



**EMC® Legato NetWorker®**  
**Module for Lotus**  
Release 3.0  
Multiplatform Version

**ADMINISTRATION GUIDE**  
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*As part of an effort to improve and enhance the performance and capabilities of its product line, EMC from time to time releases revisions of its hardware and software. Therefore, some functions described in this EMC Legato NetWorker Module for Lotus Administration Guide may not be supported by all revisions of the software or hardware currently in use. For the most up-to-date information on product features, refer to your product release notes.*

*If this product does not function properly, or does not function as described in this administration guide, go to <http://softwaresupport.EMC.com>.*

**Audience** This guide is part of the NetWorker Module for Lotus (NML) documentation set, and is intended for use by 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.

Readers of this guide are expected to be familiar with the following functions:

- ◆ Backup, recovery, and maintenance of a Lotus Notes client
- ◆ Backup, recovery, and maintenance of a Lotus Domino server
- ◆ Disaster recovery procedures on a Lotus Domino server

**Organization** This guide is organized as shown in the following table.

Chapter or Appendix	Describes
Chapter 1, "Introduction"	Main features of the NML and NetWorker server, client, and other software required to implement the Lotus data backup and recovery solution.
Chapter 2, "Software Configuration Procedures"	Basic configuration of the NML software for each Lotus Notes client and Domino server that requires backup and recovery services.
Chapter 3, "Ad Hoc Backup Procedures"	Procedures to use the NML software to perform ad hoc (manual or unscheduled) backups of Lotus data from either the command line or the NetWorker User for Lotus program.
Chapter 4, "Scheduled Backup Procedures"	Procedures to configure and use the NML software to perform scheduled backups of Lotus data.
Chapter 5, "Recovery from the Command Line"	Procedures to configure and use the NML software to recover Lotus data from either the command line or the Lotus Notes client.
Chapter 6, "Recovery from NetWorker User for Lotus"	Procedures to use the NetWorker User for Lotus program to recover Lotus data on Windows.
Chapter 7, "Multiple Installations, Partitioned Domino Servers, and Cluster Support"	Procedures to configure and run NML backup and recovery operations with multiple Domino installations, partitioned Domino servers, and supported cluster environments.
Appendix A, "NML Configuration File"	Parameters that can be set in the NML configuration file.
Appendix B, "NML Commands and Command Options"	Syntax, notation, and related information about the NML backup and recovery commands.
Appendix C, "Troubleshooting"	Troubleshooting information to help in resolving problems with the NML software.
Appendix D, "Error Messages"	Common error messages that might be encountered while using the NML software.

**Related documentation**

Documentation related to the use of this product can be found at the EMC Legato website, [www.Legato.com](http://www.Legato.com), including:

- ◆ The NetWorker Module for Lotus release 3.0 documentation set:
  - Installation guide
  - Release notes
  - Command reference guide
- ◆ The NetWorker documentation set:
  - Administration guide
  - Installation guide
  - Release notes
  - Command reference guide



- ◆ Other EMC documentation:
  - Software compatibility guide
  - UNIX man pages

## Conventions used in this guide

EMC uses the following conventions for notes and cautions.

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



### CAUTION

**A caution contains information essential to avoid data loss or damage to the system or equipment. The caution may apply to hardware or software.**

### Typographical conventions

EMC uses the following style conventions in this guide:

<b>bold</b>	<ul style="list-style-type: none"> <li>• User actions (what the user clicks, presses, or selects)</li> <li>• Interface elements (button names, dialog box names)</li> <li>• Names of keys, commands, programs, scripts, applications, utilities, processes, notifications, system calls, services, applications, and utilities in text</li> </ul>
<i>italic</i>	<ul style="list-style-type: none"> <li>• Book titles</li> <li>• New terms in text</li> <li>• Emphasis in text</li> </ul>
Courier	<ul style="list-style-type: none"> <li>• Prompts</li> <li>• System output</li> <li>• Filenames</li> <li>• Pathnames</li> <li>• URLs</li> <li>• Syntax when shown in command-line or other examples</li> </ul>
<b>Courier, bold</b>	<ul style="list-style-type: none"> <li>• User entry</li> <li>• Options in command-line syntax</li> </ul>
<i>Courier italic</i>	<ul style="list-style-type: none"> <li>• Arguments in examples of command-line syntax</li> <li>• Variables in examples of screen or file output</li> <li>• Variables in pathnames</li> </ul>
<>	Angle brackets for parameter values (variables) supplied by user.
{ }	Braces for mandatory values.
[ ]	Square brackets for optional values.
	Vertical bar symbol for alternate selections. The bar means or.
...	Ellipsis for nonessential information omitted from the example.

