Legato NetWorker® Module for Microsoft® Exchange Server

Administrator's Guide

Release 3.0
Windows® 2000 Version

LEGATO®

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Preface

The *Legato NetWorker® Module for Microsoft® Exchange Server Administrator's Guide* contains information on how to configure and manage the Legato NetWorker Module for Microsoft Exchange Server, Release 3.0 software.

You *must* install the NetWorker Module software on your server and clients to use the information presented in this guide. If you have not yet installed the software, refer to the *Legato NetWorker Module for Microsoft Exchange Server Installation Guide* for installation instructions.

Audience

The information in this guide is intended for system administrators who are responsible for installing software and maintaining the servers and clients on a network. Operators who monitor the daily backups may also find this manual useful.

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Convention	Indicates	Example
boldface	Names of DOS or UNIX line commands, daemons, options, programs, or scripts	The **nsradmin** command starts the command line version of the administration program.
italic in text	Pathnames, filenames, computer names, new terms defined in the Glossary or within the chapter, or emphasized words	Displayed messages are also written to */nsr/logs/daemon.log*.
italic in command line	A variable that you need to provide in the command line	`nwadmin -s` *server-name*
`fixed-width`	Examples and information displayed on the screen	`media waiting: recover waiting for 8mm 5GB tape volume name`
`fixed-width, boldface`	Commands and options that you must type exactly as shown	**`nsr_shutdown -a`**
Menu_Name> Command	A path or an order to follow for making selections in the GUI	Volume>Change Mode>Appendable
Important:	Information that you must read and follow to ensure successful backup and recovery of your data	⚠️ _____ **Important:** You must install the NetWorker Module software in the same directory where you installed the NetWorker client binaries.

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Chapter 1: Introduction

The Legato NetWorker Module for Microsoft Exchange Server software provides services that enable the Legato NetWorker server to back up and restore Microsoft Exchange Server objects. The NetWorker Module software integrates this capability into the comprehensive, network-wide data protection solution that Legato NetWorker® software provides for the Microsoft Windows NT®, Microsoft Windows® 2000, and UNIX® operating systems.

Importance of Backing Up Microsoft Exchange Server Data

In a client-server environment, data can be lost due to hardware failures, software bugs, procedural flaws, and user errors. A viable database backup strategy can help you recover your data in the event of such a disaster.

There is considerable risk in failing to perform regular backups of databases and frequent backups of transaction logs. If all transaction logs are lost, a database can be recovered only to the time of its last full backup. Without backups or transaction logs, the database cannot be recovered at all.

Without a centralized storage management solution, backups of mission-critical data must be implemented at the local system level. Local backups do not provide a cohesive policy for managing and protecting vital, enterprise-wide data.

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Using NetWorker Software to Protect your Network

Legato NetWorker software is a high-capacity, easy-to-use management solution for network data storage that provides data backup and recovery for heterogeneous networks of servers and clients. Using NetWorker software to protect your network simplifies the storage management process and reduces administrative burden by automating and centralizing your data storage operations.

With NetWorker, you can:

- Perform automated "lights-out" backups during off-peak hours
- Use centralized administration to configure, monitor, and control backups from anywhere on a network
- Automate tape handling tasks using SmartMedia®, the intelligent media manager that Legato provides
- Increase backup performance by simultaneously sending data from multiple clients to the storage management server
- Use concurrent device support to direct data streams to multiple backup devices for even greater speed
- Clone backup media for local and off-site storage strategies

Using NetWorker Module to Protect your Exchange Servers

The NetWorker Module software is an add-on module for NetWorker software. It provides automated storage management for Microsoft Exchange Server databases. A filesystem backup does not save your Microsoft Exchange Server data in recoverable form. To be able to recover Exchange Server objects such as storage groups, databases and mailboxes, you must back up the data using one of the methods described in this guide.

How NetWorker Module and NetWorker Work Together

The Microsoft Exchange Server software can reside on the same system as the NetWorker server software, or on a separate system. However, NetWorker Module software must be installed on the same system as the Microsoft Exchange Server and the NetWorker client software. In addition, the Microsoft Exchange Server host computer must be configured as a storage management client of the NetWorker server. For details about NetWorker and NetWorker Module configuration, refer to the *Legato NetWorker Administrator's Guide*.

Client-Server Model

NetWorker uses a client-server model to provide storage management services. This means that at least one computer on the network is designated as a NetWorker server. Computers with data to back up are configured as clients of the NetWorker server.

The NetWorker server:

- maintains resource information
- contacts clients listed in backup groups configured on the server
- performs manual backups when a client request is received
- restores data upon request from the client
- maintains the online client file index
- maintains the media database

Backup Process

When a scheduled backup for a Microsoft Exchange Server client is triggered by **nsrd** on the NetWorker server, **savegrp** executes the NetWorker Module backup command (**nsrxchsv**) on the client instead of performing a standard save. The **nsrxchsv.exe** program sends the backup data received from Microsoft Exchange Server to NetWorker through an X-Open® Backup Services Application Programming Interface (XBSA). The final results of the **savegrp** execution are sent back to the server and are included in the savegroup completion report, which is sent according to the notification set up in NetWorker Administrator for the Savegroup event.

The NetWorker software performs the scheduling and storage management tasks. The NetWorker Module software passes the data from Microsoft Exchange Server to NetWorker. shows the functional relationship between NetWorker, NetWorker Module, and Microsoft Exchange Server, during a scheduled backup.

1

**Figure 1. NetWorker Client-Server Interaction
During a Backup Initiated by NetWorker Module**
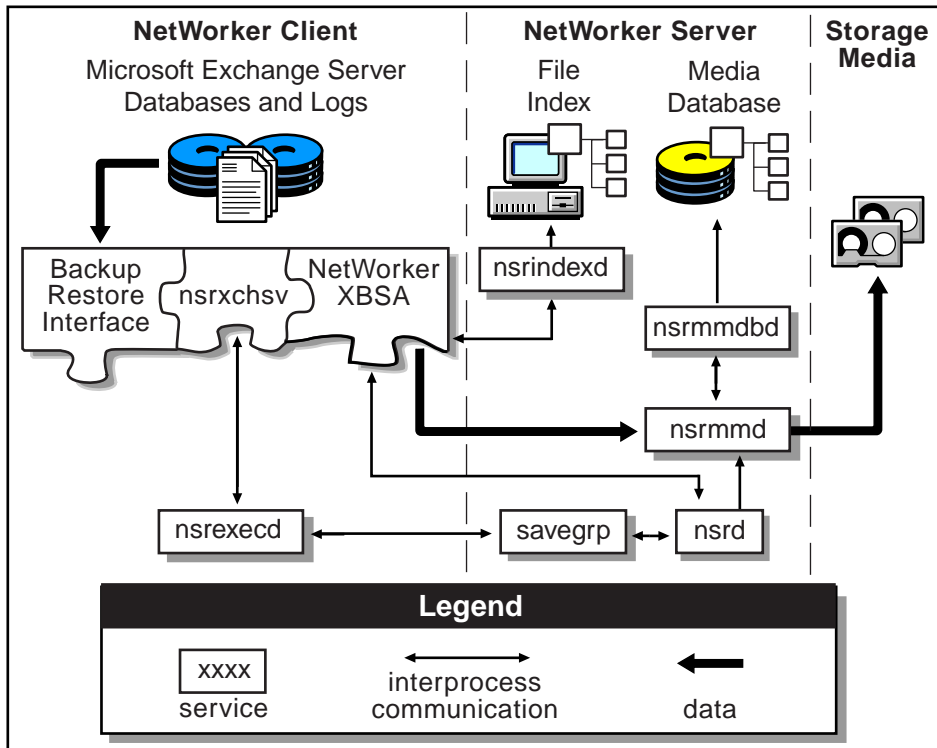
Restore Process

When a restore request is initiated by the NetWorker Module version of the recover command, **nsrxchrc**, the NetWorker XBSA API translates the object names requested by the NetWorker Module into a format understood by the NetWorker software and forwards them to the NetWorker server's **nsrd** service. The media service, **nsrmmd**, invokes **nsrmmdbd** to search the NetWorker server's online media database for the media containing the object(s) requested.

After the media is mounted, **nsrmmd** sends the data through the NetWorker XBSA API to **nsrxchrc**, which recovers the data to the Microsoft Exchange Server directories.

Figure 2 shows how data moves from the NetWorker server to the Exchange server during a NetWorker Module restore session.

1

**Figure 2. NetWorker Client-Server Interaction
During a Recovery Initiated by NetWorker Module**
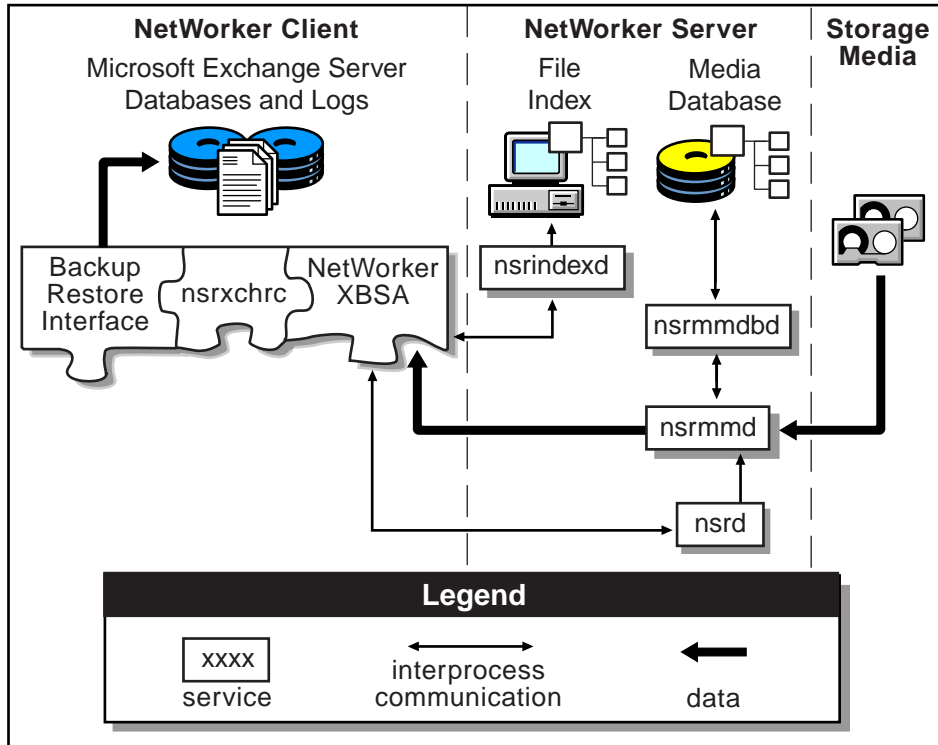
1

Chapter 2: Backup Types and Levels

This chapter introduces basic concepts for backup and recovery of Microsoft Exchange 2000 Server.

Overview of Backup Types and Levels

The NetWorker Module supports four backup levels and two backup types. Table 1 shows the backup levels that are supported for each backup type.

Table 1. Backup Levels Available for Scheduled and Manual Backups

Backup Levels	Backup Type	
	Scheduled	Manual
Full	yes	yes
Copy	no	yes
Incremental	yes	yes
Differential	yes	yes

How Scheduled Backups are Processed

A scheduled backup is one that starts automatically at a preset time. The NetWorker server initiates scheduled backups.

The NetWorker server starts a separate backup process for each item specified in the save set list. For example, if MSEXCH:IS is specified in the save set list on the NetWorker server, the server starts *one* process on the client to perform a backup of the entire Exchange Server Information Store.

If multiple items are specified in the save set list, the server starts multiple processes on the client machine. This provides support for parallel processing of storage groups. For example, selecting storage groups 1 and 2 for backup (save sets MSEXCH:IS/SG1and MSEXCH:IS/SG2) causes the server to start two backup processes in parallel: one for each storage group. This feature allows you to back up all the storage groups on your Exchange server in parallel.

Note: You cannot back up multiple databases within the same storage group in parallel.

How Manual Backups are Processed

A manual backup is one that you start yourself from the NetWorker client host, using the NetWorker Module GUI ("NetWorker User for Exchange Server"), or using the command line interface. You can back up as few or as many items as you like. Items marked for backup are processed sequentially when the backup is started manually.

Selecting Exchange Server Objects for Backup

Table 2 on page 25 explains what to mark in NetWorker Module, to back up Exchange Server objects.

Table 2. What is Marked - What is Backed Up

What is Marked	What is Backed Up
Information Store	All storage groups on the Exchange server.
Storage Group	All databases in the storage group.
Database	Only the database that is marked.
Private Mailboxes	All mailboxes.
Mailbox	Only the marked mailboxes.

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What is Backed Up at Each Level

In NetWorker Module, four backup levels are available: full, copy, incremental and differential. What each level backs up is explained in "Backup Levels - List".

Note: In the NetWorker software, the Differential level has nine sub-levels. In the NetWorker Module software, Differential backups are performed at level 1 only.

Backup Levels - List

- **Full** (database and logs; truncate committed logs) - Backs up databases and associated transaction logs. Once the databases and transaction logs are backed up, the transaction logs are truncated. It is recommended that you perform full backups daily to prevent log files from monopolizing space on the hard disk. A full backup must be performed on all databases within a storage group before an incremental or differential backup is allowed.

- **Copy** (databases and logs) - Makes a full backup of the Microsoft Exchange Server without disturbing the state of ongoing incremental or differential backups. This level of backup is like a Full backup, except that the transaction logs are not truncated after being backed up.

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- **Incremental** (logs) - Backs up only the Exchange transaction logs and then truncates them. To restore from incremental backups, the required backups include all incremental backups done since the last full backup and the full backup itself.

- **Differential** (logs) - Backs up only Microsoft Exchange's transaction logs, but unlike the incremental level, it *does not truncate them*. To restore from differential backups, one differential backup and the original full backup are required.

    Note: Incremental and Differential backups are not permitted by Exchange 2000 Server if circular logging is enabled. For information about disabling circular logging, refer to Microsoft Exchange Server documentation.

Setting Backup Levels

When you use the NetWorker Administrator program to schedule a regular backup and set the backup level, the backup level setting is retained until you change it. The level can depend on the selected schedule, for example, "Weekly Full."

For manual backups, the level you set applies to the next backup that you perform.

Scheduled Backups

Set the backup levels for scheduled backups as follows:

1. Open the NetWorker Administrator software. In the Configure tab, under the heading NetWorker Groups, click the Manage Groups button.

2. Right-click on the Exchange Server for which you want to set or select backup levels, and select Edit from the submenu.

3. Set the level if you always want to use the same backup level, or set the schedule to allow the schedule to determine the level.

Scheduled backups support three of the four possible levels in NetWorker Module: full, incremental or differential (level 1 only).

Manual Backups

For manual backups that you initiate from NetWorker User for Exchange Server on the NetWorker client host, specify backup levels in the Backup Options dialog box:

1. Open the Backup window.

2. From the Options menu, select Backup Options. The Backup Options dialog box opens.

3. Under Backup Level, click on the circle beside the backup level you want, to select it.

For manual backups that you initiate from a Windows command prompt on the NetWorker client host (by entering commands on the command line), you can also specify the four main backup levels: full, copy, incremental, and differential (level 1 only). For detailed instructions on using NetWorker and NetWorker Module software from the command line, see "Appendix A: Commands, Command Options and Save Sets" on page 99.

Table 3 on page 27 shows how the available backup levels are modified according to whether you are backing up automatically or manually. It also shows how the backup level is affected by the interface that is used to initiate the backup.

Table 3. Backup Type and Level Modifications

Operation	Initiate from	Backup Levels Available			
		Full	Copy	Differential	Incremental)
Scheduled backup	NetWorker Administrator (server GUI)	Yes	No	Yes	Yes
Manual backup or Recovery	NetWorker client host command line	Yes	Yes	Yes	Yes
	NetWorker User for Exchange Server (client GUI)	Yes	Yes	Yes	Yes

Backup Level Notation in Media Database

For any backup that was performed, you can check the level in the Volumes tab or the Indexes tab in the NetWorker Administrator software. Table 4 shows the notation used for each backup level.

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Table 4. Media Index Entries for Backup Levels

Backup Level	Corresponding Parameter for nsrxchsv -l Option	Backup Level Recorded in NetWorker Media Database
Full	-l full	full
Copy	none	none
Incremental	-l incr	incr
Differential	-l diff	diff

Chapter 3: Scheduled Backups

This chapter describes how to use NetWorker software in combination with NetWorker Module software to implement scheduled, regular backups of your network's Exchange Servers. For complete information on using the NetWorker Administrator program, refer to the *Legato NetWorker Administrator's Guide*.

