorker logical hostname first.

– Add entries for each physical host that can run the NetWorker resource group.

For example:

```
clus_vir1

clus_phys1

clus_phys2
```

d. Restart the NetWorker processes:

```
/etc/init.d/networker start
```

3. On one node in the cluster, start the NetWorker daemon by using the cluster management software, as follows:

```
scswitch -Z -g NetWorker
```

4. If required, grant access to the NetWorker virtual server on clients outside of the cluster:

On each client that is outside of the cluster:

a. To shut down the NetWorker processes, type:

```
nsr_shutdown
```

b. To verify that all NetWorker daemons have stopped, type:

```
ps -ef |grep nsr
```

c. Edit or create the **/nsr/res/servers** file:

– Add the set of NetWorker servers, one per line, that require access to this client.

– Add an entry for the NetWorker logical hostname first.

– Add entries for each physical host that can run the NetWorker resource group.

For example:

```
clus_vir1

clus_phys1

clus_phys2
```

d. Type this command to restart the NetWorker daemons:

```
/etc/init.d/networker start
```

Task 6: Configure the NetWorker server

To configure the NetWorker server:

1. Log in as root on the cluster node that is currently running the NetWorker server resource group.

2. Start the **NetWorker Console** software.

3. From the **Administration** window, select **Properties** from the **File** menu.

   a. For the **Administrator** attribute, add entries for any cluster nodes that are not already listed. For example:

      root@hostname

   b. Click **OK**.

Task 7: Configure clients under the NetWorker server

When the **networker.cluster** script runs, it creates a symbolic link named **/nsr** that points to a local disk. It also creates a second link named **nsr.NetWorker.local** that points to the local NetWorker directory. For example, if the local NetWorker directory was created in /var/nsr, each client member has these links:

◆ /nsr->/nsr.NetWorker.local

◆ /nsr.NetWorker.local->/var/nsr

To configure each client under the NetWorker server:

1. (Optional) Define save groups.

   Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the Autorestart attribute enabled and the Manual Restart option disabled.

2. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new client.

   b. Type the name of the physical client for the **Name** attribute.

3. Make each virtual client within the cluster a client of the virtual NetWorker server. For each virtual client in the cluster:

   a. Create a new NetWorker client.

   b. For the **Name** attribute, type the name of the virtual client.

   c. In the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

      root@clus_phys1

   d. For the **Group** attribute, select a group.

4. Run a test probe to verify that the **Client** resource and the **Group** resource have been properly configured.

   Type this command on the node on which the NetWorker server resides:

   savegrp -pv -c *client_name group_name*

   If the test probe does not display the correct scheduled backups and index, refer to the *EMC NetWorker Administration Guide*.

Task 8: Create instances of the NetWorker Client resource type

An instance of the NetWorker Client resource type must be created for each virtual client that accesses data on globally mounted file systems. Virtual clients in Sun Cluster 3.0 and 3.1 are either logical hostnames or shared addresses.

Note: All globally mounted file systems (except the /global/.devices/... file systems) must be owned by a resource group and defined in a NetWorker Client resource type. If the file systems are not properly configured, multiple copies will be backed up for each cluster node.

To back up the data for a virtual client:

1. Create an instance of the NetWorker Client resource as part of an existing resource group that contains a logical host or shared addresses. For example:

   ```
   scrgadm -a -j resource_name -g resource_group_name -t LGTO.clnt \
   -x clientname=virtual_hostname -x owned_paths=pathname_1,
     pathname_2[,...]
   ```

   The *virtual_hostname* variable is a hostname specified by a logical hostname or Shared Address resource. By default, the logical hostname or shared address resource name is the same as the first hostname in the list of hostnames the resource controls.

   If the logical hostname or shared address resource was explicitly named, set the optional network_resource property to the resource name:

   ```
   scrgadm -a -j resource_name -g resource_group_name -t LGTO.clnt\

   -x clientname=virtual_hostname

   -x network_resource=logicalhostname_
   or_SharedAddress_resource_name \

   -x owned_paths=pathname_1, pathname_2[,...]
   ```

   These examples provide more information:

   - "A highly available Informix database server" on page 104
   - "A scalable Apache web server" on page 105

2. Run a test probe to verify that the Client and Group resources are properly configured.

   Type this command on the node on which the NetWorker server resides:

   ```
   savegrp -pv -c client_name savegroup_name
   ```

   If the test probe does not display the scheduled backups and index, refer to the *NetWorker Administration Guide*.

Example 2 **A highly available Informix database server**

In this example, the Informix database server is configured to use the DNS registered hostname *informix_lhrs*. An existing failover resource group named informix_rg contains a:

- SUNW.informix resource named informix_res
- SUNW.LogicalHostname resource named informix_lhrs

This *SUNW*.informix database server can access data on a global file system under /global/informix/config and /global/informix/db.

To add a NetWorker virtual client to the existing resource group *informix_rg*, type:

```
scrgadm -a -j informix_clntrs -g informix_rg -t LGTO.clnt \
-x clientname=informix_lhrs \
-x owned_paths=/global/informix/config,/global/informix/db
```

Example 3   **A scalable Apache web server**

In this example, an Apache web server is configured to use the DNS registered hostname apache_sars. An existing scalable resource group named apache_rg contains a:

◆ SUNW.apache resource named apache_res

◆ SUNW.SharedAddress resource named apache_sars

This Apache web server accesses data on a global file system under /global/web/config and /global/web/data.

To add a NetWorker virtual client to the existing resource group *apache_rg*, type:

```
scrgadm -a -j apache_clntrs -g apache_rg -t LGTO.clnt \
-x clientname=apache_sars \
-x owned_paths=/global/web/config,/global/web/data
```

Task 9: Register licenses for the highly available NetWorker server

To register and license the highly available NetWorker server:

1. Order licenses for the type of NetWorker server and client configuration in use.

2. Log in to the system that is currently running the NetWorker resource group.

3. Perform these operations to enter the purchased enabler codes:

   a. If you have been evaluating the NetWorker highly available software and have now purchased the software:

      – To upgrade from the base evaluation enabler to the purchased enabler, type:

      ```
      nsrcap -v -u base_enabler_code
      ```

      – Delete any remaining evaluation enablers:

      ```
      nsradmin -s clus_vir1
      ```

      This eliminates warning messages due to expiring evaluation enablers.

   b. For each enabler code, type:

      ```
      nsrcap -v -c enabler_code
      ```

4. Ensure that the highly available NetWorker server is defined as a part of the cluster.

5. Run the following command, and capture the output, on each node that is currently running the NetWorker server resource group:

   ```
   hostid
   ```

   The numeric identifier of the current host prints.

6. Log in to the system that is running the NetWorker virtual server and create the /nsr/res/hostids file. This file contains the host IDs of all the cluster nodes.

   Use this syntax:

   ```
   hostid1:hostid2:hostid3:...
   ```

For example:

```
12345678:87654321
```

7. Type the following commands to restart the server by taking the highly available NetWorker server offline and then putting it back online:

   scswitch -F -g NetWorker

   scswitch -Z -g NetWorker

8. On one node in the cluster:

   a. Start the **NetWorker Console**. Use the logical hostname for the highly available NetWorker server.

   b. From the **NetWorker Administration** window, note the host ID number for the appropriate cluster license.

   c. Register the NetWorker software.

   Note: Do not change the logical hostname for the highly available NetWorker server. If you change it after you update the software, you must permanently license and authorize the highly available NetWorker server.

Task 10: Authorize the software

To enter the permanent authorization code for NetWorker servers and clients:

1. On one node in the cluster, start the NetWorker Console. Use the logical hostname for the highly available NetWorker server.

2. Complete the customer information and contact information fields:

   a. Start the **NetWorker Console** software.

   b. From the **Administration** window, click **Configuration**.

   c. In the left pane, select the **NetWorker** server.

   d. From the **File** menu, select **Properties**. The **Properties** dialog box appears.

   e. Select the **Customer Information** tab and complete your contact information.

   f. Click **Ok**.

3. Review the registration information:

   a. From the **Administration** window, click **Configuration**.

   b. In the left pane, click **Registration**.

   c. In the right pane, right-click the license to be authorized, then select **Properties**. The **Properties** dialog box appears.

   d. Review the **Auth Code** attribute.

Installing a virtual NetWorker Console server

To install and configure the NetWorker Console server as a highly available service in a cluster, read and follow the procedures for these tasks:

◆ "Task 1: Install the NetWorker Management software in a cluster" on page 107

◆ "Task 2: Define the NetWorker Management server as highly available" on page 107

Task 1: Install the NetWorker Management software in a cluster

To install the NetWorker software on each node in the cluster:

1. Ensure that the most recent cluster patch for the operating system is installed.

2. Install the NetWorker Console server software (**LGTOnmc**) on each node in the cluster.

The NetWorker Installation Guide provides instructions.