**Where to get help** EMC support, product, and licensing information can be obtained as follows.

#### Technical support

For information about software patches, technical documentation, and support programs:

- ◆ Customers with an active support agreement, go to:  
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- ◆ Customers without an active support agreement, please contact Support Sales and Renewals.

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  - To tell us how you prefer to use documentation, click **Document Survey**.

This chapter provides information on the main features of the EMC® Legato NetWorker® Module for Lotus (NML) software and NetWorker™ server, client, and other software required to implement the Lotus data backup and recovery solution.

This chapter includes the following sections:

- ◆ [Revision History](#)..... 1-2
- ◆ [Terminology used in this guide](#) ..... 1-2
- ◆ [Importance of backing up mission-critical data](#) ..... 1-2
- ◆ [About the NetWorker software](#)..... 1-3
- ◆ [About the NetWorker Module software](#)..... 1-4
- ◆ [NML backups and restores](#)..... 1-6
- ◆ [How NML backs up data](#)..... 1-8
- ◆ [Files backed up by the NML software](#) ..... 1-11
- ◆ [How NML recovers data](#)..... 1-11

## Revision History

The following table summarizes the changes since the initial release of this document.

Date	Revision Description
January 27, 2006	Initial release of this document.
February 28, 2006	Changed all instances of the NSR_BACKUP_TRANSACTION_LOGS parameter to NSR_BACKUP_LOGS_MODE.
March 3, 2006	In <a href="#">Example 2-10 on page 2-20</a> , changed an instance of the NSR_AES_ENCRYPTION parameter to NSR_ENCRYPTION_PHRASES.

## Terminology used in this guide

This guide uses the following terminology:

- ◆ Unlike the NetWorker software, which uses the term *recover* for *all* data retrieval activities, the NetWorker Module software distinguishes between restoring and recovering a database:
  - *Restore* means to retrieve individual datafiles from backup and store the files on disk.
  - *Recover* means to apply the archived transaction logs to make the database consistent, if necessary.
- ◆ The term *Notes user* refers to the user that runs the Domino server or Notes client where data is being backed up or restored.
- ◆ The term *Windows* refers to all the supported Microsoft Windows operating systems, unless specified otherwise.

## Importance of backing up mission-critical data

A viable backup strategy includes regular backups of databases, archive logs, and NetWorker bootstrap records.

- ◆ Without archive logs, you can recover a database only to the time of its last full backup.
- ◆ Without backups and the relevant logs, you cannot recover a database at all.

- ◆ Without the bootstrap, you may not be able to recover essential file and configuration data following a disaster, such as a disk crash or NetWorker server failure.

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## About the NetWorker software

The NetWorker software provides data storage management services that protect and help manage data across an entire network. The software simplifies storage management by automating and centralizing data storage operations.

The NetWorker software enables a user to:

- ◆ Perform automated backups during nonpeak hours.
- ◆ Administer, configure, monitor, and control NetWorker functions from any computer on a network.
- ◆ Increase backup performance by simultaneously sending more than one save stream to a single device.
- ◆ Optimize performance by using parallel save streams to multiple backup devices or storage nodes.

NetWorker client/server technology uses the network remote procedure call (RPC) protocol to back up data. The NetWorker client software consists of client-side services and programs.

The NetWorker server software consists of server-side services and programs that perform the following:

- ◆ Oversee backup and restore processes.
- ◆ Maintain client configuration files.
- ◆ Maintain an online client file index and online media database, which together comprise the *online indexes* on the NetWorker server.

During a backup, the NetWorker server makes an entry in the online client file index and records the location of the data in the online media database. These entries provide the information required to restore the backed-up data.

After a scheduled backup, the NetWorker server sends a record of the *bootstrap* file to the default printer. This is a printed record of the information required for restoring data: dates, locations, and save set ID numbers for the server's online indexes. Keep the bootstrap printout on file as a quick reference in the event of a disaster.