Note: Once you complete the installation process, you must enable, register, and authorize your NetWorker products. If you enable a NetWorker product but do not properly register the software, it will automatically be disabled 45 days from the date it was enabled.

You can register NetWorker either online through the World Wide Web, or by printing your registration information using the NetWorker Admininstrator program, and then faxing the printout to Legato.

For complete information on enabling, registering and authorizing your NetWorker Module software, see the *Legato NetWorker Module for Microsoft Exchange Server Installation Guide*.

Planning Backups

Automatic, scheduled backups are the NetWorker Module software's primary means of protecting your data. Only scheduled backups ensure that all of your Exchange Server data is automatically saved. Manual backups do not automatically include the client file indexes and bootstrap file. These are vital for restoring the Exchange servers, in the event of a disaster. Because each scheduled backup automatically includes these files, it is important to make sure that scheduled backups are performed regularly.

Multiple Databases

In previous versions of Microsoft Exchange Server, the Information Store supported only one private messaging database (*Priv.edb*) and one public messaging database (*Pub.edb*) per server. If either of the two databases grew too large, it could be time-consuming to back it up or restore it.

In Microsoft Exchange 2000 Server, *storage groups* can contain one or more databases - that is, Exchange Server now supports multiple databases on each server. By providing separate databases for public folders and private mailboxes, Exchange 2000 Server makes it easier to manipulate, back up, and restore the databases.

Two databases in Exchange 2000 Server have special names and functions. They are the *Key Management Server* and *Site Replication Server*. For the purposes of backup and recovery, these are treated identically to any other Exchange Server database. For convenience, they are often put into one backup group.

To balance network activity, consider setting up the following backup groups:

- Client host filesystem data, including Active Directory, System State and bootstrap protocol files
- Exchange Server, Key Management Server (if installed), and Site Replication Server (if installed)
- Private mailboxes

Planning Backup Schedules

In Microsoft Exchange 2000 Server, public information and messages reside in the Information Store. To maximize space and enhance performance on the Exchange Server, the Information Store is structured for *single-instance* storage within each database. For example, if a 1 MB message is sent to 100 users in the same database, only one instance of the message is stored on the Exchange server. Pointers to the message body and attachments are placed in each user's mailbox. Therefore the message uses only 1 MB of disk space, and only 1 MB is backed up. This design is optimal for efficient, reliable, storage on the server; however, it is not ideal for recovering a user's mailbox, folder, or message, primarily because the data is not organized from a mailbox-backup perspective.

Private Mailboxes

Backing up a user's mailbox extracts all message components from the database. This includes message body, header, and attachments. As a result, backing up a large number of individual mailboxes can take much longer, and require more free disk space, than backing up the Information Store or any other Exchange database.

Consider these factors:

- Mailbox backup is not recommended for large numbers of individual mailboxes, because backing up individual mailboxes takes significantly more time than backing up an Information Store.

- Private mailbox backup can be performed only at level Full, not at the Incremental or Differential levels. This contributes to time required for private mailbox backup operations, but is necessary to ensure reliable data recovery.

- In the event of a disaster, the Information Store cannot be rebuilt by recovering the private mailboxes, but it is possible to recover individual databases from a storage group backup. Regularly scheduled database backups using Legato NetWorker and NetWorker Module for Exchange Server software is the best choice for disaster recovery.

- For information about the process for backup of private mailboxes, see "Backing Up Private Mailboxes" on page 34.

Improving Performance

To improve performance of backups of the Exchange Server:

- Set backups for private mailboxes at separate times from backups of the Information Store. Even when they are in different backup groups, network congestion may result from performing these backups simultaneously.

- It is useful to set start times for different backup groups far enough apart that each backup operation can finish before the next backup operation starts.

- Set scheduled backups for times when the network is less busy, for example, nights and weekends.

- Do not use NetWorker Client to back up the Exchange Installable File System. For detailed information about this, see "Excluding the Exchange Installable File System from Backup Operations" on page 32.

Excluding the Exchange Installable File System from Backup Operations

The Exchange Installable File System (ExIFS) is a new feature in Exchange 2000 Server. ExIFS allows file level access to various items within a private or public information store. The ExIFS is displayed as a disk drive, using the drive letter M:. Users can access the web storage system using Windows Explorer, Internet Explorer, or other mechanisms supported by Windows 2000.

A scheduled file system backup will attempt to back up files on the M: drive. This will not be successful because the Information Store will have many of the files open. It is also not possible to restore the Exchange Server databases by recovering a backup of the ExIFS. For this reason most users will choose to skip the file system backup of ExIFS. This can be done easily by creating a custom directive.

3

How to Create a Custom Directive

To create a custom directive to skip the file system backup of ExIFS:

1. Create a new directive using the NetWorker Administrator program.

2. Enter a name for the new directive.

3. Enter the following commands in the Directive field:

   << **"M:"** >>

   skip: *.*

4. Edit the client resource that is used for the file system backup of the Exchange server. Select the name of your custom directive to skip the file system backup of the ExIFS drive.

5. Figure 3 on page 33 shows an example of a directive for skipping the ExIFS file system backup.

Figure 3. Directive to Skip File System Backup

Creating and Configuring Backup Groups

Each Exchange Server host must be configured as a NetWorker client using a Client resource in NetWorker Administrator. The Client resource provides the NetWorker server with information about the following:

- What data to back up for a client.
- How long to maintain entries for the data in the online index for recovery (browse policy).
- How long to keep the media containing the client's backed-up data (retention policy).

After your NetWorker Module software is installed and enabled (for detailed information, see the *Legato NetWorker Module for Microsoft Exchange Server Installation Guide*), there are two main steps for configuring Exchange servers as NetWorker clients:

- Create a backup group resource in NetWorker Administrator for scheduled backups of Exchange Server (see "Task 1: Configure Backup Groups" on page 36).
- Create a client resource in NetWorker Administrator for the Exchange Server on which you installed the NetWorker Module for Exchange Server software (see "Task 2: Configure Clients" on page 37).

Backing Up Private Mailboxes

With NetWorker Module for Microsoft Exchange Server, you can back up and recover private user mailboxes. Because the way that you set up mailbox backups affects the ways you can restore them, information about restoring mailboxes is included here.

The processes for backing up and restoring mailboxes involves the following:

- During a mailbox backup, the contents of the specified mailbox are copied from the information store to a temporary file. The temporary file is saved to the NetWorker server and entered in the NetWorker index database. When the backup is complete, the temporary file is deleted. This process is repeated for each mailbox being backed up. The Exchange Server must have sufficient free space to accommodate the temporary file.

- During a mailbox restore, the latest backup of the mailbox prior to the recovery browse time is identified in the NetWorker index database and restored from the NetWorker server to a temporary file. The contents of the temporary file are copied to the Exchange information store. When the recovery is complete, the temporary file is deleted. The contents of the mailbox are recovered to a folder called "Recovered Items," in the same mailbox as they were backup up from. The hierarchy of folders and messages present in the original mailbox is preserved in the Recovered Items.

Mailbox Backup Requirements

The following is the list of requirements for backup and recovery of mailboxes:

- The user must be logged in on the Exchange server as a member of the Administrators group, with the following permissions:
    - List Contents
    - Read Properties
    - Administer Information Store
    - View Information Store Status
    - Receive As
    - Send As

Customizing Backup Group Parameters

NetWorker provides a preconfigured group named "Default." You can modify the Default group's attributes, but you cannot delete Default from the list of NetWorker groups. The Default group has the following attributes:

- Autostart = Disabled
  After you enable the autostart feature, clients in a backup group start their scheduled backups at a designated time. Be sure to enable the Autostart option for the configured groups; otherwise, the scheduled backups cannot take place.
- Start time = 3:33
- Client retries = 0
- Clones = No
- Clone pool = Default Clone

3

Using Browse and Retention Policies

To manage and reduce the size of online indexes, the NetWorker software uses *browse policies* for the client index entries and *retention policies* for the media database entries. You can choose one of the preconfigured policies provided with NetWorker or create policies of your own.

NetWorker does not allow a backup group's browse policy to exceed that group's retention policy. The entry for a save set must be removed from the file index before the save set can be removed or marked recyclable in the media index.

You can manage the indexes manually by means of the Indexes and Volumes windows. Refer to the *Legato NetWorker Administrator's Guide* for a description of manual index management and index policy concepts.

For information on how to set the browse and retention policies, see

Implementing Scheduled Backups

This section explains how to start scheduled backups of the Information Store, Key Management Server (if installed) and Site Replication Server (if installed). Perform the steps in this section in the NetWorker Administrator program. For a detailed description of each text box in the NetWorker Administrator software's dialog boxes, click the Field Help button at the bottom of the box.

This section contains detailed instructions for each of the major tasks in implementing scheduled backups of the Exchange Server. The major tasks are:

"Task 1: Configure Backup Groups" on page 36

"Task 2: Configure Clients" on page 37

"Task 3: Enter Remote Access Accounts and Users" on page 42

"Task 4: Test the Configuration" on page 43

3

Task 1: Configure Backup Groups

To set up backup groups:

1. In the left-hand pane of the NetWorker Administrator, select the Exchange server that you want to back up. In the right-hand pane, select Configure>Manage Groups.

2. In the Groups dialog box, right-click on the main Groups icon and from the submenu that appears, select Create.

3. In the Create Group dialog box that opens, enter a name in the Name box.

4. In the Autostart box, select Enabled.

5. Use the up or down arrow to set the number of Client retries.

6. Set the backup level in the Level box, or select a schedule with the levels that you want in the Schedule box.

   a. If the Level and Schedule boxes are not visible, close the Create Group dialog box.

   b. In NetWorker Administrator, open the Options menu, select Customize, and click the Window Configurations tab.

   c. Select the Display Hidden Attributes option.

   d. Click Ok to save your setting and exit.

   e. Re-open the Create Group dialog box. The Level and Schedule text boxes are visible. Select the level you want.

7. Select Ok to save settings and exit.

Task 2: Configure Clients

Perform this task in the NetWorker Administrator program:

1. In the Configure tab, select Manage Clients.

2. Right-click on the server for the group you created, and select Edit from the submenu.

3. In the Edit Client dialog box, in the Group text field, select the group you created.

4. In the Save set box, enter the save set specifications for the Microsoft Exchange Server objects you want to back up (see Figure 4).

Use the save set specifications listed in:

- "Save Set Specifications for Storage Groups and Databases" on page 38.
- "Save Set Specifications for Private Mailboxes" on page 40.

3

Save Set Specifications for Storage Groups and Databases

To configure save set specifications for storage groups and databases, in the NetWorker Administrator Edit Client dialog box (see Figure 4 on page 39 for examples of entering Information Store and database save set specifications):

- To specify a backup of all the backup-enabled Exchange applications (currently IS, KMS, SRS; but *not* "All private mailboxes"), enter:

  MSEXCH:

- To specify a backup of the entire Information Store, enter:

  MSEXCH:IS

- To specify a backup of a Storage Group, enter:

  MSEXCH:IS<*storage_group*>

- To specify a backup of the Key Management Server (if installed), enter:

  MSEXCH:KMS

- To specify a backup of the Site Replication Server (if installed), enter:

  MSEXCH:SRS

- To specify a backup of all user mailboxes, enter:

- **MSEXCH:MB**

3

Figure 4. Information Store and Database Save Sets
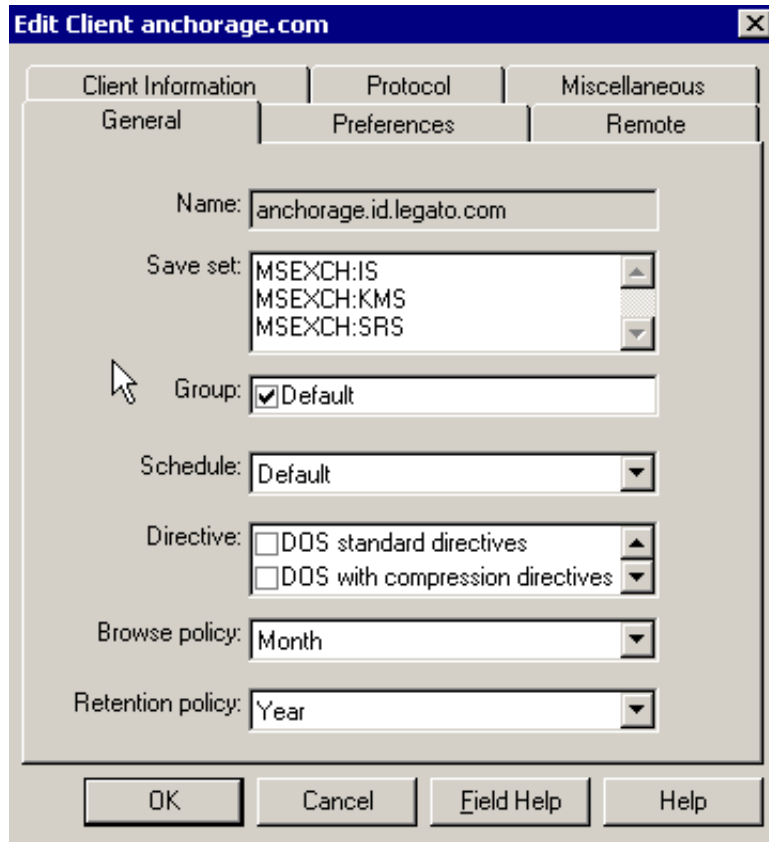
Notes

- Previous versions of the software (previous product name: Legato BusinesSuite Module for Microsoft Exchange Server) always performed a full backup when **MSEXCH:** was used. In NetWorker Module for Exchange Server, Release 3.0, the level specified in the group schedule is the level used.

- The save set **MSEXCH:DS** is obsolete in Release 3.0, because Exchange 2000 Server does not have its own directory.

⚠

Important: Do not use the Save set *All.* This is a NetWorker save set, *not* a valid NetWorker Module save set. Using it results in a backup of the entire file system *except for Exchange Server objects.*

3

Save Set Specifications for Private Mailboxes

To configure save set specifications for backing up private mailboxes, open the NetWorker Administrator Edit Client dialog box.
See Figure 5 on page 41 for examples of entering private mailbox save set specifications.
For further information on save set specifications, see
"Appendix A: Commands, Command Options and Save Sets" on page 99):

- To specify a backup of one private mailbox, enter:
  MSEXCH:MB/*<mailbox_name>*

- To specify a a backup of multiple private mailboxes, enter a specification for each mailbox on separate lines, without quotation marks, as shown in Figure 5 on page 41.

  Enter:

  MSEXCH:MB/*<mailbox_name>*

  MSEXCH:MB/*<mailbox_name>*

  MSEXCH:MB/*<mailbox_name>*

- To schedule backups for many individual user mailboxes without backing up the entire private mailbox database, use the **-I** *I<Input_file>* command option. See "How to Use an Input File to Specify Multiple Private Mailboxes for Backup" on page 43.

Figure 5. Private Mailbox Save Sets
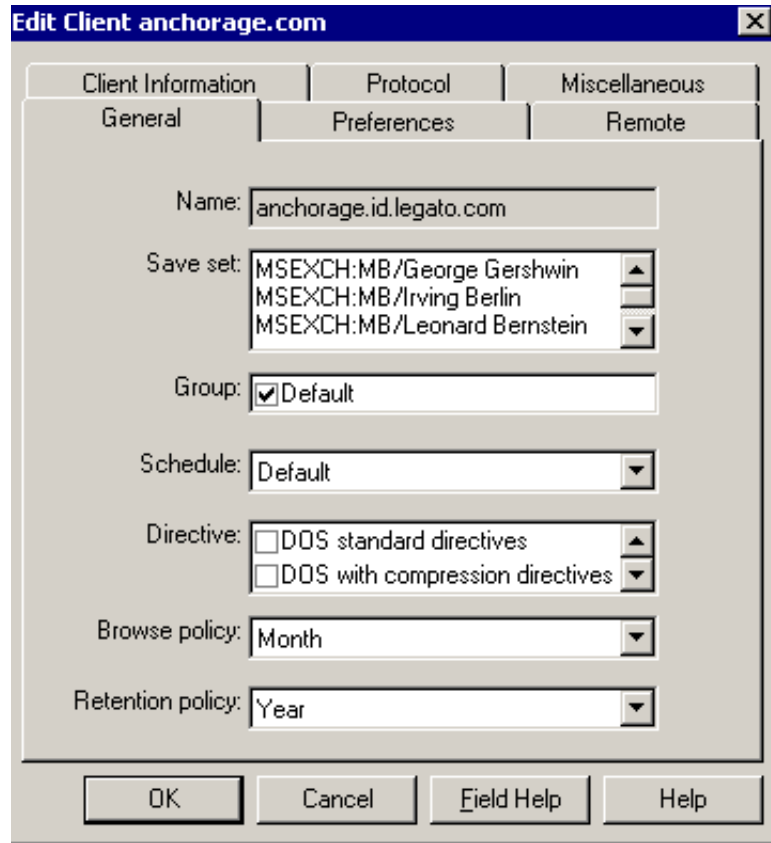
How to Select Schedule, Browse policy, and Retention Policy

To set the schedule, browse policy, and retention policy:

1. In the NetWorker Administrator Edit Client dialog box, click the drop-down list to choose from the pre-configured schedules in the Schedule box.