Task 2: Define the NetWorker Management server as highly available

To define and configure NetWorker server as a highly available application:

1. From each node in the cluster:

   a. Log in as root.

   b. Ensure that the **/etc/hosts** file on each cluster node contains the name of the logical host. The logical hostname can be published in the Domain Name System (DNS) or Network Information Services (NIS).

2. From each node in the cluster that will run the NetWorker server process:

   a. Run the cluster configuration script **gst_ha.cluster** located in /opt/LGTOnmc/bin/nsr.

      This script defines the GST_HA.serv resource type that the NetWorker Console server requires.

      Note: When running the **gst_ha.cluster** script, ensure that you use the same values for logical hostname and for the global mounted path for all node in the cluster.

      ```
      ./gst_ha.cluster

      NMC Console Server is in the process of being made a Highly
      Available application within Sun Cluster
      3.1.0,REV=2003.03.24.14.50.

      To complete this task, the following are required.

      A Logical host or virtual IP for the Console Server A globally
      mounted dir for the LGTOnmc database.

      A GST_HA.serv resource type will be created via this process and
      will be needed to configure NMC as a Highly Available
      Application within Sun Cluster 3.1.0,REV=2003.03.24.14.50.

      Do you wish to continue? [Yes]?

      Restarting syslog daemon...

      Please enter Logical Hostname to be used by NMC server? hunt

      Is the Logical Hostname entered correct (y/n)? y

      The lgto_gstdb database should be on a globally mounted
      filesystem which can be accessible by the cluster nodes which
      will host the Highly Available NMC server.

      Please enter the globally mounted shared directory for the
      lgto_gstdb database (/global/logicalhost)? /global/hunt/data1

      Is the shared directory path entered for the lgto_gstdb database
      correct (y/n)? y

      Moving /bigspace/lgto_gstdb local gstdb directory to globally
      mounted /global/hunt/data1/lgto_gstdb Resource type GST_HA.serv
      is not registered Defining GST_HA.serv resource type with RGM.

      NMC has been successfully cluster-configured.
      ```

b. Ensure that the GST_HA.serv resource type was created.

```
scrgadm -pv -t GST_HA.serv

Res Type name: GST_HA.serv

GST_HA.serv) Res Type description: NMC Server for Sun Cluster

GST_HA.serv) Res Type base directory: /opt/LGTOnmc/bin

GST_HA.serv) Res Type single instance: False

GST_HA.serv) Res Type init nodes: All potential masters

(GST_HA.serv) Res Type failover: False

(GST_HA.serv) Res Type version: (GST_HA.serv)

Res Type API version: 2

(GST_HA.serv) Res Type installed on nodes: <All>

(GST_HA.serv) Res Type packages: <NULL>
```

Note: To undo any changes to the configuration, run the **gst_ha.cluster -r** script and then run the **gst_ha.cluster** script again.

3. From one node in the cluster:

a. Create a resource group named "nmc":

scrgadm -a -g nmc

b. Create a logical hostname resource: For example:

scrgadm -a -L -g nmc -l *logical_hostname*

c. Create an nmc server resource instance. For example:

scrgadm -a -j *nmc_server_name* **-t GST_HA.serv -g nmc**
-y network_resources_used=*logical_hostname*
-x database_dir=*database_dir*

Installing only the NetWorker client software in a cluster

In this configuration, the NetWorker server is running on a node that is not a member of the cluster.

To install a NetWorker cluster client, perform these tasks:

◆ "Task 1: Install the NetWorker software" on page 97
◆ "Task 2: Configure NetWorker client software as highly available" on page 109
◆ "Task 3: Create instances of the Client resource type" on page 110
◆ "Task 4: Define the list of trusted NetWorker servers" on page 111
◆ "Task 5: Configure clients under the NetWorker server" on page 111

Note: Ensure that the NetWorker client software is installed on each node in the cluster. Do not relocate the NetWorker software. By default, the NetWorker is installed in the /usr directory.

Task 1: Install the NetWorker cluster client software

Note: Ensure that the Solaris 8 operating environment and Sun Cluster 3.0 or 3.1 software are already installed on all cluster nodes and that those nodes boot in cluster mode. Also, ensure that the PATH environment variable includes /usr/sbin and /usr/cluster/bin.

To install the NetWorker software on the computer that is designated as the NetWorker client:

1. Access the NetWorker software from the distribution media. The NetWorker Installation Guide provides installation instructions.

2. Type the **pkgadd -d .** command:

   Note: Do not press the **Enter** key for the default response **All**. Accepting the default installs the server package.

3. Type the appropriate option number to install the client package (**LGTOclnt**).

4. (Optional) Type the appropriate option number to install the man pages, (**LGTOman**).

5. Type this command to start the NetWorker daemons:

   /etc/init.d/networker start

6. When all the applicable packages have been added, and the prompt appears, type **q** to exit.

Task 2: Configure NetWorker client software as highly available

To define and configure a NetWorker client as highly available:

1. Log in as root on each node where the NetWorker software is being installed.

2. Ensure that the /etc/hosts file on each cluster node contains the name of the virtual host. The virtual hostname can be published in the DNS or NIS.

3. For each node in the cluster:

   a. Run the cluster configuration script, /usr/sbin/networker.cluster.

      This script defines the *LGTO.clnt* resource types that the NetWorker software requires.

   b. In response to the prompts, type the appropriate response::

      ```
      Enter directory where local NetWorker database is installed
      [/nsr]?
      ```

      – Type the location of the local NetWorker database directory is provided during the installation procedure. For example: **/space/nsr**.

      ```
      Do you wish to configure for both NetWorker server and client?
      Yes or No [Yes]?
      ```

      – Type **No**. This configures only the client software.

      Note: Any changes to the configuration can be undone by running the **networker.cluster -r** option and then running the **networker.cluster** script again. For information, see "System information requirements" on page 95.

Task 3: Create instances of the Client resource type

An instance of the NetWorker Client resource type must be created for each virtual client that accesses data on globally mounted file systems. Virtual clients in Sun Cluster 3.0 and 3.1 are either logical hostnames or shared addresses.

Note: All globally mounted file systems (except the /global/.devices/... file systems) must be owned by a logical host and defined in a NetWorker Client resource type. If the file systems are not properly configured, multiple copies will be backed up for each cluster node.

To back up the data for a virtual client, from any node in the cluster, create an instance of the NetWorker Client resource as part of an existing resource group that contains a logical host or shared address. For example:

```
scrgadm -a -j resource_name -g resource_group_name -t LGTO.clnt \
-x clientname=virtual_hostname -x owned_paths=pathname_1,
   pathname_2[,...]
```

Example 4   **A highly available Informix database server**

In this example, the Informix database server is configured to use the DNS registered hostname *informix_lhrs*.

An existing failover resource group named *informix_rg* contains a:

◆   SUNW.informix resource named *informix_res*

◆   SUNW.LogicalHostname resource named *informix_lhrs*

This SUNW.informix database server can access data on a global file system under /global/informix/config and /global/informix/db.

To add a NetWorker virtual client to the existing resource group *informix_rg*, type:

```
scrgadm -a -j informix_clntrs -g informix_rg -t LGTO.clnt \
-x clientname=informix_lhrs \
-x owned_paths=/global/informix/config,/global/informix/db
```

Example 5   **A scalable Apache web server**

In this example, an Apache web server is configured to use the DNS registered hostname *apache_sars*. An existing scalable resource group named *apache_rg* contains a:

◆   SUNW.apache resource named *apache_res*

◆   SUNW.SharedAddress resource named *apache_sars*

This Apache web server accesses data on a global file system under /global/web/config and /global/web/data.

To add a NetWorker virtual client to the existing resource group *apache_rg*, type:

```
scrgadm -a -j apache_clntrs -g apache_rg -t LGTO.clnt \
-x clientname=apache_sars \
-x owned_paths=/global/web/config,/global/web/data
```

Task 4: Define the list of trusted NetWorker servers

Before a NetWorker server can back up a client, the client must grant the server access. Granting access is controlled by the *servers* file. For the node that is currently running the NetWorker Server resource group, this file is located in the globally mounted file system. Otherwise, this file is located on a local disk.

Note: If the **/nsr/res/servers** file is empty or does not exist, any NetWorker server is authorized to:
- Access and back up the client.
- Perform a directed recovery to the client.

To define the list of trusted NetWorker servers, perform these steps on each node in the cluster:

1. Shut down the NetWorker processes and verify that all NetWorker daemons have stopped:

   ```
   nsr_shutdown
   ps -ef |grep nsr
   ```

2. Edit or create the **/nsr/res/servers** file and add the set of NetWorker servers, one per line, that require access to this client.

3. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option. If the **-s** option exists, remove all occurrences of the following in the file:

   ```
   -s servername
   ```

4. Restart the NetWorker daemons:

   ```
   /etc/init.d/networker start
   ```

Task 5: Configure clients under the NetWorker server

To configure the NetWorker server:

1. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the physical client.

   Note: If a physical client is backed up to a NetWorker server outside the cluster, the name of any virtual service that can run on the physical node must be added to the Remote Access list of the physical Client resource.