NetWorker server and NML software can exist on either the same or separate computers. NetWorker client and NML software must exist on the computer that contains the Lotus data to be backed up. The computer that runs the Lotus and NML software is considered a client of the NetWorker server.

The *NetWorker Installation Guide* provides information on the installation of the NetWorker server, client, and storage node software.

The *NetWorker Administration Guide* provides information on configuration and use of the NetWorker software.

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## About the NetWorker Module software

The Lotus data backup and recovery solution requires both NetWorker client and NML software to run on the computer that contains the Lotus data.

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### NML software

The NML software is an add-on module for the NetWorker server software that enables backups and restores of the supported Lotus Domino and Notes databases.

The NML software enables the NetWorker server to work with Lotus Domino server and Notes client software to provide high-performance online and offline data protection for the Lotus databases.

NML software provides the following:

- ◆ Backups and restores of Lotus Domino or Notes databases through either of the following:
  - The command-line programs:
    - `nsrnotesv` for backups
    - `nsrnotesrc` for restores
  - On Windows only, the NetWorker User for Lotus graphical user interface program.
- ◆ Both ad hoc and scheduled backups, where the scheduled backups can be optionally configured through the NML configuration wizard.
- ◆ Both full and incremental level backups.

- ◆ Storage of backup information in the backup catalog file specified by the `NSR_CATALOGFILE` parameter.
- ◆ Backups and restores of files and directories that contain non-ASCII characters when the corresponding localized NetWorker client is installed on NML client host.

For example, the Chinese version of the NetWorker client must be installed on the NML client to support Chinese characters.

- ◆ Directed recovery of Lotus database files when just the NetWorker User for Lotus program is used.
- ◆ Recovery of Lotus directory and database links.
- ◆ Document-level recovery of deleted Notes documents in the *local* database through the `nsrdocrc` command-line program. The recovery can be to any point-in-time as long as the database is logged.
- ◆ On Windows only, document-level recovery of selected (modified) and deleted Notes documents in either the *local* Notes or Domino database or a *remote* Domino database, through the Lotus Notes client GUI.




### NetWorker User for Lotus program

On Windows computers, the NetWorker User for Lotus graphical user interface program (`nwbml.exe`) is installed with the NML software.

The NetWorker User for Lotus program provides a graphical interface for configuring and performing backup and recovery operations.

[Table 1-1 on page 1-5](#) describes the toolbar buttons in the main window of the NetWorker User for Lotus program.

Table 1-1 NetWorker User for Lotus toolbar buttons

Button	Operation	Description
	Backup	Displays the Backup window for configuring and running backups.
	Recover	Displays the Recover window for configuring and running recoveries.
	Select NetWorker Server	Displays the Change Server dialog box for connecting to a different NetWorker server.

The following chapters provide more information on how to use the NetWorker User for Lotus program for backups and restores:

- ◆ [Chapter 3, “Ad Hoc Backup Procedures”](#)
- ◆ [Chapter 6, “Recovery from NetWorker User for Lotus”](#)

---

## NML backups and restores

The following sections provide an overview of the backup and restore methods that the NML software supports.

---

### NML backups

An NML backup can be *either* an ad hoc (manual or unscheduled) or scheduled backup.

- ◆ An ad hoc backup includes the following features:
  - The backup is initiated by the user on the Domino or Notes host.
  - The backup is performed by either entering the **nsrnotesv** command at the operating system command line, or running the NetWorker User for Lotus program.
- ◆ A scheduled backup includes the following features:
  - The backup is initiated by the NetWorker server.
  - Before the backup can start, the proper Client, Group, and Schedule resources must be configured on the NetWorker server. In the Client resource, the **nsrnotesv** command must be specified in the Backup Command attribute.
  - The backup starts at a scheduled time specified in the Group resource.