2. In the Browse policy box, click the drop-down list to select the browse retention period.

3. In the Retention policy box, click the drop-down list to select the browse retention policy period.

Task 3: Enter Remote Access Accounts and Users

1. Select the Remote tab of the Edit client dialog box.

2. In the Remote Access text box, enter the names of users and hosts who will back up client files, as follows:

   In the Backup Command text box, type the NetWorker Module backup command and the command options that you need. Enter:

   nsrxchsv.exe

Figure 6. Enter Remote Access Accounts and Users
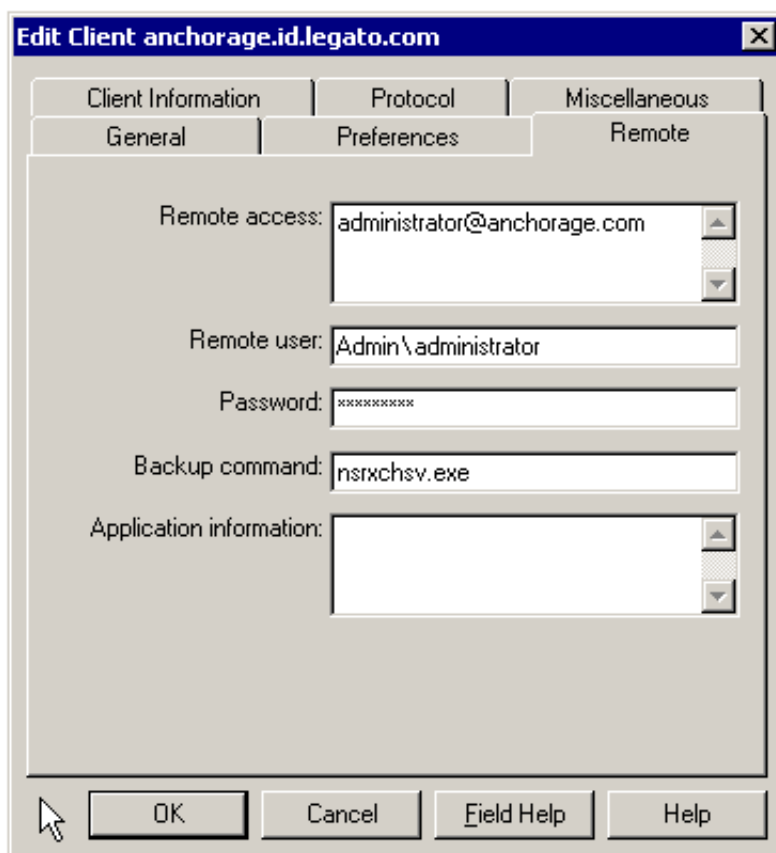
Task 4: Test the Configuration

Test the configuration by using the "Group Control" feature in the NetWorker Administrator GUI to start the backup, or verify that the first automatic backup was successful after it runs at the first scheduled time. Refer to the *Legato NetWorker Administrator's Guide* for instructions on using the Group Control feature.

Note: Write the results of a scheduled backup to a log file by entering the following in the Notifications dialog box: **nsrlog -f** *filename.* Refer to the *Legato NetWorker Administrator's Guide* for details on using the NetWorker administration program to customize your notifications.

How to Use an Input File to Specify Multiple Private Mailboxes for Backup

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To schedule a backup for multiple mailboxes without backing up the whole mailboxes database, create and save an Input file.

- Enter the **-I** *<input-file>* option in the Backup Command text box in NetWorker Administrator. The **-I** *<input-file>* option reads the mailbox names to be backed up from the Input file.

- To add or remove individual mailbox names, you can edit the Input file.

To back up multiple private mailboxes, perform these tasks:

- "Task 1: Create an Input File" on page 44
- "Task 2: Configure a NetWorker Backup Group" on page 44
- "Task 3: Create a Client Resource for the Exchange Server" on page 44
- "Task 4: Start the Exchange Backup Group" on page 46

Task 1: Create an Input File

Create an input file as follows:

1. Use any text editor to create an input file in DOS *.txt* format. Enter the names of the mailboxes that you want to back up on separate lines, *without* quotation marks, as shown in Figure 7:

Figure 7. Mailbox Names in Input File
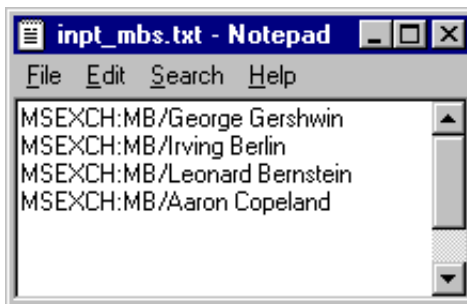
2. Save the input file to the default directory, which is the installation executable path specified on the NetWorker client: *\nsr\bin*.

Task 2: Configure a NetWorker Backup Group

Edit the Group resource as follows:

1. From the Edit Group dialog box, click the General tab, and enable the Autostart option for the group.

2. In the Backup Level field, enter Full for the backup level. (Only full backups are supported.)

3. In the Activity Timeout field, specify a large number (for example, more than 300).

4. In the Schedule field, choose a schedule or create one of your own.

Task 3: Create a Client Resource for the Exchange Server

Edit the Client resource as follows:

1. From the Create/Edit Client dialog box, select the General tab, and in the Save set text box, enter **MSEXCH:MB**.

2. In the Remote tab of the Edit Client dialog box:

   a. Enter the names of users and hosts who will be allowed to back up client files in the Remote Access text box.

   b. If the \nsr\bin file is in the default directory (<install path>:\nsr\bin), enter the backup command, the command option, and the name of the input file in the Backup Command text box:

      nsrxchsv.exe -I <Input_file>

   c. If the input file is located in a directory other than the default, enter the backup command, the command option, and the full path to the file, using quotation marks and double backslashes as shown in Figure 8:

      nsrxchsv.exe -I "C:\\my_folder\\input_file.txt"

Figure 8. Entering Input File Option
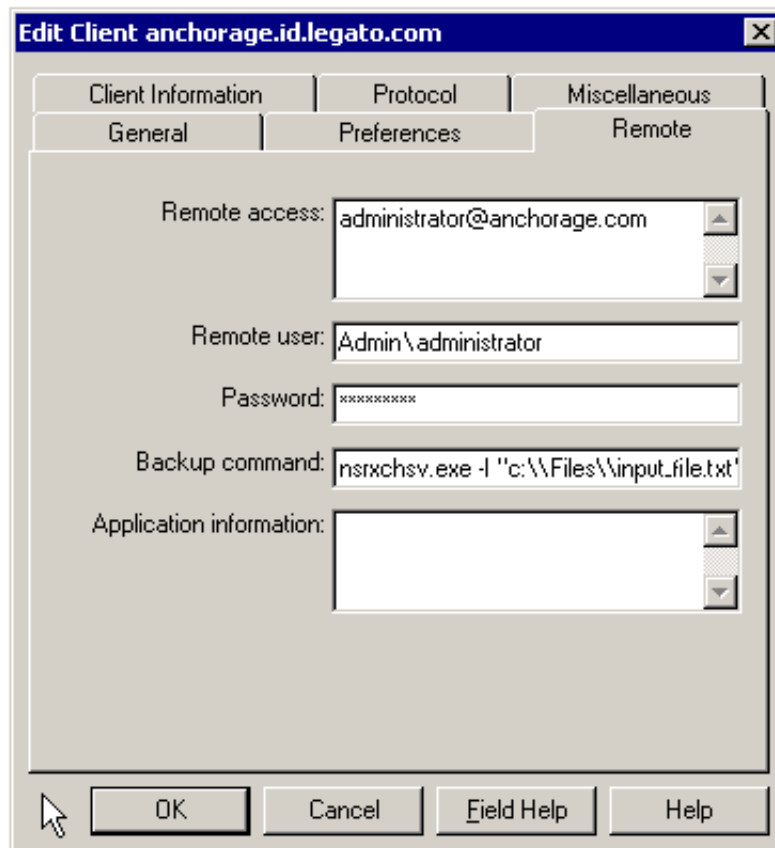
Task 4: Start the Exchange Backup Group

Start the Exchange Backup Group by:

- Using the NetWorker Administrator software's "Group Control" feature.
- Allowing the next scheduled backup to run at the preset time.

For instructions on using the "Group Control" feature, refer to the *Legato NetWorker Administrator's Guide* for your NetWorker software.

Planning Backup Storage

NetWorker provides a means for directing your backups to specific sets of data storage media.

3

Using Volume Pools

Using volume pools allows you to establish a logical and systematic method for tracking, organizing, and sorting your backup data. Volume pools are always associated with a label template. The label template provides an automated method of identifying media assigned to a pool.

What is a Volume Pool

A volume pool is a collection of labeled media volumes containing specified data from a NetWorker backup. To help organize your storage management, you can direct related data to the same pool. Volume pools provide the ability to segregate backed-up data, such as information in a database, transaction logs, and files. Pools also allow you to direct backup data to specific devices.

The NetWorker software writes data to labeled volumes associated with a specific volume pool you specify. All NetWorker volumes belong to either a preconfigured pool or a pool you create. If you do not assign data to a specific pool of volumes, NetWorker automatically uses the Default pool and looks for volumes with the pool label "Default."

Each NetWorker server has a Pools resource.

How to Create a New Volume Pool

To create a new pool:

1. Click Manage Pools in the Configure tab to open the Pools window.

2. Right-click on the main Pools icon, and select Create from the pop-up menu to open the Create Pool dialog box.

   For further instructions on creating pools, refer to the *Legato NetWorker Administrator's Guide* for your NetWorker software.

Volume Pool Locations and Contents

NetWorker uses the choices you select to sort backed-up data to specific backup volumes labeled for the pool. You can sort NetWorker backup data by several categories:

- Object type
- Backup group
- NetWorker client
- Save set
- Backup level

Each pool has a "Pool type" designation, which tells NetWorker whether the volume contains data that has been archived, backed up, or migrated. For the NetWorker Module for Exchange Server, the only valid pool types are "Backup" and "Backup clone."

The NetWorker Module software directs full backups to a NetWorker *data pool*, and directs incremental and differential backups to a NetWorker *log pool*. You can specify different data pools and log pools for different NetWorker backup groups.

The NetWorker Module software only sends transaction log backups to separate media for incremental or differential backups. The first backup of a database is always performed as a level "full," with all backed-up files directed to the media labeled for the MSXData pool.

For more information about using NetWorker volume pools, see the *Legato NetWorker Administrator's Guide*.

3

Customizing Volume Pools

This section explains how to customize volume pools for the NetWorker Module in NetWorker Administrator. You set the volume pool names in the NetWorker Administrator's Pools resource. A valid volume pool name is any valid NetWorker name of 1024 characters or less. At least one volume must be labeled for each pool.

For more information about using NetWorker volume pools, see the section on device and media management in the *Legato NetWorker Administrator's Guide*.

How to Customize Volume Pools

3

Use the NetWorker Administrator to customize volume pools and label templates in NetWorker Administrator for separating data and transaction log backups:

1. Create a data volume pool, following the instructions provided in the *Legato NetWorker Administrator's Guide*. For example, specify "MSXData" as the entry for Name. Select a backup group that is unique for Microsoft Exchange Server as the choice for Groups. Specify "full" as the selection for Levels and select "Yes" as the choice for Store Index Entries in the Preferences tab of the Create Pool dialog box.

2. Save the Pool configuration.

   A dialog box appears, asking you to select a label template or apply the configuration again to automatically create and select a label template.

3. Click OK and reapply the configuration to automatically create a label template named "MSXData" and assign it to the MSXData pool configuration.

4. Create a log volume pool. For example, use "MSXData" as the entry for Name and select the backup group you customized as the choice for Groups. Specify "incr" and "1" as the selection for Levels. Before saving the configuration, ensure that "Yes" is highlighted as the choice for Store Index Entries.

5. Save the Pool configuration.

   A dialog box appears, asking you to select a label template or apply the configuration again to automatically create and select a label template.

   Note: The first backup of a database is always performed as a level full, with all backed-up files directed to the media labeled for the data pool, which is "MSXData" in this example. The NetWorker Module software sends both differential and incremental backups to the log pool.

6. Click OK and reapply the configuration to automatically create a label template named MSXELogs and assign it to the MSXELogs configuration.

7. Insert new media, or select another drive or slot with media loaded for labeling.

8. Click the Label toolbar button to label media, selecting the label template customized for the MSXData pool. Repeat the process to label media for the MSXELogs pool, selecting the label template customized for the pool.

Viewing Backup Results

NetWorker provides several reports about the results of a backup:

- A series of messages written to the NetWorker Module for Exchange Server log files on the Exchange Server host (*nsr\applogs\nsrxchsv.log*).

- A scrolling list of messages displayed in the Group Control window of the NetWorker administration program.

  These messages are displayed in three lists: pending save sets, completed save sets, and failed save sets.

- A "savegroup completion" notice upon completion of a scheduled backup.

Important: When one or more individual databases in a storage group are selected for backup in NetWorker User, the save set name that is assigned to the backup in the NetWorker index is the name of the storage group that holds the databases. For example, if you perform a backup that consists of **MSEXCH:IS/SG1/DB1**, **MSEXCH:IS/SG1/DB2** and **MSEXCH:IS/SG2/DB3**, you see two save sets in the index, named MSEXCH:IS/SG1 and MSEXCH:IS/SG2**.** If you specify the backup operation at a higher level (**MSEXCH:** or **MSEXCH:IS)** when you perform the backup operation, the higher-level name is assigned as the save set name.

Setting up E-mail Notification of Backup Results

If you are using a NetWorker server for UNIX, you can send an e-mail notification of the results of a scheduled backup to the owner of a save set.

1. Use the "View Details" option to edit the NetWorker client resource for the computer running NetWorker Module for Exchange Server.

2. Edit the Owner Notification attribute and enter a notification command directed to the login ID of the owner.

3. Edit the notification setup for this report using the Customize feature of the NetWorker administration program. Refer to the section on setting up event notifications in the *Legato NetWorker Administrator's Guide* for details on using the NetWorker administration program to customize your notifications.

The *Legato NetWorker Administrator's Guide* provides complete details about the reports generated by NetWorker.

3

Chapter 4: Manual Operations: Backing Up and Restoring

This chapter provides information on performing recovery operations and manual backups, on the client host. Recoveries and manual backups can be performed at any time.

Because the way that objects are backed up can affect the ways that they can be restored, some information about recovering mailboxes is included in sections about performing backups.

This chapter including the following topics:

- "Manual Backups" on page 51
- "Performing a Manual Backup" on page 52
- "Performing a Data Recovery" on page 58
- "Monitoring Backups and Recoveries" on page 75

You can start backup and restore operations at any time, on the client host. Make sure that a scheduled backup of the objects you want to back up or restore is not in progress before performing a manual backup or restore operation.

Manual Backups

There are two ways to start a manual backup:

- Use the NetWorker User for Exchange Server user interface (see "Performing a Manual Backup" on page 52).
- Use the Windows command line interface (see "Appendix A: Commands, Command Options and Save Sets" on page 99).