2. Make each virtual client within the cluster a client of the NetWorker server.

   For each virtual client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the NetWorker server.

   c. For the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

   ```
   root@clus_phys1
   ```

   d. For the **Group** attribute, select a group.

3. Schedule backups by using the NetWorker application.

Note: The NetWorker server might reside outside of the cluster.

Uninstalling the NetWorker software

To uninstall the NetWorker software from a cluster environment:

1. On one node in the cluster, disable and remove all instances of the **LGTO.serv** and **LGTO.clnt** resource types in the cluster.

   For information, refer to the **scswitch(1m)** and **scrgadm(1m)** man pages.

2. On each node in the cluster:

   a. Log in as root on the computer that the software is being removed.

   b. Undo all changes to the configuration by running the **networker.cluster -r** option.

   c. To shut down the NetWorker daemons, type:

      nsr_shutdown

      > **Note:** Remove the NetWorker software packages in this order:
      > - LGTOserv
      > - LGTOnode
      > - LGTOnmc
      > - LGTOclnt

      The man pages (**LGTOman**) and document files have no dependencies and can be removed at any time.

   d. To remove *all* the packages, type:

      pkgrm LGTOserv LGTOnode LGTOnmc LGTOclnt LGTOlic LGTOman

Configuring an external client to a virtual server

Use this procedure to configure and back up an external NetWorker client to a highly available NetWorker server. Before a NetWorker server can back up a client, the client must grant the server access. Granting access is controlled by the servers file. If the servers file does not exist, any NetWorker server can back up this client. If the servers file does exist, only the specific servers listed in the file can back up the client.

On each NetWorker client that is outside of the cluster:

1. Shut down the NetWorker processes:

   nsr_shutdown

2. Verify that all NetWorker daemons have stopped:

   ps -ef |grep nsr

3. Edit or create the **/nsr/res/servers** file:

   a. Add the set of NetWorker servers, one per line, that require access to this client.

   b. Add an entry for the NetWorker logical hostname first. Then add entries for each physical host that can run the NetWorker resource group. For example:

      – clus_vir1
      – clus_phys1
      – clus_phys2

Defining ownership of a raw partition for virtual clients

To back up the raw partitions of a NetWorker virtual client, ensure that the raw device path appears in the owned paths field of the **LGTO.clnt** resource.

Example 6   **A highly available web server**

In this example, a highly available web server uses the shared address web_server. The web server services are placed under the control of the apache_rg resource group. The services access files that are kept in two separate globally mounted file systems: /global/web/config and /global/web/data. The web server also accesses the raw partition /dev/md/hunt/rdsk/d30.

To create the NetWorker Client resource named *apache_nw*, type:

```
scrgadm -a -j apache_nw -g apache_rg -t LGTO.clnt
-x clientname=web_server \
-x owned_paths=/global/web/config,/global/web/data,
   /dev/md/hunt/rdsk/d30
```

For information on backing up raw partitions, refer to the **rawasm** command as described in the **uasm(1m)** man page.

EMC NetWorker Release 7.4 Service Pack 1 Multiplatform Version Cluster Installation Guide

TruCluster 5.1B-3 or Later Installation

This chapter includes the following sections:

Software installation roadmap

Use the following roadmap to follow when installing NetWorker software:

1. Review "Installation requirements" on page 116 and note the default directory location.

2. If you are updating from an earlier release of NetWorker software follow the procedures in "Updating from a highly available NetWorker server" on page 118.

3. Install the required NetWorker software by following "Installing NetWorker software as highly available" on page 120.

4. Enable and register all of the NetWorker products. Chapter 10, "Licensing and Enabling the Software," provides detailed information.

Installation requirements

This section specifies the software and hardware required to install and configure the NetWorker server or client software within an HP Tru64 UNIX TruCluster environment:

The EMC Information Protection Software Compatibility Guide provides the most up-to-date information about software and hardware requirements.

Ensure that the most current software patches are installed. For further information regarding the latest Tru64 UNIX and TruCluster Server software patches, refer to the Hewlett-Packard website.

Software requirements

The following software must be installed on each node in the cluster:

◆ HP Tru64 UNIX Version 5.1B-3 or later

◆ NetWorker release 7.3 or later

◆ Latest NetWorker patch

◆ Latest TruCluster Server and Tru64 UNIX patches

Hardware requirements

The following hardware requirements must be met:

◆ Dedicated disk to be used as the NetWorker storage disk (for the /nsr directory) connected to a shared SCSI bus for NetWorker indexes.

◆ Shared tape devices.

To install the NetWorker software, ensure that the following hardware requirements are met for server installation only:

◆ Dedicated shared disk that is to be used as the NetWorker storage disk (for the /nsr directory) that is connected to all the nodes within the cluster.

◆ Each physical node of the cluster on which the virtual server can run must have a storage device with local affinity attached. The *EMC NetWorker Administration Guide* provides more information about storage devices in a cluster.

> **Note:** Do not use file type devices on shared file systems as permanent storage for the server bootstrap records.

System information requirements

Figure 6 on page 117 and Table 19 on page 117 display the system information that is needed to install NetWorker software within an HP Tru64 UNIX TruCluster environment.
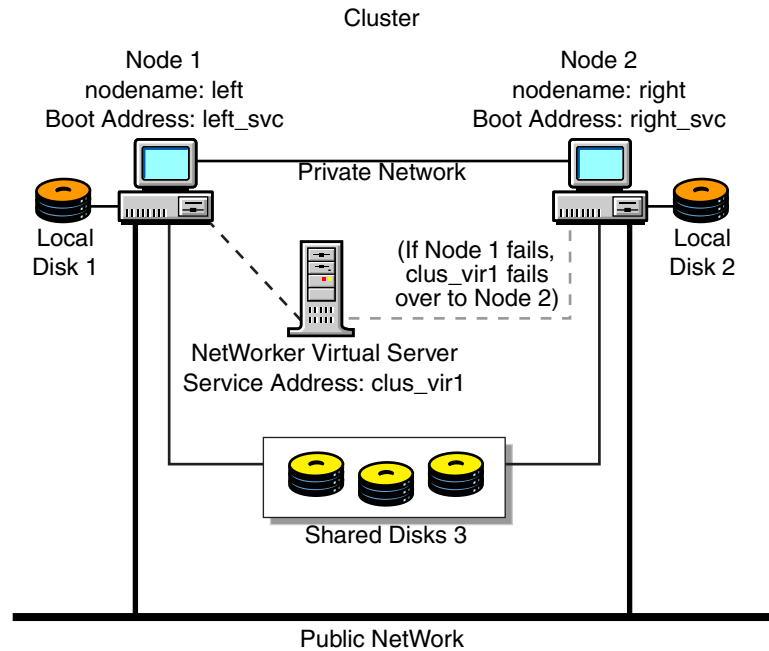
Figure 6   **Sample cluster configuration**

Table 19   **Required information**

Information required	Example
Cluster default alias and its corresponding IP address	clus_vir1, 192.168.99.31
Media changer (if required)	/dev/changer/mc0
Tape, one or more devices	/dev/ntape/tape0_d1
Mount point for NetWorker server databases	/cluster_default_alias

Different operating systems use different terms for the same cluster concepts. TruCluster refers to *physical hosts* as *members.*

Updating from a highly available NetWorker server

Use the following roadmap to update the NetWorker software:

- ◆ "Task 1: Store NetWorker profiles" on page 118
- ◆ "Task 2: Remove the NetWorker cluster configuration" on page 118
- ◆ "Task 3: Remove the existing NetWorker software" on page 119
- ◆ "Task 4: Install the updated NetWorker software" on page 119
- ◆ "Task 5: Run the networker.cluster script" on page 119
- ◆ "Task 6: Disable strong authentication for each NetWorker client" on page 119
- ◆ "Task 7: Disable strong authentication for the NetWorker server" on page 120
- ◆ "Task 8: Register NetWorker licenses for cluster server failover" on page 120

Task 1: Store NetWorker profiles

If a highly available server that is running NetWorker release 6.0 or later exists on TruCluster 5.*x*, save the current NetWorker cluster profile with any customizations before updating to release 7.3 of the NetWorker software.

The contents of the NetWorker cluster action script, and the NetWorker cluster profile, might be deleted when uninstalling an earlier release of the NetWorker software.

To store the NetWorker profiles:

1. Shut down the NetWorker services and make a backup copy of the Cluster Applications Availability (CAA) script profiles for NetWorker software:

   caa_stop networker

   cp /var/cluster/caa/profile/networker.cap /tmp

2. Save a copy of the following files:

   - /var/cluster/caa/script/networker.scr
   - /var/cluster/caa/profile/networker.cap

3. Unregister NetWorker software from CAA. For example:

   caa_unregister networker

Task 2: Remove the NetWorker cluster configuration

On each node in the cluster:

1. Remove the NetWorker server cluster configuration files.

   /usr/opt/networker/bin/networker.cluster -r

2. ***In response to the following **networker.cluster** prompt, select **No**:

   ```
   % This node was removed from the cluster configuration.
   % A cluster configuration removal will follow.
   Do you wish to continue [No]? No
   ```

3. Remove the /nsr Context Dependent Symbolic Link (CDSL) from the cluster file system:

   rm /nsr

Task 3: Remove the existing NetWorker software

The NetWorker Installation Guide provides instructions on how to remove the existing NetWorker software.