Both ad hoc and scheduled NML backups must be configured properly according to the [“Software configuration roadmap” on page 2-2](#). The following chapters provide more information on ad hoc and scheduled backups:

- ◆ [Chapter 3, “Ad Hoc Backup Procedures”](#)
- ◆ [Chapter 4, “Scheduled Backup Procedures”](#)



## Full and incremental backups

The NML software also supports the following full and incremental backup methods:

- ◆ A *full backup* backs up the specified database files, regardless of whether or not they have changed since the last backup operation. This is the default backup configuration.
- ◆ An *incremental backup* backs up only the specified database files that have changed since the previous backup. The behavior of an incremental backup is based on the settings for Lotus transactional logging on the Domino server:
  - If Lotus transactional logging is enabled and set to archive mode, then an incremental backup will back up transaction logs, and any database files that are not logged and have changed since the last full backup.
  - If Lotus transactional logging is enabled and the database instance ID (DBIID) property has changed since the last backup of the database, then a full backup of the database is automatically performed before the logs are backed up.
  - If Lotus transactional logging is disabled (or enabled but *not* set to archive mode), then an incremental backup backs up only the database files that have changed since the last backup.

## Backups of Lotus database or directory links

Review the following important notes about backups of database and directory links:

- ◆ By default, NML follows directory and database links when it forms the file list for backup. NML backs up both the link and the databases that the link points to.

To prevent NML from following the directory and database links, the NML configuration file must contain the following parameter setting:

```
NSR_FOLLOW_LINKS = FALSE
```

- ◆ If a database link (*link.nsf*) or directory link (*link.dir*) has a bad reference (either the destination database or directory does not exist or cannot be opened properly), NML cannot determine whether the file is a link or an actual database or directory.

In this case, the link is *not* backed up because NML does not know whether to back it up as a database, directory, or regular operating system file. The backup *fails* unless the parameter `NSR_SKIPDBERRORS` is set to `TRUE` in the NML configuration file.

---

## NML restores

The NML software supports the following types of restore methods:

- ◆ A *database-level (file-level) restore* will restore all databases associated with a Domino server.
- ◆ A *document-level restore* will restore modified or deleted Notes documents from a single database, whether the database is logged or not.

The behavior of a recovery operation is based on the settings for Lotus transactional logging on the Domino server, as follows:

- ◆ If Lotus transactional logging is enabled, a database or document can be recovered to any point in time, provided the transaction logs for that time period are available.
- ◆ If Lotus transactional logging is disabled, a database or document can be restored to the time of the last full backup *only*.

---

## How NML backs up data

This section describes the interactions involved in a Lotus backup performed by the NML software.

At the scheduled backup start time, the main NetWorker service, **nsrd**, starts the backup of the configured group (that contains the NML client) by invoking the **savegrp** program. The **savegrp** program contacts the NetWorker client-side service, **nsrexecd**, on each client in the backup group to start the backup.

A scheduled NML backup involves the following steps on each NML client (Domino host) in the backup group:

1. The **nsrexecd** service starts the **nsrnotesv** binary for the scheduled backup, as specified in the **Backup Command** attribute of the NetWorker Client resource.
2. The **nsrnotesv** process sets the required parameters and invokes another **nsrnotesv** process called the *parent process*.

---

**Note:** Invocation of the parent process is required because certain operating systems do *not* allow a process to change its execution parameters after the process has started.

---

3. The parent **nsrnotesv** process performs the following:
  - a. Processes the backup parameters passed by the **savegrp** command and set in the configuration file.
  - b. Generates a list of files to back up, based on options specified by the user.
  - c. Stores the list of the files in shared memory for access by *child processes*.
  - d. Spawns child **nsrnotesv** processes to back up the Domino data. The number of processes spawned depends on the number of Domino files to be backed up and the specified parallelism.
  - e. Monitors the execution of the child processes.
  - f. If required:
    - Backs up the transaction logs.
    - Updates the backup catalog file.
4. Each child **nsrnotesv** process performs the following:
  - a. Obtains the required authorization and the identifier of the **nsrmmmd** process that manages the requested backup device.
  - b. Selects a file to back up from the list generated by the parent.
  - c. Reads the data from disk and sends the backup data to the NetWorker media service, **nsrmmmd**, to store on the appropriate backup volumes.

The **nsrmmmd** service records tracking information in the NetWorker media database by using the **nsrmmdbd** service.
  - d. Sends tracking information to the NetWorker client file index by using the **nsrindexd** service.
  - e. Repeats steps 4b through 4d until all the files are backed up.