Performing a Manual Backup

Complete the following tasks to start a manual backup:

- "Task 1: Initiate a Manual Backup" on page 52
- "Task 2: Select and Mark Objects for Backup (or Recovery)" on page 53
- "Task 3: Select Backup Options" on page 54
- "Task 4: Perform the Backup Operation" on page 56

Task 1: Initiate a Manual Backup

1. Open the NetWorker User for Exchange Server software. It opens to the Startup window (Figure 9):

Figure 9. Startup Window
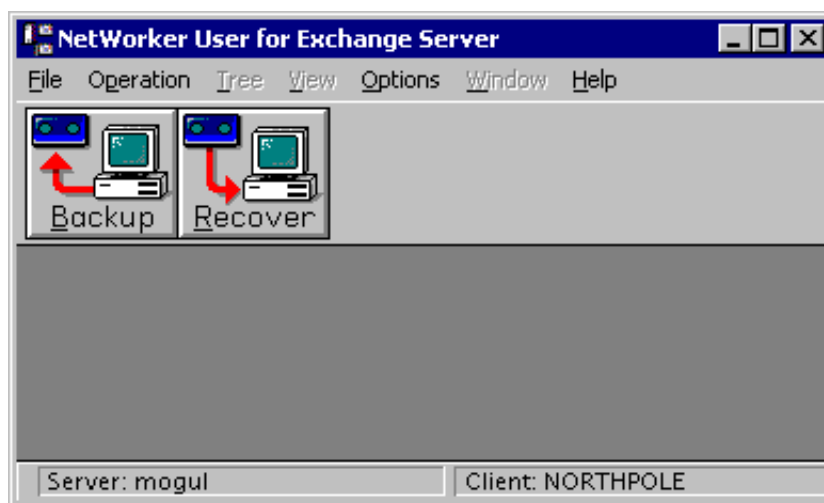
2. Click the Backup button to open a Backup browse window (or, to perform a recovery, click on the Restore button to open a Restore window). These windows show Exchange Server objects (Figure 10).

Figure 10. Backup Window
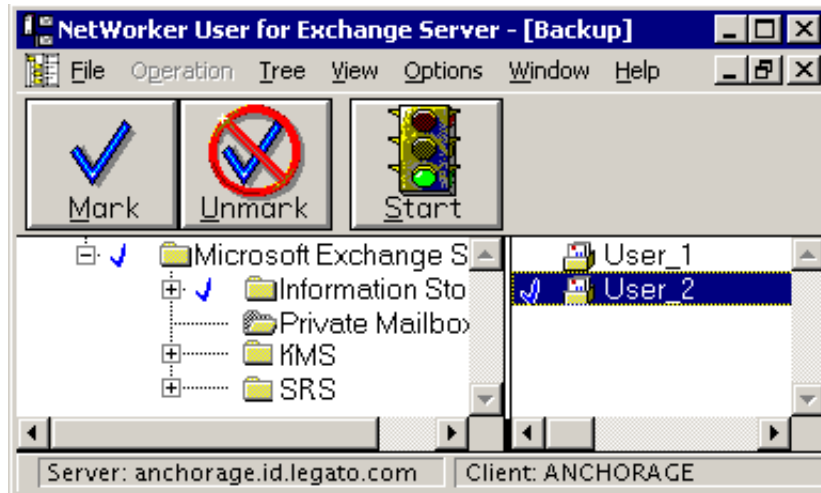
- The Microsoft Exchange Server folder contains these Exchange Server objects:
    - Information Store
    - Private Mailboxes
    - Key Management Server (if installed)
    - Site Replication Server (if installed)

Task 2: Select and Mark Objects for Backup (or Recovery)

The NetWorker User browse windows -- that is, the Backup and Recover windows -- work identically, and conform with basic Windows structure. Select and mark items for backup and recover operations as follows:

How to Open and Close Folders

To open and close folders so that you can view their contents:

- Double-click the folders or the boxes beside them to expand folders.
- Double-click again to close folders.

How to Select and Mark Objects

1. Select the Exchange Server object that you want to back up or recover by clicking on it.

2. Click the Mark button to put a check mark beside the object, or right-click on the object to mark it. The check mark indicates the object will be included in the backup or recover operation.

What is Marked; What is Backed Up (or Recovered)

- To back up or recover the entire Information Store, mark the Information Store folder. Marking the Information Store specifies a sequential backup of all the databases contained in each storage group on the Exchange Server.

- To back up or recover individual databases, open the database folder in the left-hand side of the browse window, and mark the individual database in the right-hand pane.

- To back up or recover all databases in a storage group, mark the icon(s) in the left-hand pane of the window. Marking a storage group specifies a sequential backup of each database contained within the storage group.

- To unmark an item, select the item, then click Unmark. If you have a multi-button mouse, the secondary button (usually the right mouse button) alternately marks and unmarks files.

Task 3: Select Backup Options

The Backup Options that are available in this dialog box are explained below Figure 11.

1. Open the Options menu and select Backup Options to open the dialog box (Figure 11).

Figure 11. Backup Options Dialog Box
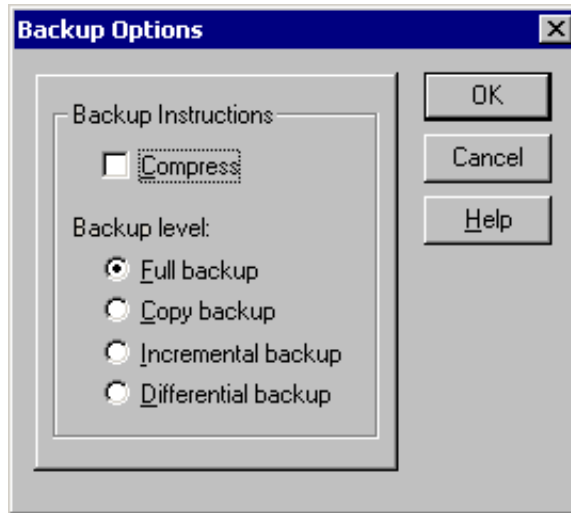
2. Select the options you want. The available options are:

   - **Compress data -** Compress all selected components before saving to the NetWorker server.

   ⚠ ——————————————————————————————

   Important: Microsoft does not recommend compressing Exchange Server components.

   ———————————————————————————————

   - **Backup level** - To ensure reliable data recovery, manual mailbox backups can be performed only at level full, not at the incremental or differential levels. To set the level for this backup, click on the circle beside the level you want.

3. Click Ok to save settings and close the box.

Task 4: Perform the Backup Operation

When you are finished marking objects and setting the backup options:

1. Click the Start button to start the backup or recovery (see).

    • The amount of time NetWorker takes for the backup depends on the amount of data to be transferred, network traffic, server load, and tape positioning.

Monitor the Backup

• During the backup, NetWorker displays messages for each object backed up in the Backup Status window, so you can monitor the progress of your backup.

• shows the Backup Status window you see when the backup operation is successful.

• If your backup takes a very long time and no messages appear in the status window, there might be no backup volume mounted on the server. Contact your administrator for assistance.

4

Complete the Backup Process

1. After your backup is finished, close the Backup Status window ().

    • You can cancel the backup at any time by selecting End Backup from the File menu or by closing the Backup window.

!

Important: A backup cannot run if there is no media volume mounted at the NetWorker server or *storage node* (backup device). Therefore, it is best to have a labeled media volume mounted in the storage node at all times. The volume should be labeled for the volume pool where the backup is to be directed. If there is no volume in the backup device when a scheduled backup is triggered, no messages will be displayed in the status window and the backup will wait for operator intervention.

Figure 12. Backup Status
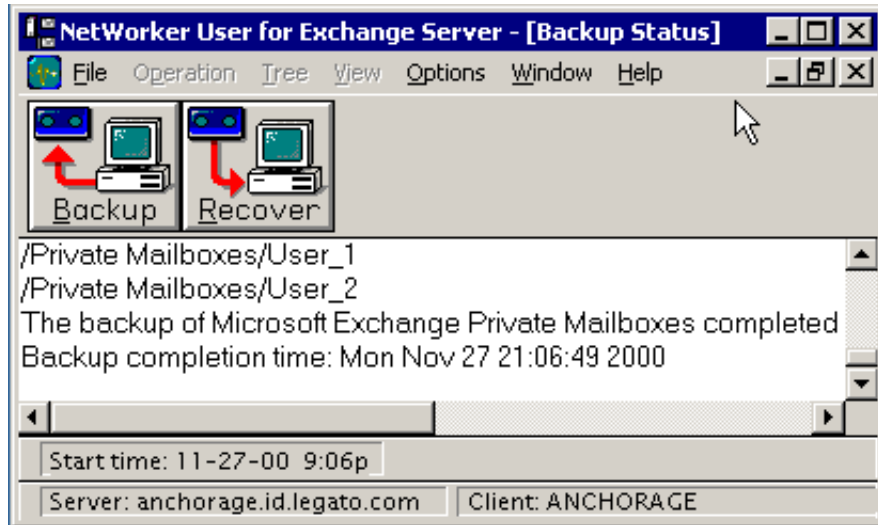
Note: For instructions on performing backups within a Microsoft cluster, see "Backing Up and Recovering within Microsoft Clusters" on page 79.

4

Performing a Data Recovery

This section covers the information you need to perform recoveries from your backups. Before starting a recovery, read the following:

It contains the following topics:

How to Set the Database Properties to Allow Recoveries

To recover data from an Exchange server database, you must first set the Exchange Server database properties so that the database can be overwritten with restored data. Note, however, that for KMS and SRS, this is not necessary.

In the Exchange System Manager window:

1. Right-click on the icon for the Exchange database from which you want to restore. Select Properties to display the Database Properties dialog box.

2. Select the Database tab. Mark the check box labelled The database can be overwritten by a restore (see Figure 13 on page 59).

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Figure 13. Database Properties Dialog Box
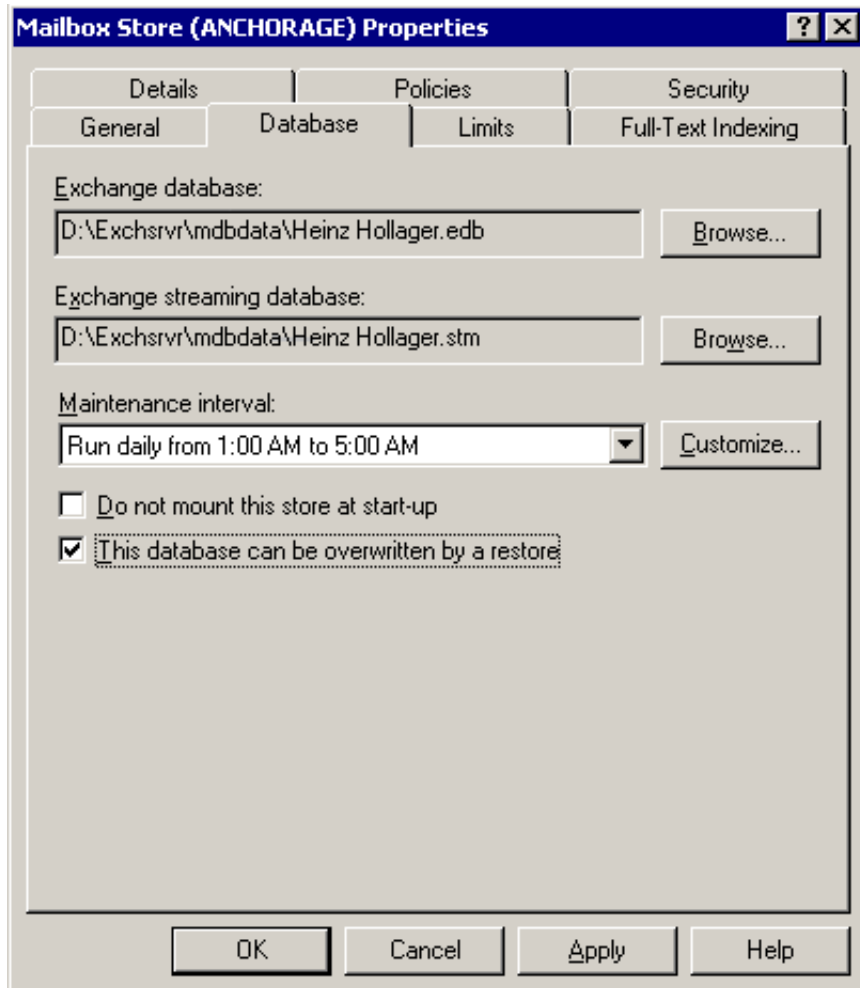
How to Select and Mark Objects for Recovery

1. In the NetWorker User for Exchange Server window, click the Recover button to open the Recover window.

Figure 14. Recover Window
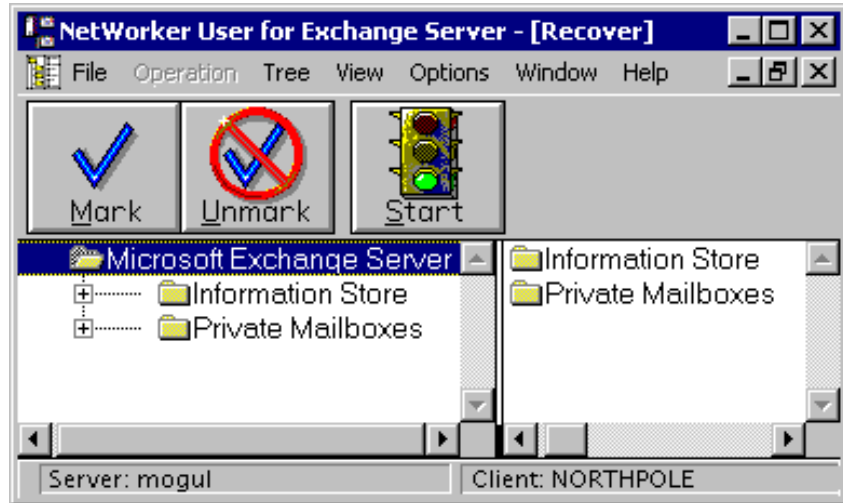
2. Open and close folders and mark and unmark objects for recovery. For detailed instructions, see " Task 2: Select and Mark Objects for Backup (or Recovery)" on page 53.

How to Select Recover Options

You can set options in the Recover Options dialog box before you start a recovery.

1. Select Options>Recover. The Recover Options dialog box appears (see Figure 15 on page 61).

Figure 15. Recover Options Dialog Box
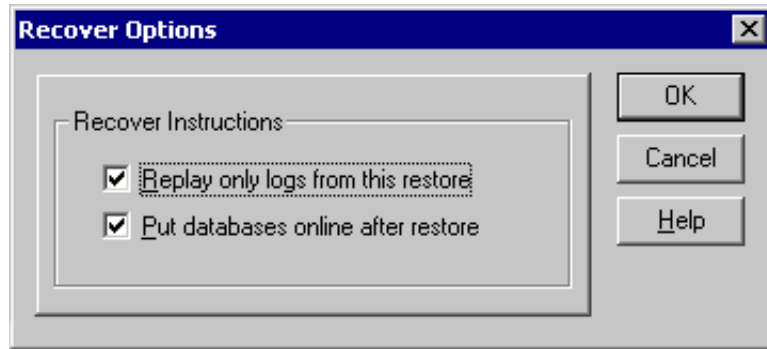
2. Select the recover options you need. For details, see "Recover Options".

Recover Options

Replay only recovered logs - Using this option causes Exchange to replay only recovered logs. Existing log files are not replayed.

Use this option to restore a database to the state it was in at the point in time the backup was performed. If this option is not selected, Exchange will replay all recovered logs and then it will replay any existing logs. This gives you the option to restore a database to a point in time, or replay all logs to minimize the loss of transactions.

Put databases online after restore - Select this option if you want restored databases to be mounted automatically, when the restore is completed.

Click the box beside this option to unmark it anytime you want to put the database online manually after recovering data.

Selecting a Browse Time

This section explains how to select a browse time so that you will be able to recover the version of your Exchange Server data that you want. By using the NetWorker User Change Browse Time and Show Version tools, you can restore an Exchange Server object to the state it was in at any time that it was backed up.

Browse Time Background

When you select a browse time, you see a directory tree showing backups that were created at that time.

When you open the Recover window, the browse time is set to the date and time at which you opened it. As a result, you see the most recent entries for backed-up objects.

You can browse all the backed-up versions of an object, within the retention period. For example, if the retention period is one year, you see entries for objects that were backed up a year ago.

You can change the browse time by using the Change Browse Time tool in the Options menu.

Versions Background

Using Versions under the Options menu, you can view the history of the currently selected object, including all the times it was modified and backed up. Versions are sorted according to backup time (most recent first). These versions are available for recovery.

When the Versions dialog opens, the current version is selected. Each version is listed with its size, backup time, and backup volume location. If the backup volume is currently online, the location specifies the device as well.

Use the Versions dialog box to find a version of your object from an earlier point in time, and then change your browse time to the backup time of the version you want to recover. After you change the browse time, you see other objects that were in existence (and backed up) at the same time as the selected object or folder.

Exchange Server Background

Recovering Exchange Server objects – that is, storage groups, databases, or mailboxes – requires recovering several, possibly many, related files. In addition to the main database files (the *.edb* and *.stm* files), transaction logs and database patch files are required, to make the database consistent.

Backup of Exchange Servers can take several hours because of the size of items that must be backed up. A full backup takes longer than an incremental or differential backup. Generally, the backup schedule is set so that a full backup of each Exchange Server is performed periodically, for example, once a week. Incremental or Differential backups, are performed more frequently – usually once a day.