Task 4: Install the updated NetWorker software

Install the updated NetWorker software on each node in the cluster:

◆ Client

◆ Storage node

◆ Server

"Installing NetWorker software as highly available" on page 120 provides instructions on installing NetWorker as a highly available application.

Task 5: Run the networker.cluster script

For each node in the cluster run the **networker.cluster** script:

```
/usr/opt/networker/bin/networker.cluster
```

Task 6: Disable strong authentication for each NetWorker client

On each node in the cluster:

1. Use the **kill <pid>** command to manually kill the **nsrexecd** daemon:

   ```
   ps -ef | grep nsrexecd | grep -v grep
   kill -9 <pid>
   ```

   Note: Do *not* use the **nsr_shutdown** command.

2. Restart the **nsrexecd** daemon:

   ```
   /usr/opt/networker/bin/nsrexecd
   ```

3. Disable strong authentication for each NetWorker client:

   ```
   /usr/opt/networker/bin/nsradmin -p nsrexecd
   nsradmin> . type: NSRLA
   Current query set
   nsradmin> update auth methods: "0.0.0.0/0,oldauth"
   Update? y
   updated resource id 3.0.80.79.183.75.167.67.10.0.0.2(6)
   nsradmin> q
   ```

4. Restart the **nsrexecd** daemon:

   ```
   /usr/opt/networker/bin/nsr_shutdown -f
   /usr/opt/networker/bin/nsrexecd
   ```

Task 7: Disable strong authentication for the NetWorker server

On one node in the cluster:

1. Register the NetWorker software with CAA:

   ```
   caa_register networker
   ```

2. Retrieve the saved NetWorker profiles from "Task 1: Store NetWorker profiles" on page 118. For example:

   ```
   cp /tmp/networker.cap /var/cluster/caa/profile
   ```

3. Start the NetWorker resource group:

   ```
   caa_start -c firstnode networker
   ```

4. From the node that is running the NetWorker server:

   a. Disable strong authentication:

   ```
   /usr/opt/networker/bin/nsradmin -p nsrexecd

   nsradmin> . type: NSRLA

   Current query set

   nsradmin> update auth methods: "0.0.0.0/0,oldauth"

   Update? y

   updated resource id 3.0.80.79.183.75.167.67.10.0.0.2(6)

   nsradmin> q
   ```

   b. Restart the NetWorker resource group:

   ```
   caa_stop networker

   caa_start networker
   ```

Task 8: Register NetWorker licenses for cluster server failover

Locate the composite hostid from the Registration window in the NetWorker Administrator program. Contact Product Licensing to obtain an update authorization code. Chapter 10, "Licensing and Enabling the Software," provides details.

The *EMC NetWorker Administration Guide* provides details about NetWorker cluster licensing.

Installing NetWorker software as highly available

Use this roadmap when installing NetWorker software as a highly available application:

Note: The NetWorker release 5.5.2 server is not supported on TruCluster Server Version 5.1B-3 or later. Do *not* upgrade or migrate to a NetWorker release 6.0 or later server.

Task 1: Check for previously installed NetWorker packages

If a previous version of NetWorker software is installed on the system, it will interfere with the installation of new NetWorker packages.

Before installing the NetWorker software, perform *one* of the following:

◆ Remove any previously installed NetWorker packages on a cluster node. For example, use the following **setld -i** and **grep** commands as root user:

```
setld -i | grep -E LGTO
```

◆ As root user, type the following command to remove all existing NetWorker packages on the system:

```
setld -d subset_names
```

NetWorker software packages have dependencies and *must* be removed in this order:

1. Server

2. Storage node

3. Client

The man page packages have no dependencies and can be removed or installed at any time.

Task 2: Install the NetWorker software within a cluster

To install the NetWorker software within a cluster, see one of the following sections:

◆ "Installing the client software" on page 121

◆ "Installing the storage node software" on page 122

◆ "Installing the server software" on page 123

If a file system for the NetWorker database is being created, set the following mount point before installing the NetWorker software. This allows for neater system administration:

```
/cluster_default_alias
```

Note: If the NetWorker file system is mounted under /cluster_default_alias/nsr, the NetWorker uninstall procedure will fail.

Installing the client software

You can choose to install *only* the client software within the TruCluster Server environment.

To install only the client software:

1. Log in as root on the system where the NetWorker software is being installed.

2. Change directories to the location of the NetWorker software distribution files:

   • To change from a local or remote CD-ROM, mount the CD-ROM and then change directories to where it is mounted.

   • To change from a downloaded web file, change to the directory where the installation files were extracted from the downloaded package.

3. Type the following command to install the appropriate NetWorker subsets:

   setld -l path_name

4. When the NetWorker software subsets appear, select only the client software for installation.

   Note: Type /nsr when prompted to type the location of the client's NetWorker home directory on the local disk. If any other path is entered, /nsr will be created as a symbolic link and will cause the cluster configuration to fail.

5. On each node in the cluster:

   a. Run the following script:

      /usr/opt/networker/bin/networker.cluster

   b. Use the **kill <pid>** command to manually kill the **nsrexecd** daemon. For example:

      ps -ef | grep nsrexecd | grep -v grep

      kill -9 <pid>

      Note: Do *not* use the **nsr_shutdown** command for this step.

   c. Restart the **nsrexecd** daemon:

      /usr/opt/networker/bin/nsrexecd

   d. Disable strong authentication:

      /usr/opt/networker/bin/nsradmin -p nsrexecd

      nsradmin> . type: NSRLA

      Current query set

      nsradmin> update auth methods: "0.0.0.0/0,oldauth"

      Update? y

      updated resource id 3.0.80.79.183.75.167.67.10.0.0.2(6)

      nsradmin> q

   e. Restart the **nsrexecd** daemon:

      /usr/opt/networker/bin/nsr_shutdown -f

      /usr/opt/networker/bin/nsrexecd

Installing the storage node software

Virtual storage nodes on a cluster with failover capability and the NetWorker server outside of the cluster, are not supported. However, a single storage node (physical, not virtual) on a cluster node for a NetWorker server outside the cluster is supported.

To install the storage node software:

1. Log in as root on the computer where the NetWorker software is being installed.

2. Change directories to the location of the NetWorker software distribution files:

   • To change from a local or remote CD-ROM, mount the CD-ROM and then change directories to where it is mounted.

   • To change from a downloaded web file, change to the directory where the installation files were extracted from the downloaded package.

3. Type the following command to install the appropriate NetWorker subsets:

   ```
   setld -l path_name
   ```

4. When the NetWorker software subsets appear, select these additional subsets:

   • Client

   • Storage node

5. On each node in the cluster:

   a. Run the following script:

      ```
      /usr/opt/networker/bin/networker.cluster
      ```

   b. Use the **kill <pid>** command to manually kill the **nsrexecd** daemon. For example:

      ```
      ps -ef | grep nsrexecd | grep -v grep
      kill -9 <pid>
      ```

      Note: Do *not* use the **nsr_shutdown** command.

   c. Restart the **nsrexecd** daemon:

      ```
      /usr/opt/networker/bin/nsrexecd
      ```

   d. Disable strong authentication:

      ```
      /usr/opt/networker/bin/nsradmin -p nsrexecd
      nsradmin> . type: NSRLA

      Current query set

      nsradmin> update auth methods: "0.0.0.0/0,oldauth"
      Update? y
      updated resource id 3.0.80.79.183.75.167.67.10.0.0.2(6)
      nsradmin> q
      ```

   e. Restart the **nsrexecd** daemon:

      ```
      /usr/opt/networker/bin/nsr_shutdown -f
      /usr/opt/networker/bin/nsrexecd
      ```

Installing the server software

To install the server software:

1. Log in as root on the system where the NetWorker software is being installed.

2. Change directories to the location of the NetWorker software distribution files:

   • To change from a local or remote CD-ROM, mount the CD-ROM and then change directories to where it is mounted.

   • To change from a downloaded web file, change to the directory where the installation files were extracted from the downloaded package.