If the NML software *cannot* access or resolve a specific pathname when it generates the list of files for backup, the following occurs:

1. A warning message is printed.
2. The backup of the file or directory (with the inaccessible pathname) is skipped, whether or not the NSR\_SKIPDBERRORS parameter is set.
3. The backup continues.
4. If no other errors are encountered during the backup, the backup is reported as successful.

Figure 1-1 on page 1-10 shows the processes involved in an NML backup.

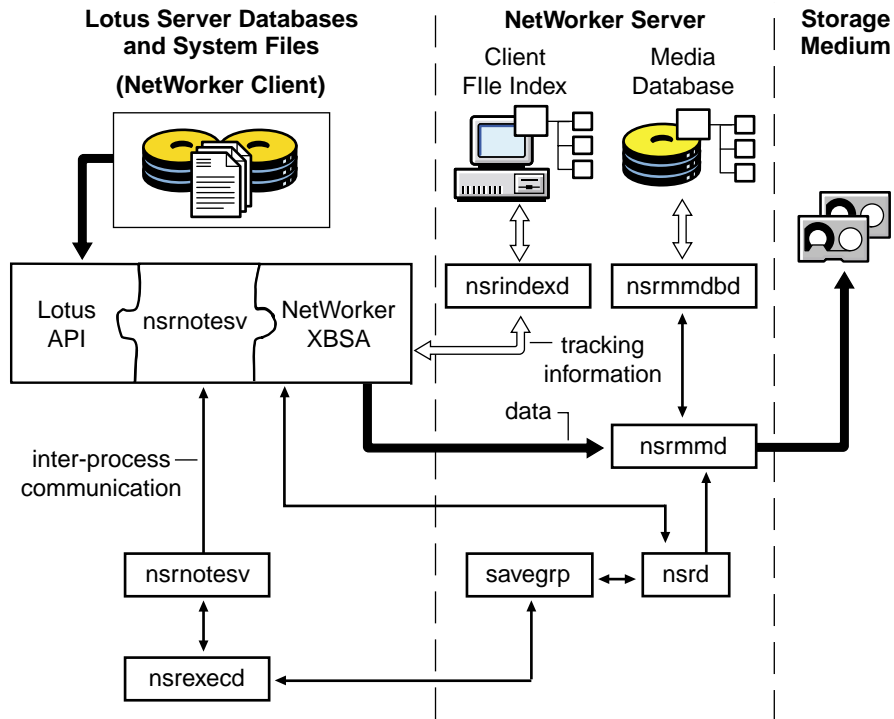


Figure 1-1 NML backup processes

---

## Files backed up by the NML software

The NML software considers .nsf, .ntf, and .box files to be Lotus databases and backs up these files by using the Domino Backup application programming interface (API) for databases.

The NML software considers .ncf, .njf, .dic, .dsk, .id, and notes.ini files to be normal files and backs up these files at the file system level.

The NML software can also be used to back up any other files that exist in a Lotus directory, such as .gif, .html, and .doc files.

---

## How NML recovers data

This section describes the process interactions involved in a Lotus data recovery performed by the NML software.

An NML recovery involves the following steps on the NML client:

1. The Lotus user starts the **nsrnotesrc** process, which performs the following:
  - a. Processes the restore parameters set in the configuration file.
  - b. Queries the NetWorker server to obtain a list of Domino files to recover, based on options specified by the user.
  - c. Stores the list of files in shared memory for access by child processes.
  - d. Spawns child **nsrnotesrc** processes to recover Domino data. The number of processes spawned depends on the number of Domino files to be recovered and the specified parallelism.
  - e. Monitors the execution of the child processes.
  - f. When the child processes finish the recovery successfully, restores the Domino logs, if requested by the Domino server.

2. Each child **nsrnotesrc** process performs the following:
  - a. Selects a file to restore from the list generated by the parent.
  - b. Sends a restore request to the NetWorker server.

When the NetWorker server receives a restore request from the client, the following occurs:

1. The main NetWorker service, **nsrd**, contacts the media service, **nsrmmd**.
  2. The **nsrmmd** service calls the media database service, **nsrmmdbd**, to determine which media contains the requested save set, and issues a mount request.
  3. The **nsrmmd** service reads the appropriate backup volumes and passes the data to the **nsrnotesrc** process.
- c. Writes the data to the disk.
  - d. Repeats steps 2a through 2c until all the files are restored.