The NetWorker Module for Exchange Server software (for which NetWorker User for Exchange Server is your interface) uses the browse time as a reference point for identifying the files that must be restored to fulfill a recovery request. When you start a recovery, NetWorker Module searches the client index on the NetWorker server to find the most recent full backup, with respect to the browse time. It then restores all the files that are required for recovering the Exchange Server objects you requested, from the start of that full backup through the end of the specified browse time.

Optimal Browse Times

Setting the browse time to any time that falls between backup operations is fine. Do not select a browse time that falls during a backup operation – in other words, while backup data was being written to the NetWorker server. Browse times should be set for times between backup operations, to ensure that the referenced backups are complete.

Example:

This example illustrates how the set of files required for recovering Exchange Server objects changes according to the browse time that is selected.

The timeline in Figure 1 shows a hypothetical sequence of backups, consisting of a full backup followed by three incremental backups, and a final full backup.

Below Figure 1 there is a list of the sets of files required for recovering Exchange objects to the states they were in at different points along the timeline.

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Figure 16. Browse Time Selection
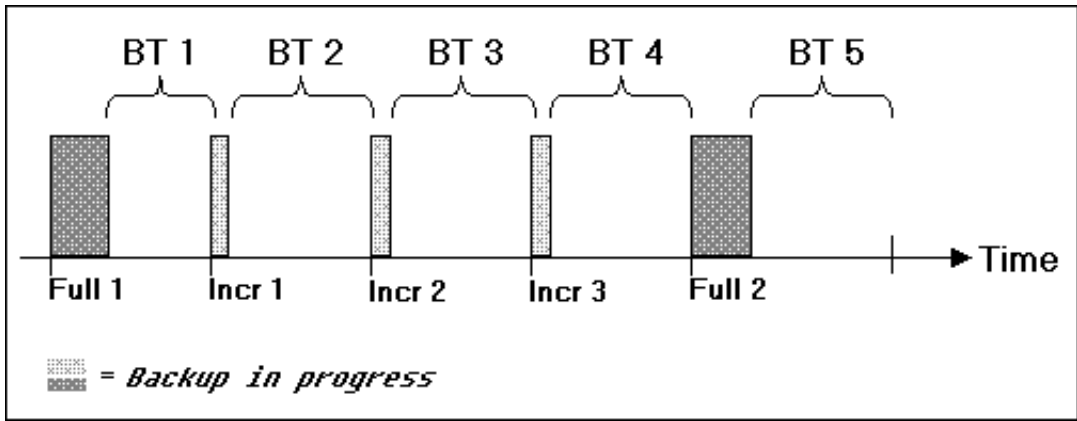
- To recover the data backed up during the first full backup (Full 1), select a browse time in the range BT1 (that is, any point after Full 1 ends, but before Incr 1 begins).
- To recover both Full 1 and Incr 1, select a browse time in the range BT 2 (that is, any point after Incr 1 ends, but before Incr 2 begins).
- If no browse time is selected, NetWorker Module defaults to the current time. In Figure 1, this has the effect of selecting Full 2.

Summary - Selecting a Browse Time

Table 5 summarizes the backups that are recovered for each Browse Time range shown in Figure 16.

Table 5. Effects of Browse Time Selection

Browse Time Selection Range	Backup that is Restored
BT 1	Full 1
BT 2	Full 1 + Incr 1
BT 3	Full + Incr 1 + Incr 2
BT 4	Full + Incr 1 + Incr 2 + Incr 3
BT 5	Full 2

How to Change the Browse Time

While you are in the Recover window, you can browse the online index as of any time in the past. The Change Browse Time option on the View menu allows you to view the entries for your backed-up files from that point in time.

Check with your administrator to find out how long backups are retained. For example, if you would like to recover a lost database or mailbox that you backed up six months ago, you can do so only if backup volumes are retained for at least six months.

Change the browse time to the date of the backup you need.

When you open the Change Browse Time dialog box it shows the current date and time. To select the date you want:

1. Select Change Browse Time from the View menu to open the Change Browse Time dialog box.

2. Select a new date from the calendar, if necessary. Use Previous Month or Next Month to change from the current month.

3. Enter a new time (for example, 10:28p) and click OK. Valid values are:

   - Hours: 12 or under
   - Minutes: under 60
   - "a" for a.m. or "p" for p.m.

After you change the browse time, the Recover window displays the entries for the specified time in the past. The new browse time is displayed in the status bar at the bottom of the Recover window. All objects you mark are recovered from a backup made at the selected time.

If you select a browse time that is earlier than the first time you backed up a file, the file index is empty. If you change the browse time to some time in the future, you see the files as they look at the present moment. If you enter a time format that NetWorker does not understand, you receive an error message.

Using the Versions Dialog Box

When you open the Recover window, you see the objects available for recovery as of the date and time you opened the window. You can open the Versions dialog box to view all the available backups for any one of these objects. In the box, you can select the version you want, mark it for recovery and open a Recovery window for the desired browse time, so that you can start the recover operation.

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Versions Dialog Box Contents

The data displayed in this dialog box pertains to the object that was selected in the Recover window when the dialog box was opened.

Name -- the name of the selected object.

Size -- the size of the selected object, in kilobytes.

Mod Time -- the time the selected object was last modified.

Backup Time -- the time(s) the object was backed up.

Location -- the object was backed up to this backup volume

Change Browse Time -- changes the browse time to the backup time of the version currently selected in the Versions dialog box.

Mark -- click to mark the selected object for recovery or verification.

Unmark -- click to unmark a marked object.

How to Use the Versions Dialog Box

To use the Versions dialog box:

1. In NetWorker User, click the Recover toolbar to open the Recover window.

2. Select the object you want. If you highlight multiple items, the last item selected is the one for which versions will be shown.

3. From the View menu, select Versions. There is a short delay as all the available backed-up versions of the object are gathered.

4. The Versions dialog box appears. Select the version that you want to recover, click the Mark button to mark it for recovery, and with the version still selected, click the Change Browse Time button to open a Recover window to the correct browse time, with the object marked for recovery.

5. To start the recover operation, click the Start button.

Note: If you do not mark the version of the object that you want to recover before you click the Change Browse Time button, the Recover window opens to the desired browse time, with none of the objects in the window marked for recovery. You can then select and mark the object(s) that you want to recover.

How to Start a Recovery

To start a recovery operation:

1. In the NetWorker User for Exchange Server window, click the Recover button to open the Recover window.

2. (Optional) Select Change Browse Time from the View menu, or use the Versions dialog to select a Save set to recover.

3. In the right pane of the Recover window, select the icon of the item you want to recover.

4. Click the Mark button. A check mark appears next to the items you selected. To unmark an item in the Recover window, click the Unmark button or right-click on the item.

Recovering Exchange Server Data

An administrator can initiate a recovery at any time, by:

- Using the NetWorker User for Exchange Server program.
- Entering the appropriate command and options at a Windows command prompt.

Note: Recoveries *cannot* be performed from the NetWorker Administrator program.

Before you perform a recovery, make sure that objects marked for recovery are not in the process of being backed up.

How to Recover an Exchange Server Object

1. In the NetWorker User for Exchange Server window, click the Recover button to open the Recover window.

2. (Optional) If you want to recover an object from a different point in time, select Change Browse Time from the View menu.

3. In the right pane of the Recover window, select the object you want to recover.

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4. Click the Mark button. A check mark appears next to the objects you selected. To unmark an item in the Recover window, click the Unmark button.

   If you have a multibutton mouse, the secondary button (usually the right mouse button) alternately marks and unmarks files, one file at a time.

5. Click the Start button.

If the backup volume containing your objects is loaded in the device attached to the NetWorker server, the recovery starts.

If the recover operation does not begin soon, the wrong volume might be mounted. Contact your administrator for assistance. If necessary, cancel the recovery by selecting End Recover from the File menu.

When the recovery is complete, NetWorker displays messages in the Recover Status window.

Note: For instructions on performing recoveries within a Microsoft cluster, see "Chapter 5: Backing Up and Recovering within Microsoft Clusters" on page 79.

Recovering the Key Management Server (KMS)

Key Management Server does not provide an automated way to take a database offline prior to performing a recover. It also requires the user to provide a password whenever the KMS service is started. For these reasons the KMS recover process requires more manual steps than the recover process for Exchange or SRS.

KMS recovery also requires the Active Directory to contain the user accounts of administrators who were given full permission to manage KMS.

If the Active Directory containing the KMS administrator accounts is lost or damaged, it must be recovered before you can recover the KMS.

How to Recover the KMS Database

Recover the KMS database as follows:

1. Verify that the required KMS administrator accounts exist in the Active Directory. Restore the Active Directory if necessary.

2. Stop the KMS service (**MSExchangeKMS**).

3. When the KMS service is stopped, move any existing KMS files from the KMS installation folder (*KMSDATA)* to a temporary folder.

4. Start the KMS service. Verify that it is ready for a recover operation, by making sure the application event log shows the following error message:

```
KMS cannot mount the key database. Either the database is
missing or it is corrupted. The service started, but
Admin/User can not do any operation except restoring the
database from a backup set. After restoring, please stop and
restart the service.
```

5. Open NetWorker User for Exchange Server. Mark and recover the version of KMS that you want to recover, and click the Start button to perform the recover operation.

6. Stop and restart the KMS service following the recovery.

7. Delete the files you saved to the temporary folder.

Recovering the Site Replication Server (SRS)

Recover the SRS, a specialized Exchange Server database, by following the procedures for recovering any other Exchange Server database. For instructions, see "How to Recover an Exchange Server Object" on page 67.

4

Recovering Private Mailboxes

Before you use instructions in this section, check to see if you can recover your deleted items using the Exchange 2000 Server System Manager and Microsoft Outlook.

In earlier versions of Microsoft Outlook® and Microsoft Exchange Server (Outlook 8.03 and Exchange Server 5.5), it was possible to use Exchange Server to recover Outlook items after their permanent removal from Outlook folders. In Exchange 2000 Server this feature is improved. Within the retention period (configurable by the administrator), you can recover entire mailboxes. Refer to Microsoft documentation for detailed information.

User-Initiated Recovery

If users are having mail delivered to personal folders stored on their client systems, they are responsible for the recovery. They can recover the the personal folders and Personal Address Book, if needed, from a local backup or file server backup if they stored them on a mapped server drive. If they did not perform any local backups and no file server backups are available, their data is lost.

Administrator-Initiated Recovery

If a user's client configuration keeps messages and other objects in the Exchange Server Information Store, then you (the Exchange administrator) have one of two options:

- Recover the required database from the Information Store (see "Performing a Directed Recovery of a Database" on page 72).

- Recover the user mailbox from a mailbox backup (assuming the mailbox was individually selected for backup). For complete backup information, refer to "How to Recover Private Mailboxes from a Mailbox Backup".

If you work primarily with offline folders, you need to log on to your mailbox on the server to retrieve deleted items. Some items or folders may not be recoverable because the length of time that deleted items are stored on the server has expired. The time period for which objects are retained can be set by the administrator. For public folders, expiration dates take precedence over the length of time set by the administrator.

How to Recover Private Mailboxes from a Mailbox Backup

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In NetWorker Module for Microsoft Exchange Server, you can only select entire mailboxes for backup or recovery. Individual folders and messages cannot be individually selected.

The processes involved in the recovery are: the latest backup of the mailbox prior to the recovery browse time is identified in the NetWorker index database and restored from the NetWorker server to a temporary file. The contents of the temporary file are copied to the Exchange information Store. When the recovery is complete, the temporary file is deleted. The contents of the mailbox are recovered to a folder called "Recovered Items," in the same mailbox as the one that they were in when they were backed up. The hierarchy of folders and messages present in the original mailbox is preserved in the Recovered Items.

If you work primarily with offline folders, you need to log on to your mailbox on the server to retrieve deleted items.

Some items or folders may not be recoverable because the length of time that deleted items are stored on the server is set by the administrator. For public folders, expiration dates take precedence over the length of time set by the administrator.

To recover individual user mailboxes:

1. In the NetWorker User for Exchange Server window, click the Recover button to open the Recover view.

2. (Optional) If you want to recover a mailbox from a different point in time, select Change Browse Time from the View menu.

3. In the right pane of the Recover view, select the mailbox you want to recover.

4. Click the Mark button. A check mark appears next to the mailbox you selected. To unmark an item in the Recover view, click the Unmark button.

   If you have a multibutton mouse, the secondary button (usually the right mouse button) alternately marks and unmarks files, one file at a time.

5. To begin the recovery, click the Start button.

6. When the recovery is complete, the contents of the mailbox are recovered to a folder called "Recovered Items," in the original mailbox. Inside the recovery folder, the hierarchy of folders and messages present in the original mailbox is preserved.

   A separate Recovered Items folder is created for each mailbox recover.

   Move the recovered items to a different folder.

7. When you are finished, delete the Recovered Items folder.

4

Performing a Directed Recovery of a Database

The Directed Recover command allows you to recover Exchange Server data to a new recovery server in case of a problem on the original recovery server. Use this feature if a system is inoperable, a disk drive has crashed, or a system has disappeared from the network. You can easily configure the replacement recovery server by recovering a set of files for it that were backed up from another existing client.

How to Configure for a Directed Recovery

Before you perform a directed recovery, ensure that the following conditions are met:

- In NetWorker Administrator, you are listed as an administrator in the Server Setup dialog box.
- In NetWorker Administrator, your host name or user@hostname is entered in the Remote access list of the NetWorker client from which the data was backed up.

![warning triangle]

Important: You *cannot* recover an Exchange 5.5 database to an Exchange 2000 server, or vice versa.

How to Start a Directed Recovery

You must manually create a target database on the recovery server if it does not exist. The name must *exactly* match the name of the database being recovered. Set the "database can be overwritten" property.

Follow these steps on the host to which the data is to be recovered:

1. In NetWorker User for Exchange Server, select Directed Recover from the Operations menu to open the Source Client dialog box.

2. Select the name of the client whose files you are recovering and click OK. The Destination Client dialog box appears.

3. Select the data you want to recover.

4. Click Start to perform the directed recovery.

For more information about directed recoveries, refer to the *Legato NetWorker Administrator's Guide*.

Peforming a Directed Recovery of a Private Mailbox from a Database Backup

You can recover a user's mailbox from a database backup using the Directed Recover feature in NetWorker User for Exchange Server.

To do this, you must recover the original Microsoft Exchange database to a new Microsoft Exchange Server host or virtual server. In the following procedures, *production server* refers to the original Microsoft Exchange Server host. The *recovery server* is the computer or virtual server to which you plan to recover the user mailbox.

After you recover the user mailbox to the recovery server, you must merge the recovered mailbox with the user's mailbox on the original production server.

Prerequisites

To set up the recovery server, configure a Microsoft Exchange Server host identically to the original Exchange Server host.

Software and Hardware Requirements are as follows:

- Microsoft Exchange 2000 Server
- Windows 2000
- Software versions and service packs on production and recovery servers must match.
- Create a target database with a name that exactly matches the database being recovered.
- Legato NetWorker 6.0
- Legato NetWorker Module 3.0 for Microsoft Exchange Server
- Hard disk: Sufficient capacity to accommodate temporary and restored Exchange Server files (varies with size of databases).

How to Prepare the NetWorker Server for the Directed Recovery

On the NetWorker server host:

1. Start NetWorker Administrator. If a client resource does not already exist, create one for the recovery server.

2. In the production server's client resource Remote access attribute, add: *Administrator@<recovery_server_name>*

For more information about NetWorker resources and resource attributes, see the *Legato NetWorker Administrator's Guide*.

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How to Recover a Mailbox from a Database Backup

In NetWorker Module for Microsoft Exchange Server, you can only select entire mailboxes for backup or recovery. Individual folders and messages cannot be individually selected. If an individual user's mailbox is accidentally deleted and purged, it must be recovered from a mailbox database backup.

The scenario for this procedure assumes:

- the user's mailbox was deleted and purged
- the user account was not removed from the Active Directory

The procedure is as follows:

1. Create a victim database on the recovery server. The names of the storage group and database on the recovery server must **exactly** match the original. Set the "database can be overwritten by a restore" property.

2. Run the NWM Exchange GUI on the recovery server. Select Directed Recover from the Operations menu. Select the client name for the original Exchange server.

3. Mark the database to be recovered and press the Start button.

4. After the recover is finished run the Exchange System Manager. Make sure the recovered database is online. Right-click on the database and select Run Cleanup Agent from the context menu. This will display the mailbox names with a red mark to indicate that they are not attached to an Active Directory user.

5. Select the desired mailbox. Right-click and select Reconnect from the context menu. Specify the name of an existing Active Directory user account for the mailbox.