3. Type the following command to install the appropriate NetWorker subsets:

   ```
   setld -l path_name
   ```

4. When the NetWorker software subsets appear, select these additional subsets:

   • Client

   • Drive and storage node

   • Server

   • Man pages (optional)

5. On each node in the cluster:

   a. Run the following script:

      ```
      /usr/opt/networker/bin/networker.cluster
      ```

   b. Use the **kill <pid>** command to manually kill the **nsrexecd** daemon. For example:

      ```
      ps -ef | grep nsrexecd | grep -v grep
      kill -9 <pid>
      ```

      Note: Do *not* use the **nsr_shutdown** command for this step.

   c. Restart the **nsrexecd** daemon:

      ```
      /usr/opt/networker/bin/nsrexecd
      ```

   d. Disable strong authentication:

      ```
      /usr/opt/networker/bin/nsradmin -p nsrexecd
      nsradmin> . type: NSRLA
      Current query set
      nsradmin> update auth methods: "0.0.0.0/0,oldauth"
      Update? y
      updated resource id 3.0.80.79.183.75.167.67.10.0.0.2(6)
      nsradmin> q
      ```

   e. Restart the **nsrexecd** daemon:

      ```
      /usr/opt/networker/bin/nsr_shutdown -f
      /usr/opt/networker/bin/nsrexecd
      ```

6. On one node in the cluster:

   a. Register the NetWorker software with CAA:

      ```
      caa_register networker
      ```

   b. Start the NetWorker resource group:

      ```
      caa_start -c firstnode networker
      ```

7. From the node that is running the NetWorker server:

   a. Disable strong authentication:

      ```
      /usr/opt/networker/bin/nsradmin -p nsrexecd
      nsradmin> . type: NSRLA
      Current query set
      nsradmin> update auth methods: "0.0.0.0/0,oldauth"
      Update? y
      updated resource id 3.0.80.79.183.75.167.67.10.0.0.2(6)
      nsradmin> q
      ```

   b. Restart the NetWorker resource group:

      ```
      caa_stop networker
      caa_start networker
      ```

Task 3: Define the list of trusted NetWorker servers

To define the list of trusted NetWorker servers:

1. On one node in the cluster, shut down the NetWorker service by using the cluster management software.

2. On each node in the cluster:

   a. Edit or create the **/nsr/res/servers** file and add the set of NetWorker servers, one per line, that require access to this client.

   b. Ensure that the first entry in this file is the virtual hostname for the NetWorker service. This entry becomes the default NetWorker server.

   Note: If the **/nsr/res/servers** file is empty or does not exist, any NetWorker server is authorized to:
   - Access and back up the client.
   - Perform a directed recovery to the client.

3. Check the NetWorker boot-time startup file for **nsrexecd -s** arguments. If they exist, delete the **-s** arguments. The **nsrexecd -s** argument supersedes the **/nsr/res/servers** file.

   For example, delete the arguments for **nsrexecd -s** in the following file:

   ```
   vi /sbin/init.d/NSRstartstop
   ```

   ```
   nsrexecd -s venus -s mars
   ```

   The **nsrexecd** daemon named in the file should appear only as:

   ```
   nsrexecd
   ```

4. Use the NetWorker boot-time startup file to stop and restart the NetWorker software:

   ```
   /sbin/init.d/NSRstartstop stop
   ```

   ```
   /sbin/init.d/NSRstartstop start
   ```

5. On one node in the cluster, start the NetWorker service by using the cluster management software.

6. On the node that is running the NetWorker server:

   a. Edit or create the **/nsr/res/servers** file and add the set of NetWorker servers, one per line, that require access to this client.

   Note: Ensure that the first entry in this file is the virtual hostname for the NetWorker service. This entry becomes the default NetWorker server.

   b. Shut down and restart the NetWorker service by using the cluster management software.

Task 4: Configure the NetWorker cluster server

After the NetWorker software is installed on the cluster nodes, complete the installation by configuring the NetWorker server.

To configure the NetWorker server within the cluster:

1. Log in as root on the cluster node that is running the NetWorker virtual server and start the NetWorker software:

   `/usr/opt/networker/bin/nsradmin -s clus_vir1`

2. From the **Administration** window, select **Properties** from the **File** menu.

3. For the **Administrator** attribute, add entries for any cluster nodes that are not already listed. For example:

   `root@hostname`

4. Click **OK**.

Task 5: Configure the cluster to back up itself

To configure the cluster client to back up itself:

1. (Optional) Define save groups.

   Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the physical client.

   The NetWorker cluster server will take the identity of the cluster's default alias regardless of which cluster node is currently running the NetWorker service. The first time NetWorker software runs, it creates the Client resource for the NetWorker virtual server.

3. Make each cluster member within the cluster a client of the virtual NetWorker server. For each cluster member in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the virtual client.

   c. For the **Remote Access** attribute, type the *user@hostname* of each physical node within the cluster, as follows:

   `root@clus_phys1`

   d. For the **Group** attribute, select a group.

   The first time the NetWorker software runs, it creates the Client resource for the NetWorker virtual server.

   e. Perform the following steps:

   – Make the cluster nodes and the cluster default alias clients.

   – Select only **Save Set All** for the cluster default alias.

f. Run a test probe to verify that the Client and Group resources have been properly configured.

On the node on which the NetWorker server resides, run the following command:

savegrp -pv -c *client_name group_name*

If the test probe does not display the correct scheduled backups and index, see "Tracking scheduled saves" on page 131.

Task 6: Configure cluster clients to a remote NetWorker server

To configure the cluster as a client of itself:

1. (Optional) Define save groups.

    Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical client within the cluster a client of the NetWorker server. For each physical client in the cluster:

    a. Create a new client.

    b. For the **Name** attribute, type the name of the physical client.

3. Configure the cluster's default alias as a NetWorker client:

    a. Create a new client.

    b. For the **Name** attribute, type the name of the default alias.

    c. Complete the remaining attributes in the **Client** window.

    d. Perform the following steps:

    –   Make the cluster nodes and the cluster default alias clients.

    –   Select only **Save Set All** for the cluster default alias.

    e. Run a test probe to verify that the Client and Group resources have been properly configured.

    On the node on which the NetWorker server resides, run the following command:

    savegrp -pv -c *client_name group_name*

    If the test probe does not display the correct scheduled backups and index, see "Tracking scheduled saves" on page 131.

Task 7: Register NetWorker licenses for cluster server failover

To register NetWorker software in a cluster environment:

1. Type the following command on each node in the cluster:

    ifconfig -a

    The IP address of all interfaces, including the memory channel, appears.

2. To determine the host ID for each node in the cluster, type the following command on any node:

    hostid IP_address

    hostid

3. Ensure to type the IP_address for *all* nodes in the cluster, including physical nodes and the memory channel. For example:

    hostid 10.0.0.1

    hostid 0xa000001

    hostid 10.0.0.2

    hostid 0xa000002

    hostid 137.69.102.209

    hostid 0xa894566d1

4. For each hexadecimal value, delete the *0x* at the beginning. If the remaining hexadecimal value is less than eight digits, precede the value with an additional zero.

    For example:

    0xa000001 becomes a000001 after you delete the 0x.

5. Create a file named /nsr/res/hostids that contains the host IDs of all the cluster nodes by using the following syntax: hostid1:hostid2:hostid3:.

    For example: 0a000001:0a000002:0a000003:

6. Register the NetWorker software.Chapter 10, "Licensing and Enabling the Software," provides details.

Uninstalling the cluster server

Before uninstalling the cluster server, shut down the NetWorker server.

Note: If the NetWorker services are not shut down before attempting to uninstall the software, an error message will appear.

To delete the server package from the cluster:

1. From one node in the cluster:

    a. Take the NetWorker service offline:

        caa_stop networker

    b. Type the following command to unregister the software:

        caa_unregister networker

2. On each node in the cluster, run the following script to complete unregistering the software:

    /usr/opt/networker/bin/networker.cluster -r

3. From one node in the cluster, remove the NetWorker subsets:

    setld -d subset_names

Note: When NetWorker release 6.x is removed, the /cluster_default_alias/nsr directory is automatically deleted. The /cluster_default_alias directory can be removed manually. The NetWorker Installation Guide provides instructions.

Connecting storage devices

Note: TruCluster Server, release 5.1B-3 or later, cannot enforce the NetWorker software's exclusive access to autochanger devices. Consequently, tape operations by utilities other than NetWorker software might result in data loss. To make an autochanger jukebox an optional resource for the NetWorker server, register it as a CAA resource. This requires that you create profiles for all the devices (tape drives and media changers) on the cluster shared bus.

To register the autochanger as an optional resource for the NetWorker server:

1. Change directories to the following location:

   ```
   /var/cluster/caa/profile
   ```

2. Create a **media.cap** file for each media change.

3. Create a **tape.cap** file for each tape drive.

   The following examples of the **media.cap** and **tape.cap** files illustrate the information that each file must contain:

   ```
   mczero.cap file:

   NAME=mczero

   TYPE=changer

   DEVICE_NAME=/dev/changer/mc0

   tapezero.cap:

   NAME=tapezero

   TYPE=tape

   DEVICE_NAME=/dev/ntape/tape0_d1

   tapeone.cap:

   NAME=tapeone

   TYPE=tape

   DEVICE_NAME=/dev/ntape/tape1_d1
   ```

   After creating the profiles, create a dependency from the profiles to the **networker.cap** file.

4. Create the dependency by editing the OPTIONAL _RESOURCES entry to contain the names of the media changer and tape drives. This is the only change required.