Figure 1-2 on page 1-12 shows the processes involved in an NML recovery.

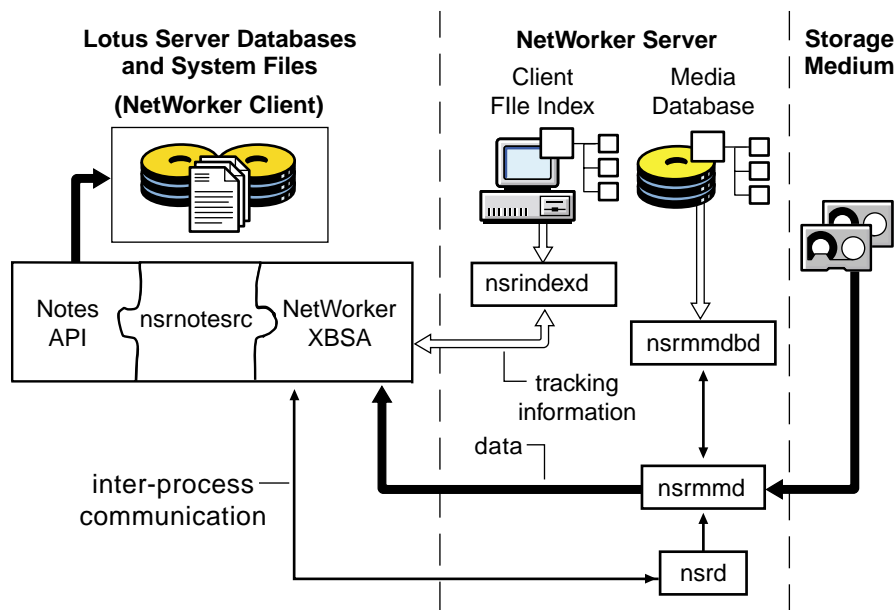


Figure 1-2 NML recovery processes

This chapter provides information on the basic configuration of the NetWorker Module for Lotus (NML) software for each Lotus Notes client and Domino server that requires backup and recovery services.

[Chapter 4, “Scheduled Backup Procedures”](#) provides information on configuring scheduled NML backups.

[Chapter 7, “Multiple Installations, Partitioned Domino Servers, and Cluster Support”](#) provides information on configuring backup and recovery of partitioned Domino servers and cluster servers.

This chapter includes the following sections:

- ◆ [Software configuration roadmap](#)..... 2-2
- ◆ [Task 1: Verify the NetWorker Server resource](#) ..... 2-3
- ◆ [Task 2: Verify the NetWorker user group privileges](#)..... 2-4
- ◆ [Task 3: Configure the NetWorker Schedule resource](#) ..... 2-5
- ◆ [Task 4: Configure the NetWorker Group resource](#)..... 2-6
- ◆ [Task 5: Configure the NetWorker Client resource](#)..... 2-7
- ◆ [Task 6: Configure the other NetWorker resources](#) ..... 2-10
- ◆ [Task 7: Configure firewall support](#)..... 2-11
- ◆ [Task 8: Set up the NML configuration file](#)..... 2-12
- ◆ [Task 9: Ensure the required settings on Solaris and Linux](#) ..... 2-22
- ◆ [Example of an NML backup configuration](#)..... 2-23

## Software configuration roadmap

Before the NML software can be used, the required NetWorker resources must be configured and the NML configuration file set up. Before completing the configurations, ensure that the NML software is installed on the Lotus Notes client or Domino server according to the instructions in the *NetWorker Module for Lotus Installation Guide*.

NML 3.0 configuration procedures differ from the procedures in previous NML releases. NML 2.2.x configuration procedures are still supported for backwards compatibility, but are *not* included in this guide. The configuration procedures are contained in the NML 2.2.x documentation.

To perform the configuration procedures, you can use the NetWorker Administrator program or the NetWorker Configuration Wizard.

- ◆ To configure all the required NetWorker resources for *both* ad hoc and scheduled NML backups, use the NetWorker Administrator program. The NetWorker server online help and *NetWorker Administration Guide* provide information on the NetWorker Administrator.