6. Run the Active Directory Users & Computers application. Right-click on the user name and select Exchange Tasks from the context menu. Select the Move Mailbox task and follow the wizard to specify the desired target server and mailbox store. This will move the mailbox from the database on the recovery server to the desired production server.

How to Verify a Recovery

Log on to the recovery server. Use a Windows 2000 account with Exchange Server permissions.

1. If you did not select the option to restart Microsoft Exchange Server services after data recovery, restart them now from (Select Start > Programs > Administrative Tools (Common) > Services).

2. Verify that the recovered Exchange Server object that you recovered is present in the Exchange Server System Manager directory tree.

Recovery Recommendations

Recovery recommendations for NetWorker Module for Microsoft Exchange Server are:

- Minimize the number of transaction logs that are backed up by increasing the frequency of full backups. A full backup is needed when incremental or differential backups contain more than 50 log files.
- Perform test recover operations regularly.

4

Monitoring Backups and Recoveries

The Windows 2000 Performance Monitor is a tool for measuring the performance of your own computer or other computers on a network. It allows you to view the behavior of objects such as processors, memory, cache, threads, and processes. The Performance Monitor provides charting, alerting, and reporting capabilities that reflect both current activity and ongoing logging. You can use the Performance Monitor to monitor NetWorker Module for Exchange backup and restore operations. Because NetWorker Module for Exchange Server supports multiple Performance Monitor instances, it is also possible to monitor parallel operations.

This section explains how to use Windows 2000 to monitor backup and recovery operations that are in progress.

Using the Windows Performance Monitor

The Performance Monitor displays the NetWorker Module software in the Performance object sub-menu when there is a backup or recovery operation underway.

1. From the Windows Start menu, select Programs >Administrative Tools >Performance Monitor, to open the Performance Monitor window (Figure 17).

2. From the toolbar in the right-hand window pane, select the + icon to open the Add Counters dialog box.

   In the Select Counters From computer text field, make sure that the correct server is selected.

3. Open NetWorker User for Exchange and start a backup or recovery, then return to the Add Counters dialog box.

4. In the Performance Object field, select NetWorker Module for Exchange Server from the drop-down list.

5. In the Select Counters From list-box, select any of the counters that are supported for NetWorker Module and click on the Add button.

   Supported counters are:

   Average Rate -- Average throughput rate for all files in the current operation

   File Bytes -- Number of bytes processed by the current operation

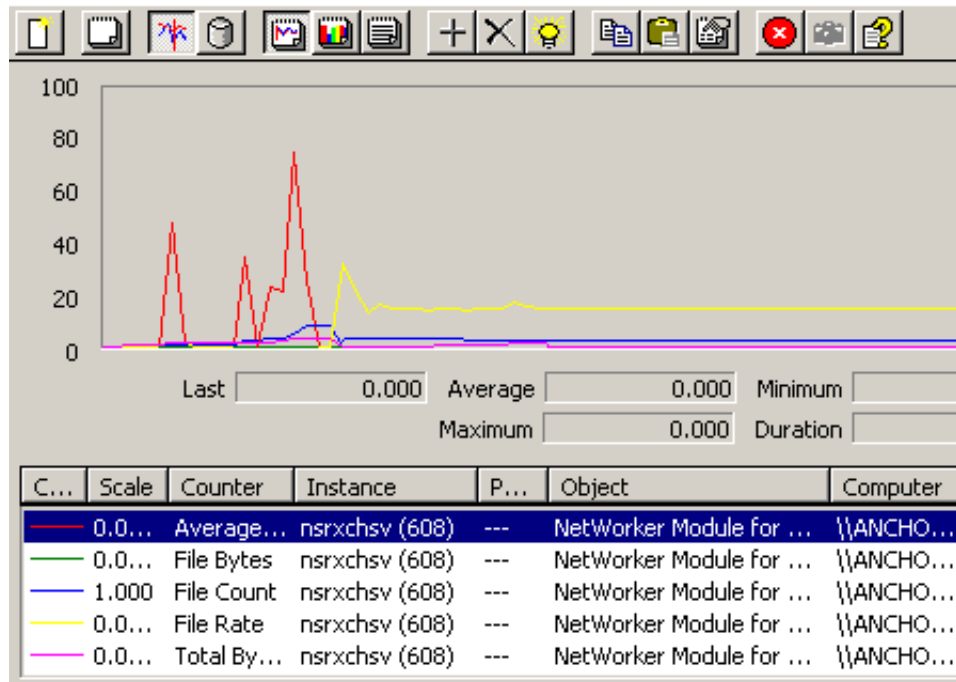   **File Count** -- Number of Exchange files or mailboxes processed by the current operation

   File Rate -- Throughput rate for the current file

   Total Bytes -- Total number of bytes processed during the current operation

   The display reflects the system activity as the backup or recovery operation proceeds (Figure 17 on page 77).

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Figure 17. Counters for NetWorker Module

4

Chapter 5: Backing Up and Recovering within Microsoft Clusters

NetWorker Module for Microsoft Exchange Server supports Microsoft Cluster Server (MSCS). This chapter briefly describes how to configure and use Legato NetWorker 5.7 or later together with NetWorker Module for Microsoft Exchange Server, within the MSCS environment. To use these instructions, the reader should be familiar with Microsoft clustering technology. For more information about MSCS, refer to Microsoft documentation.

Using NetWorker Module in Microsoft Clusters

The procedures for using NetWorker Module in a cluster (on a virtual server) are similar to those used on a stand-alone Exchange server host. However, certain configuration procedures should be followed to ensure reliable backups and to simplify recovery.

In the following instructions, *<node_a>* and *<node_b>* represent the names of the physical nodes, while *<virtual_server_name>* represents the network name of the Exchange server running on the virtual node. As you install and configure NetWorker Module, replace the names shown in the examples with the appropriate physical node and Exchange virtual server names for your cluster.

This chapter contains the following sections:

Scheduled Backups

To run scheduled backups, see the following procedures:

How to Configure Scheduled Backups within a Microsoft Cluster

Perform the following installation and configuration procedures to enable the NetWorker Module software to perform backups and recoveries of Exchange servers in a cluster.

1. Install the NetWorker client software and the NetWorker Module for Exchange Server software on the local disk of *<node_a>* and the local disk of *<node_b>*. For detailed instructions about installing the NetWorker software in a Microsoft Cluster, refer to the *Legato NetWorker Installation Guide*, *Windows version*.

   When you install the NetWorker client software, you have the opportunity to specify the names of the NetWorker server hosts that may be used to back up the cluster.

   a. To modify the list of authorized servers, edit the *<install_path>*:*nsr**res**servers* file.

   b. After editing the file, restart the NetWorker Remote Exec Service.

2. Install the enabler for NetWorker Module on the NetWorker server host.

How to Schedule a Backup within a Microsoft Cluster

In NetWorker Administrator on the NetWorker server host:

1. Create a group resource to perform the Exchange backup.

2. Create a client resource for each physical node and virtual server: *<node_a>*, *<node_b>*, and *<virtual_server_name>*. If you have more than one virtual server, create a client resource for each one. There can be as many as four virtual servers in a cluster.

3. Make sure that the NetWorker Server can get an authoritative DNS reply for at least one of the names in the client resource alias list. To do this, enter the following command, where *<alias_name>* is the name that is listed in

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the alias field of the Preferences Tab on the Client resource. At least one of the names in this list must get an authoritative DNS reply. The reply is authoritative when the reply message does not say "non-authoritative."

Enter:

<system_root>:**nslookup** *<alias_name>*

4. Edit the client resource for *<virtual_server_name>*:

In the Edit Client dialog box, click the General tab and enter the save set value for the type of backup you want. Save set specifications are listed in Table 8 on page 102.

The command option to enter varies, in this step, according to whether or not the virtual server name and client names match:

- If the virtual server name and the client names *do not match*, in the Remote tab of the Edit Client dialog box, enter the following command in the Backup command field, on each Exchange client resource:

  nsrxchsv -a *<virtual_server_name>* **-c** *<client_name>*

- If the virtual server and client names *match*, enter the following command in the Backup command field:

  nsrxchsv -a *<virtual_server_name>*

5. Edit the Remote access list to include the following literal strings:

   <system>@<node_a>
   <system>@<node_b>

6. Edit the Group resource for the Exchange backup group. Set the level to match the desired backup level. Table 6 shows available backup levels:

Table 6. Backup Levels

Backup Level selected	Backup Result
Full	Full backup
Incr	Incremental backup
1	Differential backup

7. Start the group manually, or allow the NetWorker Module for Exchange Server software to back up the Exchange Server at the next scheduled time.

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8. After the backup operation is finished, use the Networker Administrator program's Index tab to verify that the backup was indexed using the Exchange server's network name, *<virtual_server_name>***.**

Manual Backup within a Microsoft Cluster

The procedure for starting a manual backup operation within a Microsoft Cluster is similar to starting a manual backup on a stand-alone Exchange server host. The only difference is selecting the virtual server to make active, when the NetWorker User software opens.

This section explains how to select the virtual server to make active, when you open the NetWorker User for Exchange Server software in a Microsoft cluster. After the virtual server is selected, perform backups and recoveries just as you would normally. For detailed instructions on backing up, see "How to Start a Manual Backup within a Microsoft Cluster" on page 82.

How to Start a Manual Backup within a Microsoft Cluster

Use the NetWorker User for Exchange Server software to start a manual backup.

1. Open NetWorker User from within a Microsoft Cluster. The Exchange Servers dialog box opens, and shows a list of the online virtual servers in the cluster (Figure 18 on page 83).

2. Select the virtual server that should be opened, and then select OK (see Figure 18 on page 83).

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Figure 18. Exchange Servers Dialog Box

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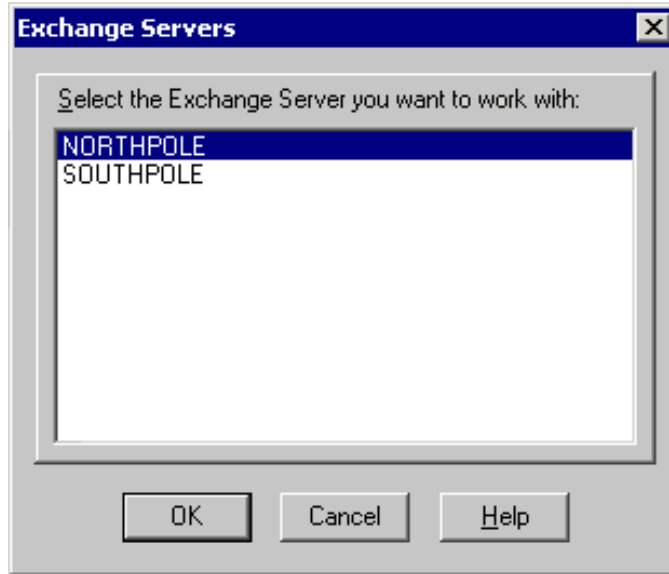
The NetWorker User for Exchange Server startup window opens (Figure 19).

Figure 19. Startup Window

3. To continue, follow the procedures in "Performing a Manual Backup" on page 52.

How to Change the Virtual Server

To switch to another virtual server at any time:

1. In NetWorker User, close the Backup or Recover window, if either is open.

2. From the Operation menu, click Select Exchange Server to open the Exchange Servers dialog box.

3. In the Exchange Servers dialog box, select the name of the virtual server to open, and click OK (see Figure 18 on page 83).

How to Start a Manual Backup from a Command Prompt, within a Cluster

Use the Windows command-line interface to start a manual backup of an Exchange virtual server in a Microsoft cluster as follows:

1. From the Windows command prompt on *<node_a>* or *<node_b>*:

   a. Enter the **nsrxchsv** command, with the **-a** and **-c** options, and other command options that you need.

The **-a** and **-c** options identify the Exchange virtual server and the NetWorker client index.

Save set syntax is shown in Table 8 on page 102. (If you do not enter a valid save set parameter, the program returns an error message and the program closes.)

Note: It is not necessary to use both the **-a** and **-c** options when the **-a** *<virtual_server_name>* and **-c** *<client_name>* are the same.

2. When the backup is complete, use the Index tab in the NetWorker Administrator to verify that the backup was indexed using *<virtual_server_name>*

Example:

This command is an example of one you might use to back up an Exchange virtual server:

nsrxchsv -s *<NetWorker_server>* **-a** *<virtual_server_name>* **-c** *<client_name>* **-l** *<Backup_level>* **MSEXCH:IS**

Using an Input File for Mailbox Names within a Microsoft Cluster

To use the **-I** *<Input_file>* option to list the names of mailboxes to be backed up on a virtual server in a Microsoft cluster, the client resource must specify a uniquely named input file for it, and must specify a uniquely named input file for the other virtual server(s) in the cluster. The input files must be identically located, in the *<install_path>:\nsr\bin* directory of each physical node.

The input file can be specified in the NetWorker Administrator program or on the command line. For detailed instructions about how to create and specify an input file, see "How to Use an Input File to Specify Multiple Private Mailboxes for Backup" on page 43, and Table 9 on page 102.

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Example:

1. For *node a*, create an input file named *vserver1.txt*. Place copies of the file in the *nsr**bin* directory on *node a* and in the *nsr**bin* directory on *node b.*

2. For *node b*, create an input file named *vserver2.txt*. Place copies of the file in the *nsr**bin* directory on *node b* and in the *nsr**bin* directory on *node a.*

3. Edit the client resource for <*node_a*> by entering:

   nsrxchsv.exe -I *vserver1.txt*

4. Edit the client resource for <*node_b*> by entering:

   nsrxchsv.exe -I *vserver2.txt*.

Backup Recommendations

To improve post-recovery processing of Exchange databases, minimize the number of transaction logs that are backed up, by increasing the frequency of full backups. As a rule of thumb, schedule a full backup whenever incremental or differential backups contain more than 50 log files.

5

Recovering an Exchange Server Database in a Cluster

The procedure for starting a recover operation within a Microsoft Cluster is similar to starting one on a stand-alone Exchange server host. The only difference is selecting the virtual server to make active, when the NetWorker User software opens.

This section explains how to select the virtual server to make active. After the virtual server is selected, perform backups and recoveries just as you would normally. For detailed instructions on backing up and restoring, see "Manual Operations: Backing Up and Restoring" on page 51.

How to Start a Recovery within a Cluster

Use NetWorker User for Exchange Server to start a recovery within a Microsoft Cluster.

1. When you open NetWorker User for Exchange Server from within a Microsoft Cluster that has multiple active virtual servers, the Exchange Servers dialog opens before the Startup window opens. It shows the virtual servers in the cluster, so that you can select one to work on (see Figure 18 on page 83).

2. The NetWorker User for Exchange Server startup window opens (see Figure 19 on page 84). Now you can perform the recovery as you normally would, starting with Step 1(see "Performing a Data Recovery" on page 58.)

How to Start a Recovery from a Command Prompt, within a Cluster

When recovering an Exchange Server database that resides on a virtual server, use the **nsrxchrc** command, adding the **-a** and/or **-c** options to identify the Exchange virtual server and the NetWorker client, and setting the recover values required for the virtual server. For details on command line syntax, see Table 10 on page 105.

To recover an Exchange virtual server:

1. Use the Exchange System Manager to select the following property: "Database can be overwritten by a restore".

2. At a Windows command prompt, enter the recover command, replacing the values shown in the example with the values you require:

nsrxchrc -erq -c *<client_name>* **-s** *<NetWorker_server_name>* **-a** *<virtual_server_name>* **MSEXCH:IS**

Note: If the NetWorker client name and the Exchange virtual server name do *not* differ, you need not enter both the **-a** and **-c** options.

⚠️

Important: After the files are recovered, Exchange Server may require a long time to replay the transaction logs, depending on your system configuration, Exchange Server parameters, and the number of logs recovered. You can monitor transaction log progress with the Windows Event Viewer. The advisory message indicates "The database engine is replaying log file exxnnnnn.log", where xx is the storage group number starting with 00, and nnnnn is a five-digit hex number.

Recovery Recommendations

- To improve post-recovery processing of Exchange databases, minimize the number of transaction logs that are backed up. You can do this by increasing the frequency of full backups. For example, schedule a full backup whenever incremental or differential backups contain more than 50 log files.
- Test your recovery procedures on a regular basis.

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Chapter 6: Disaster Recovery

This chapter covers the procedures to follow in case of a catastrophic data loss
- that is, the loss of an Exchange server. It contains the following sections:

Prerequisites

1. It is strongly recommended that these files always be backed up or
   recovered at the same time:

   - system partition (*c:*), or all disk drives
   - SYSTEM STATE
   - SYSTEM FILES
   - SYSTEM DB

   This can be done by specifying the save set **All** for file system backups.