   This example shows the networker.cap file, with the OPTIONAL _RESOURCES entry edited to contain the media changer and tape drive names from the mczero.cap and tape.cap files displayed in step 2:

   ```
   NAME=networker

   TYPE=application

   ACTION_SCRIPT=/var/cluster/caa/script/networker.scr

   ACTIVE_PLACEMENT=0

   AUTO_START=0
   ```

```
CHECK_INTERVAL=60

DESCRIPTION=NetWorker server

FAILOVER_DELAY=0

FAILURE_INTERVAL=0

FAILURE_THRESHOLD=0

HOSTING_MEMBERS=

OPTIONAL_RESOURCES=mczero tapezero tapeone

PLACEMENT=balanced

REQUIRED_RESOURCES=

RESTART_ATTEMPTS=1

SCRIPT_TIMEOUT=600
```

5. Continue with the configuration. provides more information.

Relocating the NetWorker service

Each time the NetWorker server is relocated, the CAA software:

1. Shuts down all the NetWorker services on the node that are running the NetWorker server.

2. Restarts the client services, such as **nsrexecd,** on that system.

3. Starts the NetWorker service on the assigned cluster member. The /nsr link is redefined to point to the NetWorker service shared disk.

The link to the /nsr directory that is configured as follows:

◆ On the cluster member running the NetWorker server:

   /nsr ->/cluster/members/{memb}/nsr->/cluster_default_alias/nsr

◆ On each cluster member that is not running the NetWorker server:

   /nsr -> /cluster/members/{memb}/nsr->

   /var/cluster/members/{memb}/nsr

Shutting down and restarting the cluster server

The following section provides steps to shut down and restart the cluster server:

1. To shut down the NetWorker server in the cluster and stop all NetWorker server activity, type:

   caa_stop networker

2. To manually restart the NetWorker server in the cluster, type:

   caa_start networker

Tracking scheduled saves

To verify that the Client and Group resources are properly configured, run a test probe for each client from the node where the NetWorker application is running:

savegrp -pv -c *client_name group_name*

If the test probe does not display all the scheduled save sets:

◆ Check the cluster configuration by using the cluster management software. If necessary, reconfigure the cluster.

◆ Ensure that the save sets defined for the client are owned by that client. If necessary, redistribute the client save sets to the appropriate **Client** resources.

Note: Misconfiguration of the Cluster resources might cause scheduled save sets to be dropped from the backup. The *NetWorker Administration Guide* provides more information.

◆ Type this command to override scheduled save rules (not path ownership rules):

touch networker_bin_dir/pathownerignore

◆ Run a second test probe to verify the configuration.

This command allows any path to be backed up for a client, whether it is owned by the virtual client or physical node. The *NetWorker Administration Guide* provides more information.

If the **pathownerignore** command was used, check that the NetWorker scheduled save uses the correct client index. If the wrong index is used, the save sets can be forced to go to the correct index:

1. From the **NetWorker Administration** window, select a client and edit its properties.

2. For the **Backup Command** attribute, type the name of a backup script that contains
save -c *client_name*

The *EMC NetWorker Administration Guide* provides details about the **Backup Command** attribute.

VERITAS Cluster Server Installation

This chapter includes these sections

Cluster Configuration

Figure 7 on page 134 displays a general cluster configuration consisting of two or more nodes and at least one virtual server. In this illustration:

- Node 1 is a computer with its own **Local Disk.**
- Node 2 is a computer with its own **Local Disk.**
- Virtual Server owns **Shared Disks.**

In this example, the virtual server, *clus_log1*, can fail over between Node 1 and Node 2. However, the server runs only on one node at a time.

The NetWorker client software runs on all the physical nodes within the cluster. This allows the backup of the physical client to proceed, as long as the node is running. Only one instance of the client software (**nsrexecd**) runs on each physical node within the cluster. The NetWorker client software is designed to recognize more than one client (physical client plus virtual client) that might be associated with a single physical node.
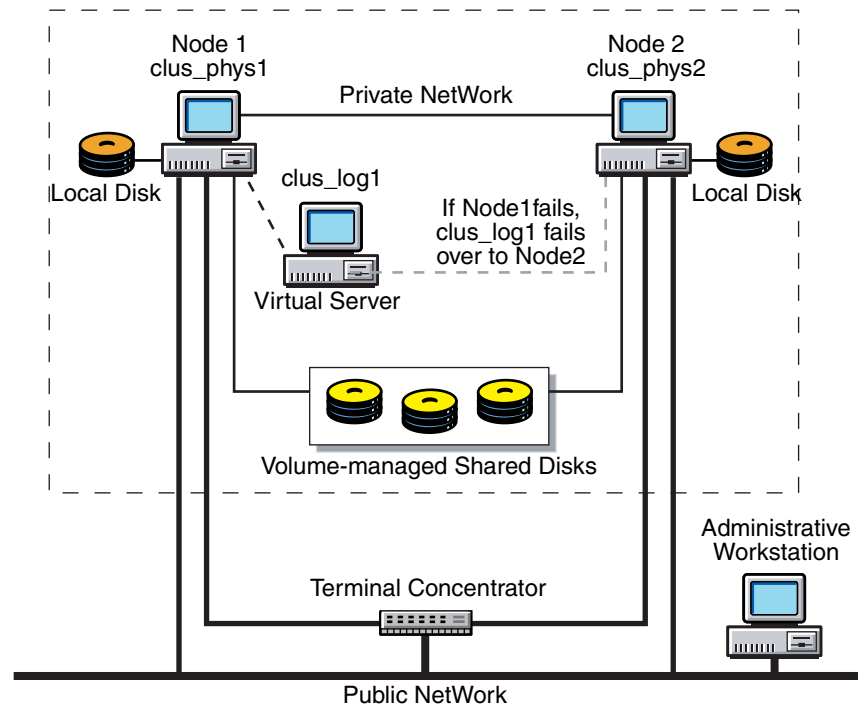

Figure 7   **General cluster configuration**

Note: The NetWorker Virtual server is not supported for the VERITAS Cluster server (VCS).

Software requirements

Ensure that the following software is installed on each node in the cluster:

◆ Solaris 7, 8 or 9 operating environment with Veritas Cluster Server (VCS) required patches

◆ VERITAS Cluster Server 3.5, 4.0

◆ NetWorker release 7.4 Service Pack 1

◆ VERITAS Volume Manager VxVM 3.5, 4.0 (optional)

◆ VERITAS File System VxFS 3.5 (optional)

Note:—*"""""""""""""""""""***????**Astand-aloneorhighlyavailable(virtual)NetWorkerserveris *not* supported in the cluster. The NetWorker server must be outside the cluster. Storage nodes and a highly available Console server are also *not* supported in the cluster.

The EMC Information Protection Software Compatibility Guide provides the most up-to-date software and hardware requirements.

Installing only the NetWorker client software in a cluster

In this configuration, the NetWorker server is running on a node that is not a member of the cluster.

To install a NetWorker cluster client, perform the following:

◆ "Task 1: Prepare to install the software" on page 135

◆ "Task 2: Install the NetWorker cluster client software" on page 137

◆ "Task 3: Configure NetWorker client software as highly available" on page 137

◆ "Task 4: Register the NWClient resource type" on page 138

◆ "Task 5: Define the list of trusted NetWorker servers" on page 140

◆ "Task 6: Configure clients under the NetWorker server" on page 140

Note:—*"""""""""""""""""""***????**EnsurethattheNetWorkerclientsoftwareisinstalledoneach node in the cluster.

Task 1: Prepare to install the software

To prepare to install the software:

1. Ensure that the Solaris operating environment and the VERITAS Cluster Server 3.5, 4.0 software are already installed and configured on all cluster nodes.

2. If the VERITAS Cluster Server installation and configuration directories are different from the default directories, set the following environment variables:

   • VCS_HOME

     The default directory is /opt/VRTSvcs.

   • VCS_CONF

     The default directory is /etc/VRTSvcs.

3. Ensure that the PATH environment variable includes /usr/sbin and $VCS_HOME/bin. The the default directory is /opt/VRTSvcs/bin.

Task 2: Install the NetWorker cluster client software

To install NetWorker software on the computer designated as the NetWorker client:

1. Access the NetWorker software from the distribution media.

   The NetWorker Installation Guide provides detailed installation instructions.

2. Type the following command:

   pkgadd -d .

   Note: Do *not* press **Enter** for the default response **All**. Accepting the **All** response installs the server package.

3. Type the appropriate option number to install the client package.

4. (Optional) Type the appropriate option number to install the man pages.

5. Start the NetWorker daemons:

   /etc/init.d/networker start

6. When all the applicable packages have been added, and the prompt appears, type **q** to exit.

Task 3: Configure NetWorker client software as highly available

To define and configure a NetWorker client as highly available:

1. Log in as root on each node where the NetWorker software is being installed.

2. Ensure that the **/etc/hosts** file on each cluster node contains the name of the virtual host.

   The virtual hostname can be published in the Domain Name System (DNS) or Network Information Services (NIS).