---

**Note:** NetWorker resources can be configured *only* by a NetWorker administrator.

---

- ◆ To create the basic NetWorker Client and Group resources and NML configuration file for scheduled NML backups *only*, use the NetWorker Configuration Wizard. Once the wizard creates a NetWorker resource, the resource can be edited with the NetWorker Administrator program.

---

**Note:** The configuration wizard must be launched by the root user on Solaris, or a member of the Administrators group on Windows. The user must be a NetWorker administrator.

---

The *NetWorker Module for Lotus Installation Guide* provides information on the configuration wizard requirements.

The following documents provide additional information on the configuration wizard:

- ◆ *NetWorker, Release 7.2.x, Release Notes*
- ◆ *NetWorker, Release 7.3, Administration Guide*



To complete the required configurations, perform the following:

- ◆ “Task 1: Verify the NetWorker Server resource” on page 2-3
- ◆ “Task 2: Verify the NetWorker user group privileges” on page 2-4
- ◆ “Task 3: Configure the NetWorker Schedule resource” on page 2-5
- ◆ “Task 4: Configure the NetWorker Group resource” on page 2-6
- ◆ “Task 5: Configure the NetWorker Client resource” on page 2-7
- ◆ “Task 6: Configure the other NetWorker resources” on page 2-10
- ◆ “Task 7: Configure firewall support” on page 2-11
- ◆ “Task 8: Set up the NML configuration file” on page 2-12
- ◆ “Task 9: Ensure the required settings on Solaris and Linux” on page 2-22

View and edit the NetWorker resources and their attributes by using the NetWorker Administrator program.

“Example of an NML backup configuration” on page 2-23 provides an example of the NetWorker resources configured for a typical backup.

## Task 1: Verify the NetWorker Server resource

After the NetWorker server software is installed, the NetWorker configuration includes a preconfigured Server resource with attribute settings that influence the performance and security of backups.

Table 2-1 on page 2-3 describes the relevant NetWorker Server resource attributes. Verify that the attribute settings in the Server resource are valid for the NML backup environment. Modify the settings as required.

Table 2-1 NetWorker Server resource attributes

Attribute	Description
Name	Specifies the hostname of the NetWorker server.
Parallelism	Specifies the maximum number of backup save streams that the NetWorker software allows to arrive concurrently at the server. The NetWorker server edition determines the maximum parallelism value. When multiple data streams are backed up at the same time, the efficiency of the storage devices is increased.

The NetWorker server online help and the *NetWorker Administration Guide* provide information on how to configure a NetWorker Server resource and its attributes.

---

## Task 2: Verify the NetWorker user group privileges

The NetWorker server includes an access control feature that allows NetWorker administrators to assign users to NetWorker user groups. Each user group has a specific set of privileges associated with it, as defined in the Privileges attribute of the User Group resource.

The NetWorker server is installed with two preconfigured user groups:

- ◆ Administrators — Members of this group have privileges to perform all NetWorker operations. The root user on UNIX and Linux, and members of the Microsoft Windows Administrators group on the NetWorker server computer, are always members of this group and *cannot* be removed from the group.
- ◆ Users — By default, members of this group have privileges to back up and recover local data and monitor NetWorker operations. They *cannot* view or edit configurations.

The privileges associated with the Users group can be customized to fit the requirements of the NetWorker users in the group. The privileges associated with the Administrators group cannot be changed.

By default, the NetWorker server assigns the following privileges to all users:

- ◆ Monitor NetWorker
- ◆ Back Up Local Data
- ◆ Recover Local Data

These default user group configurations are sufficient for NML backup and restore operations. If the default user group configurations are changed, ensure that the required privileges are assigned for the NML operations, as shown in [Table 2-2 on page 2-5](#).

The Operate NetWorker privilege is required to use the NetWorker command **nsrinfo** to access information in the client file index.

The *NetWorker Administration Guide* provides more information on user group privileges.