   ![Important warning icon]

   Important:
   Failure to back up or recover these components *together* will yield
   unpredictable results.
   Back up of the *M:* drive is not required.

2. To complete the backup and recovery operations on the COM+ database,
   you must ensure that the TEMP environment variable points to a valid
   directory.

3. NetWorker requires the IIS metabase to be located at
   <System_Root>\system32\inetsrv\MetaBase.bin

4. A backup of the Active Directory (using save set All) is required whenever
   configuration changes are made.

Disaster Recovery

The procedures for recovering an Exchange server consist of the following
tasks:

Task 1: Reinstall the Operating System

1. To reinstall the Windows 2000 operating system:

   a. Install to the same disk and partition used previously.

   b. Configure the machine properties to match the original configuration.
      This includes computer name, Administrator account name and
      password.

   c. Configure the TCP/IP properties to match the original configuration.
      This includes IP address, default gateway, subnet mask, and DNS
      server.

   d. Set the Date/Time properties to match the original configuration.

   e. Install the computer into a workgroup, *not* a domain. If the computer
      was previously a domain controller or a member of a domain, it will
      be restored to the correct domain when recovery is complete.

2. Restart the computer after installing the operating system.

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Task 2: Configure the System for Recovery

To configure the system for recovery:

1. Reset the virtual memory settings to match the original configuration.

2. Edit *<system_root>\system32\drivers\etc\hosts*. For the NetWorker server, add:

   - IP address
   - Fully qualified domain name
   - Any aliases that will be used for the recovery

3. Save and close the file.

4. Verify network connectivity to the NetWorker Server. To do this, at a Windows command prompt on the Exchange server, enter:

   ping *<server_name>*)

5. Reinstall NetWorker Client 5.7 (or later), in the original installation directory.

Task 3: Recover the System to the Pre-disaster State

1. Open the NetWorker User program (**winworkr −s** *<server_name>*)

2. Click the Recover button to open a Recover window.

3. The following must be selected, marked, and recovered together:

   - All disk drives
   - SYSTEM STATE
   - SYTEM FILES
   - SYSTEM DB

4. In the Options menu, select Recover Options and select Overwrite Existing File.

5. Click the Start button. The recovery operation starts.

6. When the recovery is finished, reboot the system. The system is now restored to the pre-disaster state.

6

Task 4: Reinstall Exchange Server software

To reinstall the Exchange 2000 Server software:

1. Reinstall Exchange 2000 Server from the CD-ROM.

    a. Execute *Setup.exe/Disaster Recovery*

2. The Exchange setup does not create any missing storage group directories. Verify that all storage group directories exist. If any are missing:

    a. Using Exchange Server System Manager, display the database properties. The Database tab contains the path to the storage group files.

    b. Manually create any missing storage group directories.

3. In Exchange Server System Manager, for *each* database, open the Database Properties dialog box and select Allow database to be overwritten by a restore.

4. Delete any existing *e*.log* files from the storage group directories.

5. Use the NetWorker Module software to recover the Exchange databases.

6. Reboot the computer.

6

Chapter 7: Troubleshooting

This chapter contains information that may be helpful for troubleshooting NetWorker Module backup or restore problems. It contains the following topics:

- "NetWorker Module Log Files"
-
-
-
-
-
-
-

NetWorker Module Log Files

The NetWorker Module backup and recover programs (*nsrxchsv.exe* and *nsrxchrc.exe*) log their activity and error messages to log files on the client machine. The backup log file is named nsrxchsv.log and the recover log file is named nsrxchrc.log. Both files are located in the *<install_path>:\nsr\applogs* directory (for example, *c:\Program files\nsr\applogs*). Nsrxchsv.log is updated by scheduled or manual backups. Nsrxchrc.log is updated when a restore (restores are manual only) is performed.

nsrxchsv.exe and **nsrxchrc.exe** will append current activity to an existing log, or create a new log if none exists. Users can delete these logs files if there is no need to keep the information.

These log files should be provided for Legato technical support if a problem occurs.

-D command Line Option

The NetWorker Module backup and recover programs (**nsrxchsv.exe** and **nsrxchrc.exe**) both accept the **–D** command line switch. The **–D** switch is used to specify the level of debug output from the program. The format of this option is **–D n** where **n** is a number between 0 (none) and 9.

The **–D** option is currently only supported from the command line. It is not possible to specify **–D** from the UI.

Problems with Scheduled Mailbox Backup

Scheduled backups are initiated by the NetWorker Remote Exec service (**nsrexecd.exe**) on the client machine. The NetWorker Client installation configures this service to run under the local System account. This will cause problems with scheduled mailbox backup because the local System account does not have the required privileges. For example, the scheduled backup may fail with the error:

```
OpenMsgStore() = 0x8004011d: The Microsoft Exchange Server
computer is not available. Either there are network problems or
the Microsoft Exchange Server computer is down for maintenance.
(Microsoft Exchange Server Information Store)
```

To identify which account is being used for the scheduled backup check the *nsrxchsv.log* file. It identifies the user name that invokes the backup. The following example was taken from a backup that was run from the local System account:

```
Computer Name: ITCHY User Name: SYSTEM
```

To correct this problem:

1. Edit the NetWorker client resource to specify the name of an account with sufficient privileges to backup Exchange mailboxes. This is typically the name of the account used to install Exchange server.

2. On the client resource select the Remote tab.

3. Enter the correct user name in the Remote User field, and enter the password in the Password field.

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4. Ensure the following requirements are met:

   a. The user is a member of the server's Administrators group.

   b. On the Exchange server, these Exchange security properties are set for the user:
      – List Contents
      – Read Properties
      – Administer Information Store
      – View Information Store Status
      – Receive As
      – Send As

This change will be needed in the client resource for each Exchange server.

nsrinfo

nsrinfo is a NetWorker client program that can be used to display the contents of a client index file. This can be useful to determine if a specific object has ever been backed up, or to display the files that were backed up during a backup sequence.

Where *server* is the name of the NetWorker server, and *client* is the name of the desired client, the format of the **nsrinfo** command to display index information for NetWorker Module backup is:

nsrinfo –s *server* **–n msexch** *client*

Refer to the NetWorker command documentation for more details about using **nsrinfo** (see "Appendix A: Commands, Command Options and Save Sets" on page 99**).**

Windows 2000 Event Log

The Windows 2000 application event log can be a useful source of information regarding backup or restore activity. Both Exchange Server and NetWorker Module write information to the event log. This makes it possible to follow the sequence of events that occur during a backup or restore.

It is also possible to save the contents of the event log to a file (either *.evt* or *.txt*). This event log file should be provided for Legato technical support in the event a problem occurs.

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Windows 2000 Support Tools

The Windows 2000 CD provides some support tools that can be helpful for diagnosing problems. For example,

- **nltest** can be used to verify that the locator is functioning. The command `nltest /dsgetdc:domain` lists information about the specified domain.
- **netdiag** performs network diagnostic tests to identify configuration or connection problems.

To install the tools, run *Support**Tools**setup.exe* on the Windows 2000 CD. For more information, refer to the Active Directory Support Tools section of the Windows 2000 online help.

Active Directory Connection Problems

DNS configuration errors are a major source of Active Directory connection problems. Both the primary and secondary DNS server must have a valid entry for the host. This can be verified by using **nslookup** *host_name primary_dns_server* and **nslookup** *host_name secondary_dns_server* where *host_name* is the name of the Windows 2000 computer.

Windows 2000 Advanced Server allows Power Management to turn off the NIC. Make sure that this option is not enabled.

In an MSCS cluster the private network configuration is important to insure correct operation. Refer to Microsoft knowledge base article Q258750 for recommendations on configuring the cluster private network.

Cluster failover problems can occur if DNS is not configured correctly. The primary and secondary DNS server must have valid host entries for each physical node and each virtual server. Failover will not work if the virtual server host entries are not valid.

The following tools are useful for diagnosing Active Directory connection problems:

1. Run the Active Directory Users and Computers application (*dsa.msc*). This is installed on all Windows 2000 machines, but does not appear in the Administrative tools unless the machine is a domain controller. If *dsa.msc* is unable to reliably connect to the Active Directory, you have a network configuration problem.

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2. The **netdiag** tool from the Windows 2000 Support Tools provides diagnostic information. Install the support tools from the Windows 2000 CD, in the *Support\Tools* directory.

Microsoft Web Site Information

The Microsoft Exchange web site (*www.microsoft.com/exchange)* is a good source of information about Microsoft Exchange 2000 Server.

The Microsoft Developer Network web site (*www.msdn.microsoft.com*) provides information on Exchange 2000 Server, Windows 2000, and other Microsoft products.

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Appendix A: Commands, Command Options and Save Sets

This appendix provides syntax, notation, and related information for Legato NetWorker commands and command options related to NetWorker Module for Microsoft Exchange Server. It contains the following sections:

NetWorker Module Commands

The following commands are used by Legato NetWorker Module, to back up and recover Microsoft Exchange Server data:

- **nsrxchsv**: **Backup command** -- backs up specified Exchange Server objects
- **nsrxchrc**: **Recover command** -- recovers specified Exchange Server objects

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NetWorker Module Command Options

Command options modify the backup and recover commands, allowing you to set backup types, levels, and other parameters. The command options can be implemented by means of the NetWorker Administrator program or by typing the full NetWorker Module commands and options at a Windows command prompt.

The NetWorker Administrator software supports the command line options accepted by **nsrxchsv.exe** and **nsrxchrc.exe**.

Save Set Specifications

To perform a manual backup from the command line, enter the backup command and one or more save set specifications (Table 7)

Table 7. Save Set Specifications and Descriptions

Save Set Specification	Save Set Description
MSEXCH:	Process all ESE-enabled applications on the server. Currently IS, SRS, and KMS. This DOES NOT include all private mailboxes.
MSEXCH:IS	All IS storage groups.
MSEXCH:IS/<*storage_group*>	All databases in a storage group.
MSEXCH:IS/<*storage_group*>/<*database*>	A specific information store database.
MSEXCH:KMS	All KMS storage groups
MSEXCH:KMS/<*storage_group*>	A specific KMS storage group.
MSEXCH:KMS/<*storage_group*>/<*database*>	A specific KMS database.
MSEXCH:SRS	All SRS storage groups.
MSEXCH:SRS/<*storage_group*>	A specific SRS storage group.
MSEXCH:SRS/<*storage_group*>/<*database*>	A specific SRS database.
MSEXCH:MB	All private mailboxes
MSEXCH:MB/<*mailbox*>	A specific private mailbox

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Example:

> **MSEXCH:IS/Engineering Group/Engineering**
>
> **MSEXCH:MB/Tom Franklin**
>
> The above specifications indicate both the database named Engineering in the Engineering Group storage group and Tom Franklin's private mailbox.

Notes

- Items containing white space must be enclosed in double quotations when entered on a command line (that is, at a Windows command prompt).
- Double quotes are not required when entering Save sets in the NetWorker Administrator GUI, or in an input file.

Important: The Save set *All*, which is a NetWorker Save set rather than a NetWorker Module for Exchange Server Save set, backs up the entire filesystem *except* for Exchange Server objects. Use the Save set specifications in Table 7 on page 100 for backing up Exchange Server objects.

Backup Command

Command line syntax for the NetWorker backup command **nsrxchsv** is shown in Table 8. The command options are listed and defined in Table 9.

Table 8. Backup Command Line Syntax

Function	Command Line Syntax
Backup	**nsrxchsv** [-**Cqv**] [-**c** *<client_name>*] [**-a** *<Virtual_server_name>*][**-s** *<NetWorker_server_name>*] [-**l** *<Backup_level>*] [-**N** *<Name>*][-b *<Pool>*][-**g** *<Group>*][-**m** *<Masquerade>*] [-**D** *<Debug_level>*][-**e** *<Expiration_date>*] [-**I** *<Input_file>*] [**MSEXCH**:] [**MSEXCH:IS**] [**MSEXCH:IS**/*<Storage_group_name/Database>*] [**MSEXCH:KMS**/*<Storage_group_name/Database>*] [**MSEXCH:SRS**/*<Storage_group_name/Database>*] [**MSEXCH:MB**] [**MSEXCH:MB**/*<Mailbox_name>*]

Backup Command Options

The options accepted by the Backup command (**nsrxchsv.exe)** are listed in Table 9.

Table 9. List of Backup Command Options

Command Option	Function
-a *<Virtual_server_name>*	Specify MSCS virtual server name
-b *<Pool>*	Specify pool name
-c *<Client_name>*	Specify client name
-C	Use compression *Note: Use of this feature with Exchange Server is not recommended by Microsoft. This option is rarely (if ever) used with Exchange.*

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Table 9. List of Backup Command Options

Command Option	Function
-D *<nn>*	Specify level of debug output
-g *<Group>*	Specify group name
-I *<Input_file>*	• Reads, from the specified text file, the names of the databases and mailboxes (in addition to those specified on the command line), that are to be backed up. • If no database or mailbox names are entered at the Windows command prompt, only those whose names appear in the Input file are backed up (see the Input text file example in Figure 7 on page 44). • To set up an input file, enter the names that you want to back up on the command line, or in separate lines, *without* quotation marks, in a .txt file. Then, specify the input filename in the Backup command text box under the Remote tab (NetWorker Administrator>Edit Client>Remote Tab). • If the input file is not located in *<install_path>:\nsr\bin* file is not in, specify the full pathname to the bin file in the Backup Command text box under the Remote tab, using double backslashes instead of single backslashes in the pathname. For an example of how to do this, see Figure 8 on page 45. ⚠ **Important:** The Input filenames, together with the backup command, must not exceed 64 characters in length.

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Table 9. List of Backup Command Options

Command Option	Function
-l *<Backup_level>*	Specify backup level. • For full, incremental, or differential backups, specify **nsrxchsv** and the **-1** command option with the level parameter you want, such as the **incr** parameter in the command: **nsrxchsv -s** *<NetWorker_server_name>* **-l incr** • To perform a copy level backup, enter the same command, but omit the **-l** option: **nsrxchsv -s** *<NetWorker_server_name>*
-N	Specify save set name
-n	Do not save data
-q	Quiet mode
-s *<Server_name>*	Specify NetWorker server

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Recover Command

Command line syntax for the NetWorker recover command (**nsrxchrc)** is shown in Table 10. The recover command options are listed and defined in Table 11 on page 106.

Table 10. Recover Command Line Syntax

Function	Command Line Syntax
Recover	**nsrxchrc** [-*erqv*][**-s** *<NetWorker_server_name>*] [**-t** *<Browse_time>*] [-c *<client_name>*] [-a *<Virtual_server_name>*] [**-I** *<Input_file>*] [**-l** *<Backup_level>*] [**-N** *<Name>*][**-b** *<Pool>*][**-g** *<Group>*][**-m** *<Masquerade>*] [**-D** *<Debug_level>*][**-e** *<Expiration_date>*] [**MSEXCH:**] [**MSEXCH:IS**] [**MSEXCH:IS**/*<Storage_group_name>*/*<Database>*] [**MSEXCH:KMS**/*<Storage_group_name>*/*<Database>*] [**MSEXCH:SRS**/*<Storage_group_name>*/*<Database>*] [**MSEXCH:MB**/*<Mailbox_name>*]

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Recover Command Options

Recover command options are listed in Table 11.

Table 11. Recover Command Options

Option	Function
-a *<Virtual_server_name>*	Specify MSCS virtual server name
-c *<Client_name>*	Specify client name
-D *<nn>*	Specify level of debug output
-e	Replay only recovered logs
-f	Force overwrite
-I *<Input_file>*	Specify Input filename
-q	Quiet mode
-r	Remount database
-s *<Server_name>*	Specify NetWorker server
-t *<Browse_time>*	Specify browse time

Command Options for Microsoft Clusters

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You can use NetWorker Module for Exchange Server to back up Exchange servers that operate within Microsoft clusters. This section describes the use of the **-a** *<virtual_server_name>* and **-c** *<client_name>* command line options. These options are required when NetWorker Module is used within a Microsoft cluster environment. The **-a** *<virtual_server_name>* and **-c** *<client_name>* options identify the Exchange virtual server and the NetWorker client, respectively. When the names of the Exchange virtual server and the NetWorker client match, it is not necessary to enter both options to back up or restore data to a virtual server. When the names of the Exchange virtual server and the NetWorker client do not match, you must use both options.

During a scheduled backup, the NetWorker server should send a **-c** option to the backup program. When it does, if the client and virtual server names match, the backup operation succeeds.

Some versions of the NetWorker server software do not send the **-c** option. You can see whether the **-c** option was sent by checking the command-line activity logged in *\nsr\applogs\nsrxchsv.log*.

If the **-c** option does not appear in the log, add the **-c** or **-a** options to the backup command field in the client resource.