3. For each node in the cluster:

   a. Run the cluster configuration script:

      /usr/sbin/networker.cluster

      This script creates NWClient resource types that might need to be added later to the VERITAS Cluster Server configuration.

   b. Type the following information in response to the prompts:

      ```
      Enter directory where local NetWorker database is installed
      [/nsr]?
      ```

      – Type the location of the local NetWorker database directory provided during the installation procedure. For example:

         /**space/nsr**

      ```
      Do you wish to configure for both NetWorker server and
      client? Yes or No [Yes]?
      ```

      – Type **No**. This configures only the client software.

   Note: Any changes to the configuration can be undone by running the **networker.cluster -r** option and then running the **networker.cluster** script again.

Task 4: Register the NWClient resource type

You might need to configure an instance of the NetWorker Client resource type (NWClient) for virtual clients that own data on shared devices. Virtual clients in the VERITAS Cluster Server are IP type resources.

Depending on the VERITAS Cluster service group configuration, this task might not be required. Create an instance of NWClient resource type in VERITAS Cluster service groups that:

◆ Contain raw devices or logical volumes to back up.

◆ Contain more than one IP type resource.

◆ Are parallel with one or more IP type resources.

Creating an instance of NWClient resource type is optional if the following conditions exist:

◆ The failover VERITAS Cluster service group has only one IP type resource.

◆ The owned filesystems on the shared devices are instances of the mount type resource contained in the same service group.

Check the VERITAS Cluster Server configuration to determine which, if any, service groups require one or more NWClient resources. If no such groups require NWClient resources, proceed to "Task 5: Define the list of trusted NetWorker servers" on page 140.

About NWClient resources

Before performing this task, review the information in this section to become familiar with the structure of an NWClient resource.

The NWClient resource type definition is:

```
type NWClient (
static str ArgList[] = { IPAddress, Owned_paths }
NameRule = NWClient_ + resource.IPAddress
static str Operations = None
str IPAddress
str Owned_paths[]
)
```

Table 20 on page 138 describes the required NWClient resource attributes.

Table 20   NWClient resource required attributes

Required attributes	Type and dimension	Definition
IPAddress	string, scalar	IP address of the virtual NetWorker client. An IP type resource with a matching Address attribute must exist in the service group.
Owned_paths	string, vector	A list of filesystems or raw devices on a shared storage device. These filesystems or raw devices are owned by the virtual NetWorker client specified by the IP Address attribute.

Example 7   **NWClient resource sample configuration**

The following is a sample of a configured NWClient resource:

```
NWClient nw_helene (
IPAddress="137.69.104.251"
Owned_paths={ "/shared1", "/shared2", "/dev/rdsk/c1t4d0s4" }
)
```

Register resource type and create resource instances

This section describes how to register the NWClient resource and create NWClient resource instances.

To register the resource type and create resource instances:

1. Save the existing VERITAS Cluster Server configuration and prevent further changes while **main.cf** is modified:

    haconf -dump -makero

2. Stop the VERITAS Cluster Server software on all nodes and leave the resources available:

    hastop -all -force

3. Make a backup copy of the **main.cf** file:

    cd /etc/VRTSvcs/conf/config
    cp main.cf main.cf.orig

4. Copy the NWClient resource definition file that is in the VERITAS Cluster Server configuration directory:

    cp /etc/VRTSvcs/conf/NWClient.cf /etc/VRTSvcs/conf
    /config/NWClient.cf

5. Add the NWClient resource type and the NWClient resource type instances by editing the **main.cf** file:

    a. Add the NWClient resource type definition by adding an include statement to the **main.cf** file:

        include "NWClient.cf"

    b. Add an NWClient resource instance to every service group that contains an IP type resource and has associated filesystems or raw devices on shared storage.

6. Save and close the file.

7. Verify the syntax of the file, **/etc/VRTSvcs/conf/config/main.cf**:

    hacf -verify config

8. Start the **VERITAS Cluster Server** engine:

    hastart

9. Log in on the remaining nodes in the cluster and start the **VERITAS Cluster Server** engine:

    hastart

10. Verify the status of all service groups:

    hagrp -display

Task 5: Define the list of trusted NetWorker servers

Before a NetWorker server can back up a client, the client must grant the server access. Granting access is controlled by the servers file. For the node that is currently running the NetWorker server resource group, this file is located in the globally mounted filesystem. Otherwise, this file is located on a local disk.

Note: —"""""""""""""""""""""????If the **/nsr/res/servers** file is empty or does not exist, any NetWorker server is authorized to:
- Access and backup the client.
- Perform a directed recovery to the client.

To define the list of trusted NetWorker servers, perform the following steps on each node in the cluster:

1. Shut down the NetWorker processes and verify that all daemons have stopped:

   ```
   nsr_shutdown
   ps -ef |grep nsr
   ```

2. Edit or create the **/nsr/res/servers** file and add the set of NetWorker servers, one per line, that require access to this client.

3. Check the NetWorker boot-time startup file to see whether **nsrexecd** is being run with the **-s** option. If the **-s** option exists, remove all occurrences. For example:

   ```
   -s servername
   ```

4. Restart the NetWorker daemons:

   ```
   /etc/init.d/networker start
   ```

Task 6: Configure clients under the NetWorker server

To configure each client under the NetWorker server:

1. (Optional) Define save groups.

   Note: In order for their save sets to restart after a virtual client or NetWorker server failover, save groups must have the **Autorestart** attribute enabled and the **Manual Restart** option disabled.

2. Make each physical Client within the cluster a client of the NetWorker server. For each physical client in the cluster:

   a. Create a new client.

   b. For the **Name** attribute, type the name of the physical client.

3. Make each virtual client within the cluster a client of the NetWorker virtual server. For each virtual client in the cluster:

   a. Create a new NetWorker client.

   b. For the **Name** attribute, type the name of the virtual client.

   c. For the **Remote Access** attribute, add entries for each physical client within the cluster. For example:

   ```
   root@clus_phys1
   ```

d. For the **Group** attribute, select a group.

The first time the NetWorker application runs, it creates the Client resource for the NetWorker virtual server.

4. Run a test probe to verify that the Client and Group resources have been properly configured.

On the node on which the NetWorker server resides, type:

savegrp -pv -c client_name group_name

If the test probe does not display the scheduled back ups and index, see .

Uninstalling the NetWorker software

To uninstall the NetWorker software from a cluster environment:

1. On one node in the cluster, remove all the instances of NWClient resource types and remove the NWClient type definition from the configuration.

For information, refer to the **hares (1m)** and **hatype(1m)** man pages.

2. On each node in the cluster:

a. Log in as root on the computer from which the software is being removed.

b. Undo all changes to the configuration by running the **networker.cluster -r** option.

c. To shut down the NetWorker daemons, type:

nsr_shutdown

A list of NetWorker daemons to be shut down appears, and you are prompted whether to continue.

d. To remove the software, type:

– All the packages:

pkgrm LGTOclnt LGTOman

– Only the client package:

pkgrm LGTOclnt

– Only the man pages:

pkgrm LGTOman

Tracking scheduled saves

To verify that the Client and Group resources are properly configured, run a test probe for each client from the node where the NetWorker application is running:

savegrp -pv -c *client_name group_name*

If the test probe does not display all the scheduled save sets:

◆ Check the cluster configuration by using the cluster management software. If necessary, reconfigure the cluster.

◆ Ensure that the save sets defined for the client are owned by that client. If necessary, redistribute the client save sets to the appropriate **Client** resources.

> **Note:** Misconfiguration of the Cluster resources might cause scheduled save sets to be dropped from the backup. The *NetWorker Administration Guide* provides more information.

◆ Type this command to override scheduled save rules (not path ownership rules):

touch networker_bin_dir/pathownerignore

◆ Run a second test probe to verify the configuration.

This command allows any path to be backed up for a client, whether it is owned by the virtual client or physical node. The *NetWorker Administration Guide* provides more information.

If the **pathownerignore** command was used, check that the NetWorker scheduled save uses the correct client index. If the wrong index is used, the save sets can be forced to go to the correct index:

1. From the **NetWorker Administration** window, select a client and edit its properties.

2. For the **Backup Command** attribute, type the name of a backup script that contains
save -c *client_name*

The *EMC NetWorker Administration Guide* provides details about the **Backup Command** attribute.

10

Licensing and Enabling the Software

The chapter includes these sections:

How NetWorker software is licensed

NetWorker software and added features, such as modules, are installed in evaluation mode with all of the features enabled. The licensing of NetWorker software means entry of enabler and authorization codes on the server for the NetWorker environment. Without these codes, the software or added features will *not* run beyond the evaluation period.

Each installation of NetWorker server software must be licensed with a base enabler. This enabler "turns on" the software and allows you to use a particular bundle of features, such as a specified number of clients and devices. All licensing takes place on the server. The licenses are entered and stored on the server. The server enforces the licensing.

Base enablers come in different editions, which enable varying degrees of functionality. Add-on enablers allow a broader scope of features.

The steps in this chapter assume that the NetWorker software is installed and that all of the software and hardware requirements have been met on the computer that will access the NetWorker Management Console.