Table 12 summarizes the uses of the **-a** and **-c** command options. An example for using these options with the backup command and syntax appears below the table.

Table 12. Uses of the -a and -c Options for Microsoft Clusters

−a *<Virtual_server_name>*	−c *<Client_name>*	**Result**
none	none	Error: use **-a** or **-c**
none	**-c** *<Client_name>*	*<Virtual_server_name>* must match *<Client_name>*
-a *<Virtual_server_name>*	none	*<Client_name>* must match *<Virtual_server_name>*
-a *<Virtual_server_name>*	**-c** *<Client_name>*	*<Client_name>* and *<Virtual_server_name>* are used as given

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Example:

Enter the following command and options at a Windows command prompt, on *<node_a>* or *<node_b>*:

nsrxchsv -s *<NetWorker_server_name>* **-a** *<Virtual_server_name>*
-c *<Client_name>* **-l** *<Backup_level>* **MSEXCH:IS**

Appendix B: Error Messages

This appendix lists error messages you might encounter while using NetWorker Module for Microsoft Exchange Server. The appendix provides suggestions to resolve the problems described in the messages. The appendix contains the following sections:

Microsoft Exchange Server Error Messages

When NetWorker Module for Microsoft Exchange Server encounters a Microsoft Exchange Server error or condition requiring a warning during a backup or recover operation, it writes a description of the error to the *nsrschsv.log* and *nsrxchrc.log* files, as well as the Event Log. Refer to the documentation provided with your Microsoft Exchange Server software for more information on Microsoft Exchange Server error messages and their resolution.

NetWorker Module for Microsoft Exchange Server performs reliable backup and recovery of Microsoft Exchange Server databases. NetWorker Module is cannot correct errors caused by Microsoft Exchange Server. If Microsoft Exchange Server does not start or does not run properly, consult the Microsoft Exchange Server documentation, knowledge base, or technical support.

NetWorker Error Messages

NetWorker error messages are displayed in the NetWorker Administrator window. The display lists the messages encountered during the past 24 hours.

For complete information about NetWorker error messages, refer to the *Legato NetWorker Administrator's Guide*.

B

NetWorker Module Error Messages

The error messages in this section are specific to the NetWorker Module software.

A full backup will be performed.

A non-Full backup level was specified but can not be performed. Verify that circular logging is not enabled. Also verify that a full backup is performed for all databases in a storage group before attempting an incremental or differential backup.

Backup level converted from n to 1.

The backup program converts any differential level between 2-9 into a level 1.

Bad backup level

An invalid backup level was specified with the **–l** option.

Cluster backup requires use of -c or -a (or both).

In the MSCS cluster environment you must use the **–a** and/or **–c** options to identify the virtual server name and client index.

Cluster recover requires use of -c or -a (or both).

In the Microsoft cluster environment you must use the **–a** and/or **–c** options to identify the virtual server name and client index.

Could not determine overwrite status for sg_name / db_name

The recover program could not determine if the specified database has the "database can be overwritten by a restore" property set.

Database sg_name / db_name cannot be overwritten by restore.

The specified database does not have the "database can be overwritten by a restore" property set. A database can not be restored unless this property is set.

B

Error creating PerfMon update thread. error_text

The backup or recover program was unable to start the Performance Monitor update thread.

Error loading ESE dll. Status: error_code

An error occurred when NetWorker Module attempted to load the Exchange backup *.dll* file.

Error on get_server_dn: error_code, error_text

NetWorker Module was unable to obtain the server distinguished name from Active Directory. This may be caused by a network connection problem with the domain controller.

Error opening file: file_name

The backup/recover program was unable to open the file specified with the **–I** option. Verify that the file name is spelled correctly and the file exists.

Error parsing parameter: param_string

The format of the specified command line parameter is incorrect.

Error: db_name database not mounted

An attempt was made to backup a database that is not online. Mount the database and repeat the backup.

Exchange Server server_name was not found.

NetWorker Module was unable to locate the specified Exchange server. Verify that the server name is spelled correctly.

Internal system error,
please see nsr\applogs\xbsa.messages on the client system
for reason.

B

An error occurred between the backup or recover program and the NetWorker server (for example, the NetWorker server does not have the required enablers).

Invalid database: sg_name / db_name

An invalid database name was specified. Make sure the database name is spelled correctly and exists on the Exchange server

Invalid storage group: sg_name

An invalid storage group name was specified. Make sure the storage group name is spelled correctly and exists on the Exchange server.

Invalid target storage group: sg_name

The specified storage group does not exist on the server. Make sure the storage group name is spelled correctly.

Invalid time specified: time_string

The format of the specified browse time is invalid.

Log file gap detected. Max recovered log: exxnnnnn.log

A gap was detected between the highest sequence number of the recovered logs and the existing log files. The **–e** option will be used to specify the replay of only recovered logs.

MSEXCH:DS saveset is obsolete. Continuing...

MSEXCH:DS was specified as a target for the backup or recover program. **MSEXCH:DS** is obsolete for Exchange 2000. The backup or recover program will continue processing other valid targets.

Mailbox_name <service mailbox - no IPM data>

An attempt was made to back up a service mailbox which does not contain IPM data. Only user mailboxes can be backed up.

B

No backup found, can not recover without backup

No authority for backup operation.

The account used to perform a backup is not a member of the Backup Operators group.

No authority for recover operation

The account used to perform a recover is not a member of the Backup Operators group.

No backup target.

An Exchange object name was not specified for the backup program.

No databases are mounted.

The storage group specified for backup does not have any databases mounted. Mount the databases and repeat the backup.

No recovery target.

An Exchange object name was not specified for the recover program.

No Storage Group match for sg_name

An invalid storage group name was specified for the backup program. Make sure the name is spelled correctly and the storage group exists on the server.

An attempt was made to recover a mailbox that was never backed up.

Not enough storage is available to process this command.

NetWorker Module was unable to allocate memory. It may be necessary to reduce the number of programs that are currently running.

Open Cluster error: msg_string

An error occurred when NetWorker Module attempted to open a handle to the cluster.

B

Out of disk space backing up mailbox.

The disk containing *nsr**tmp* does not have enough free space to back up a mailbox.

Previous object_name backup not found

An attempt was made to recover a storage group or database that was never backed up.

Restore must be performed on virtual server active node.

A restore operation was attempted from the node that is not hosting the virtual server. Perform the restore on the same node that is currently hosting the virtual server.

Unable to determine active node for virtual server server_name: error_text

Could not determine which physical node is currently hosting the virtual server.

Unable to get DN for storage group sg_name

NetWorker Module was unable to obtain the storage group distinguished name from Active Directory. This may be caused by a network connection problem with the domain controller.

Unable to get log file path for storage group sg_name.

NetWorker Module was unable to determine the path to the Exchange log files.

Unable to locate esebcli2.dll Status: error_code

NetWorker Module was unable to locate the Exchange backup *API DLL*. This could occur if the Exchange System Management components are not installed.

Unknown host host_name

The virtual server name specified with the **–a** option does not exist. Check the spelling of the server name.

B

B

Glossary

This glossary contains terms and definitions found in this manual. Most of the terms are specific to NetWorker products.

Administrator group
: Members of this Windows NT user group usually have all the rights and abilities of users in other groups, plus the ability to create and manage all the users and groups in the domain. Many NetWorker functions can only be accomplished by members of the Administrator group.

API
: Acronym for Application Programming Interface, an agreed-upon set of computer library routines used to accomplish a task.

autochanger
: Mechanism that uses a robotic arm to move media among various components located in a device including slots, media drives, media access ports, and transports. Autochangers automate media loading and mounting functions during backups and recovers.

backup group
: A NetWorker client or group of clients configured to start backing up files to the NetWorker server at a designated time of day.

Backup Operators group
: A Windows NT group whose members have the capability to log onto a domain from a workstation or a server, back it up, and restore the data. Backup Operators also can shut down servers or workstations.

backup volume	Backup media, such as magnetic tape or optical disk. *See also* "media."
bootstrap	Information that includes the server index, media index, and configuration files needed for recovering NetWorker after a disk crash.
browse policy	Policy that determines how long entries for your files remain in the online file index.
client file index	Database of information maintained by NetWorker which tracks every file or filesystem backed up. *See also* "online client indexes."
clone	Process by which NetWorker makes an exact copy of saved data (save sets). NetWorker can clone individual save sets or the entire contents of a backup volume.
clone volume	Duplicated volume. NetWorker can track four types of volumes: backup, archive, backup clone, and archive clone. Save sets of different types cannot be intermixed on one volume.
command line	Shell prompt, where you enter commands (for example, a DOS or C shell). NetWorker has several command line utilities that perform the same function as many of the commands available through the graphical interface. *See also* "shell prompt."
daemon	Program that is not invoked explicitly, but lies dormant waiting for a specified condition(s) to occur. *See also* "service."
device	Backup device (tape drive, optical drive, or autochanger) connected to the NetWorker server; used for backing up and recovering client files.
directory	Hierarchical structure of objects that represent each component of the organization, such as the organization itself, recipients, and more. It allows users to address messages and MTAs (message transfer agents) to route the messages.

enabler codes	Special codes provided by Legato that allow you to run your NetWorker software product. Look for the 16-character enabler code on the certificate included with your software.
filesystem	1. File tree which is on a specific disk partition or other mount point. 2. Entire set of all files. 3. Method of storing files.
heterogeneous	Heterogeneous networks are networks with systems of different platforms that interact meaningfully across the network.
information stores	Information stores hold the data that moves through your system using Microsoft Exchange Server's messaging functions. The public information store and the private information store are the components of the information stores. The information stores also maintain and enforce data security. *See also "information store."*
information store	The back-end database that contains all messages and data located on the Windows NT server that houses the Microsoft Exchange Server. *See also "information stores."*
Information Store	Storage technology used by Exchange to store users' mailboxes and folders. There are two kinds of stores: mailbox stores and public folder stores.
information store databases	The public database and the private database are databases that track the information in your public information stores and private information stores. The databases are part of the information store structure.
interoperability	Ability of software and hardware on multiple computers from multiple vendors to communicate meaningfully.
Key Management Server	The Exchange computer on which the Key Management Service has been installed. There can be one Key Management server per administrative group.

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Key Management Service	An optional Microsoft Exchange 2000 Server component that is installed on a designated server in an administrative group. It provides centralized administration and archival of private keys, and maintains every user's private encryption key in an encrypted database. The keys are used for encrypting e-mail messages and signing messages with digital signatures.
log files	The log files for a storage group contain the database transactions for all mailbox stores or public folder stores in the group. For this reason, the storage group is the best unit for backup, because backups automatically include the transaction logs for all mailbox stores or public folder stores in the group.
	To optimize performance, dedicate separate physical drives for the log files of your storage groups. When each set of log files has its own physical drive, server performance improves. To optimize fault tolerance, use hardware mirroring with redundant array of independent drives (RAID).
mailbox store	The part of Information Store that maintains information in user mailboxes. A mailbox store consists of a rich-text .edb file, plus a streaming native Internet content .stm file.
MAPI (Microsoft Messaging API)	Set for messaging applications that is widely supported by messaging vendors, primarily attributable to Microsoft.
media	Magnetic tape or optical disks used to store backed-up files. *See also* "backup volume."
media index	Database of information maintained by NetWorker which tracks every backup volume.
media manager	The NetWorker component that tracks save sets to backup volumes. The **nsrmmdbd** service is responsible for making entries in the NetWorker online media index.

Microsoft Cluster Server (MSCS)	Built-in feature of Windows NT Server, Enterprise Edition. It is software that supports the connection of two servers into a "cluster" for higher availability and easier manageability of data and applications.
Microsoft Exchange Client	Program that a client uses to read, write, and manipulate the post office and folders.
mount	To make a database available for use or to place a removable tape or disc into a drive.
multiplex	Method of transmitting multiple streams of data simultaneously through the same channel.
Multiple Information Stores and Storage Groups	Exchange supports multiple databases contained within a storage group. A storage group includes one to five databases and one set of transaction log files for all databases in the storage group. You can create a maximum of four storage groups on one server. If each storage group contains the maximum of five databases, you can create a maximum of 20 databases on one server. You can use multiple databases to increase the number of simultaneous users on a server and lessen the risk of a damaged database. Because the size of each database is decreased, data recovery is faster and does not require the server to be offline.
NetWorker client	A computer that can access the backup and recover services from a NetWorker server. Clients may be workstations, PCs, or fileservers.
NetWorker server	Computer on a network running the NetWorker software, containing the online indexes, and providing backup and recover services to the clients on the same network.
NetWorker User for Exchange Server	Client's graphical user interface for the NetWorker Module for Microsoft Exchange Server. From this interface you can initiate unscheduled backups as well as recoveries.

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notice	Response to a NetWorker event.
nsrhost	Logical *hostname* of the computer that is the NetWorker server.
object	Record in the Microsoft Exchange Server directory. A site, server, mailbox, folder, and file are all examples of objects.
online client indexes	Databases on a NetWorker server that contain information pertaining to client backups and backup volumes. *See also* "client file index."
OST (offline message store)	Message store (typically on a user's hard disk) that stores messages locally and allows for replication of information between the client and the server.
PAB (personal address book)	User's list of recipients. The file physically resides on the user's workstation.
PDC (primary domain controller)	Server in a Windows NT Server domain where changes are made to user accounts.
pathname	Instructions for accessing a file. An *absolute pathname* tells you how to find a file beginning at the root directory and working down the directory tree. A *relative pathname* tells you how to find the file starting where you are now.
permission	Rights given to a user to perform specific actions on an object. **Read-only** is an example: It allows a user to read, but *not* alter a file.
properties	Attributes of an object, such as the display name of a recipient.
PST (personal storage files)	Client-side message store for use by Microsoft Exchange Client and Microsoft Outlook. Typically resides on a user's workstation.

public folder store	The part of Information Store that maintains information in public folders. A public folder store consists of a rich-text .edb file, plus a streaming native Internet content .stm file.
recover	The NetWorker command used to browse the server index and recover files from a backup volume to a client's disk.
recycle	A volume whose data has passed both its browse and retention policies and is available for relabeling and reuse.
registry	Database of configuration information central to Windows NT operations. The overall effect centralizes all Windows NT settings and provides control over system, security, and user account settings.
resource	Resource represents a component of the NetWorker software that describes the NetWorker server and its clients. Devices, schedules, clients, groups, and pools are all examples of NetWorker resources. Each resource contains a list of attributes, defining the parameters to use for the configured NetWorker resource. Use the NetWorker administration program to configure NetWorker resources and their attributes.
retention policy	Policy that determines how long to retain entries in the media index for recovery.
save	The NetWorker command that backs up client files to backup volumes and makes data entries in the online index.
save set	Set of files or a filesystem that NetWorker has backed up onto backup media during a backup session. Save sets are assigned a "save set id," an internal number which identifies the backup session to NetWorker for subsequent restoration to primary disk.

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save set ID	Internal identification number assigned to a save set by NetWorker.
scanner	The NetWorker program used to read a backup volume when the online indexes are no longer available.
service	Program that is *not* invoked explicitly, but lies dormant waiting for a specified condition(s) to occur. *See also* "daemon."
shell prompt	Cue for input in a shell window where you enter a command. *See also* "command line."
Site Replication Service	A directory service (similar to the directory used in Exchange Server 5.5) implemented in Exchange 2000 to allow the integration with downstream Exchange 5.x sites using both RPC and mail-based replication. Site Replication Service works in conjunction with Active Directory Connector to provide replication services from Active Directory to the Exchange 5.x Directory Service.
stand-alone device	Backup device that contains a single drive for backing up data. Stand-alone devices cannot store or automatically load backup volumes.
storage group	A collection of mailbox stores and public folder stores that share a set of transaction log files. Exchange manages each storage group with a separate server process.
storage manager	Application that manages the storage devices and media used for backup and restore requests. NetWorker Module is a storage manager that connects NetWorker services to Microsoft Exchange Server to provide storage management for databases and transaction logs.
volume	Backup media, such as magnetic tape or optical disk. *See also* "*media*."

volume ID	Internal identification assigned to a backup volume by NetWorker. The volume ID is entered in the NetWorker server's media database for volume policy management.
volume name	Name you assign to a backup volume when it is labeled internally by NetWorker.
volume pool	Feature that allows you to sort backup data to selected volumes. A volume pool contains a collection of backup volumes to which specific data has been backed up.
Windows NT Server domain	Collection of Windows NT servers administered as a single unit.
XBSA	Acronym for X/Open® Backup Services Application Programming Interface, which connects NetWorker functionality to NetWorker Module. For more information about X/Open, visit the X/Open web site at *www.xopen.org*.

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