The evaluation process

You can evaluate NetWorker software two ways:

◆ By evaluating a new installation of the software on a NetWorker server.

◆ By evaluating NetWorker features on an existing NetWorker installation.

Evaluating a new installation

When you first install the NetWorker software, you can evaluate it with all the modules and features for 30 days free without entering any codes.

By the end of the evaluation period, you must purchase, enter, and authorize a base enabler to continue to use the NetWorker software to back up data. The base enabler is the license that enables the edition purchased.

To continue to use some of the modules and features that were available with the evaluation software, you might need to purchase add-on enablers, depending on the edition of the base enabler.

Evaluating features on an existing installation

If you are evaluating one or more NetWorker Modules or features on an edition of NetWorker software that has already been installed and enabled, enter a temporary enabler for each module or feature. The temporary enabler is valid for 45 days.

To obtain a temporary enabler code, do one of the following:

◆ Go to the http://Powerlink.EMC.com website, select **Support** > **Product Registration and License Keys**, and then follow the instructions for your product.

◆ Refer to the EMC Information Protection Media Kit.

By the end of the evaluation period, you must purchase, install, and authorize the corresponding license enablers to continue to use modules or features you have evaluated. "The licensing process" on page 145 provides instructions.

How to enter a temporary enabler code

CAUTION

The temporary enabler code is valid on only one computer in a network. If you enter the same code on more than one computer in a network, a copy protection violation error occurs and the NetWorker server software is disabled on all NetWorker servers with duplicate enablers.

To enter the temporary enabler code:

1. Start the **NetWorker Management Console** software.

2. Open the **Administration** window:

   a. In the **Console** window, click **Enterprise**.

   b. In the left pane, select a NetWorker server in the **Enterprise** list.

   c. In the right pane, select the application.

   d. From the **Enterprise** menu, click **Launch Application**.

   The **Administration** window is launched as a separate application.

3. From the **Administration** window, click **Configuration**.

4. In the left pane, select **Registration**.

5. From the **File** menu, select **New**.

6. In the **Enabler Code** attribute, type the enabler code.

7. In the **Name** attribute, type the name of the license.

8. (Optional) In the **Comment** attribute, type a description of the license.

9. Click **OK**.

The licensing process

To permanently use NetWorker software, you must purchase and enter a license enabler code, and then authorize it. This licensing process is the same for all editions of NetWorker software as well as for individual modules and features.

The license enabler code that you purchase is valid for 45 days, as a registration period. During the registration period, you must obtain and enter a corresponding authorization code.

These sections explain how to enter and authorize the license enabler:

◆ "Task 1: Enter the license enabler code" on page 146

◆ "Task 2: Obtain an authorization code" on page 146

◆ "Task 3: Enter the authorization code" on page 147

Task 1: Enter the license enabler code

> **Note:** To save time when entering multiple licenses, enter the base enabler last. Otherwise, once a base enabler is entered, devices that do not yet have licenses entered may be disabled. Those devices would have to be reenabled manually after their licenses are installed.

To enter the license enabler code:

1. Start the **NetWorker Management Console** software.

2. Open the **Administration** window:

   a. In the **Console** window, click **Enterprise**.

   b. In the left pane, click a NetWorker server in the **Enterprise** list.

   c. In the right pane, click the application.

   d. From the **Enterprise** menu, select **Launch Application**.

   The **Administration** window is launched as a separate application.

3. In the **Administration** window, click **Configuration**.

4. In the left pane, select **Registrations**.

5. From the **File** menu, select **New**.

   The **Create Registration** dialog box appears.

6. In the **Enabler Code** attribute, type the enabler code.

7. In the **Name** attribute, type the name of the license.

8. (Optional) In the **Comment** attribute, type a description of the license.

9. Click **OK**.

The new license is added and appears in the right pane. Repeat Step 1 to Step 9 to add any additional enabler codes.

After you type a license enabler code, you have 45 days as a registration period to authorize the NetWorker software.

Task 2: Obtain an authorization code

Registration of NetWorker software occurs by obtaining an authorization code.

To obtain a unique authorization code:

1. Go to the http://Powerlink.EMC.com website.

2. Select **Support** > **Product Registration and License Keys** and follow the instructions for your product.

⚠ **IMPORTANT**

If the software or feature is *not* authorized by the end of the 45-day registration period, the NetWorker backup function or feature is disabled. However, data that was backed up during the registration period can still be recovered from local devices.

Task 3: Enter the authorization code

To complete the licensing process, you must enter the unique authorization code on the NetWorker server within 45 days of entering the license enabler code.

If the authorization process is successful, the expiration date for the license displays:

Authorized - No expiration date.

If the authorization is not verified in this way, contact the http://Powerlink.EMC.com website.

To avoid an interruption in scheduled backups if you move the NetWorker software from one computer to another, or to change the network address of a computer after the software is installed, perform one of the following:

◆ Obtain a new authorization code. You need the host ID of the original server as well as the new server. The host ID appears in the server's Registration window.

◆ Install and configure the NetWorker License Manager software. "Managing licenses" on page 149 provides information on use of the NetWorker License Manager, and the latest NetWorker License Manager Installation and Administration Guide.

To enter the authorization code:

1. Start the **NetWorker Management Console** software.

2. Open the **Administration** window:

   a. In the **Console** window, click **Enterprise**.

   b. In the left pane, select a NetWorker server in the **Enterprise** list.

   c. In the right pane, click the application.

   d. From the **Enterprise** menu, select **Launch Application**.

   The **Administration** window is launched as a separate application.

3. In the **Administration** window, click **Configuration**.

4. In the left pane, select **Registration.**

5. In the right pane, select a license.

6. From the **File** menu, select **Properties**.

7. In the **Auth Code** attribute, type the authorization code for the product. The authorization code is the code assigned to the specified permanent enabler or update enabler code.

8. Click **OK**.

The license is now permanently enabled.

Update enablers

To update existing NetWorker software to a major release, an update enabler is necessary. Update enablers are required for any major NetWorker software upgrade from release 4.0 and later, including the current NetWorker release. To use the NetWorker License Manager, the NetWorker server must be release 5.0 or later.

With a first-time purchase of NetWorker software, a one-year update agreement may be included. After a year, an update enabler may be acquired with a new update agreement purchase.

lists the NetWorker releases that require update enablers.

Table 21   NetWorker update enablers

Upgrade from	to 5.0	to 5.5	to 5.5.x	to 5.6	to 5.7	to 6.x	to 7.0	to 7.1	to 7.2	to 7.3	to 7.4.x
Any release prior to 5.0	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
5.0		yes	yes	yes	yes	yes	yes	yes	yes	yes	no
5.5			yes	yes (UNIX only)	yes (NT only)	yes	yes	yes	yes	yes	no
5.5.x				yes (UNIX only)	yes (NT only)	yes	yes	yes	yes	yes	no
5.6					NA*	yes	yes	yes	yes	yes	no
5.7						yes	yes	yes	yes	yes	no
6.0						no	yes	yes	yes	yes	no
7.0								yes	yes	yes	no
7.1									yes	yes	no
7.2										yes	no
7.3										yes	no

Note: * Release 5.6 is UNIX only, and release 5.7 is Microsoft Windows only. NT refers to Microsoft Windows NT.

Additional licenses

This section describes a few of the additional licenses required to operate some of the NetWorker features.

Client connection licenses

Every computer to be backed up in a NetWorker datazone requires a client connection license, even the NetWorker server. The client connection license may be one of the licenses that is supplied with the base enabler or purchased separately. A cluster client or NDMP data server requires a special type of client connection license.

Storage nodes

Each storage node requires a storage node license, in addition to its client connection license. A dedicated storage node, which allows the storage node to back up only itself, is licensed separately.

NetWorker Application Modules

NetWorker Application Modules are licensed on the basis of one enabler per database type host. For example, to back up the Oracle database on two hosts, two NetWorker Module for Oracle enablers are required, even if the two hosts are backed up by the same server. However, if multiple database instances are running on a NetWorker client host, only one NetWorker Module enabler is required for that one host.

Cluster clients

For each physical node in a cluster, you must purchase a Cluster Client Connection. The NetWorker Administration Guide provides information on how to license computers in a cluster.

NDMP licensing

NDMP licensing requires one NDMP Client Connection per NAS array.

Managing licenses

The NetWorker License Manager software provides centralized license management, which enables you to maintain all of an enterprise's NetWorker licenses from a single computer. With the NetWorker License Manager, you can move NetWorker software from one computer to another, or change the IP address on an existing NetWorker server without having to reauthorize the software. The NetWorker License Manager can be installed as an option during the NetWorker software installation.

To begin to implement the NetWorker License Manager:

1. Obtain bulk enabler codes. For contact information, go to http://Powerlink.EMC.com.

2. Install the NetWorker License Manager software.

3. Configure the NetWorker License Manager software.

4. Configure the NetWorker servers to access the NetWorker License Manager for their licenses.

The latest NetWorker License Manager Installation and Administration Guide provides more information on how to install and use the NetWorker License Manager.