Table 2-2 Minimum user group privileges required for NML operations

NML operation	Privileges required with NetWorker server 7.2 and earlier	Privileges required with NetWorker server 7.3 and later
Full backup (ad hoc or scheduled)	Back Up Local Data	Back Up Local Data
Incremental backup (ad hoc or scheduled)	Back Up Local Data, Recover Local Data	Back Up Local Data
Restore	Recover Local Data	Recover Local Data



### CAUTION

**With a NetWorker server release 7.2 or earlier, if the Recover Local Data privilege is *not* granted during an incremental backup, the NML software performs a *full* backup instead. For all other NML operations, if the correct user group privileges are not assigned, the operation *fails* with an error message that indicates the required privileges.**

## Task 3: Configure the NetWorker Schedule resource

**Note:** The NetWorker Schedule resource is required for scheduled NML backups *only*.

The NetWorker server uses backup schedules to automate scheduled backups. The Schedule resource provides a graphical calendar for configuring a backup schedule, to specify the following:

- ◆ The days of the week to run scheduled backups.
- ◆ The levels of the scheduled backups.

The NetWorker server provides several preconfigured schedules. Customized schedules can also be created. Both preconfigured and customized schedules can be modified.

Customize a Schedule resource for an NML backup by using the NetWorker Administrator program. Select one of the following backup levels for each day of the week:

- ◆ Level *full* specifies that the NetWorker software runs a full backup on that day.
- ◆ Level *incr* specifies that the NetWorker software runs an incremental backup on that day.
- ◆ Level *skip* specifies that the NetWorker software does *not* run a backup on that day.

The NML software does *not* support any other backup levels, such as level 1.

For a scheduled backup only, enter the name of the NetWorker schedule in the Schedule attribute of the Client resource, as described in [“Task 5: Configure the NetWorker Client resource” on page 2-7](#).

The *NetWorker Administration Guide* provides more information on how to configure a Schedule resource by using the NetWorker Administrator program.

---

## Task 4: Configure the NetWorker Group resource

---

**Note:** The NetWorker Group resource is required for scheduled NML backups *only*.

---

A NetWorker backup group is a set of NetWorker Client resources, all of which start to back up data at a specified time once the following occurs:

- ◆ The Autostart attribute is enabled.
- ◆ The backup start time is specified in the Group resource.

All NetWorker backup groups can be created and modified. All backup groups *except* the Default group can be deleted.

The Group resource can be created with either the NetWorker Administrator program or the NetWorker Configuration Wizard. (The wizard must be launched by the root user on Solaris, or a member of the Administrators group on Windows.)

To use the Default group for testing scheduled NML backups, change its Autostart attribute to Enabled.

---

**Note:** To have a scheduled backup automatically use a volume pool associated with the backup group, specify the group name in the Pool resource for the volume pool.

---

For a scheduled backup only, enter the name of the NetWorker group in the Group attribute of the Client resource, as described in “[Task 5: Configure the NetWorker Client resource](#)” on page 2-7.

The *NetWorker Administration Guide* provides information on configuring a Group resource with the NetWorker Administrator program.

“[About scheduled backups](#)” on page 4-2 provides information on configuring a Group resource with the NetWorker Configuration Wizard.

---

## Task 5: Configure the NetWorker Client resource

The NetWorker Client resource is a set of attributes assigned to the Lotus Notes client or Domino server host and stored on the NetWorker server. Before the NML software can be used for backups and restores, a Client resource must be configured for each Notes client or Domino server to be backed up or restored.

If the NetWorker server software is installed on the Notes client or Domino sever host, a Client resource for the host is created automatically during the NetWorker installation.

To configure the required Client resource, you can use the NetWorker Administrator program or the NetWorker Configuration Wizard. “[Software configuration roadmap](#)” on page 2-2 provides details on these methods.

[Table 2-3 on page 2-8](#) describes the appropriate attribute settings in the Client resource for a Notes client or Domino server.

For a scheduled backup *only*, specify the following attributes in the Client resource:

- ◆ Backup Command
- ◆ Browse Policy
- ◆ Group
- ◆ Parallelism
- ◆ Retention Policy

- ◆ Save Set
- ◆ Schedule

Table 2-3 NetWorker Client resource attributes (Sheet 1 of 2)

Attribute	Description
Name	Specifies the hostname of the Notes client or Domino server host.
Aliases	Specifies all known aliases for the system where the Lotus software is installed.
Backup Command	For a scheduled backup <i>only</i> , specifies <code>nsrnotesv(.exe) -z config_filepath</code> , where <code>config_filepath</code> is the complete pathname of the NML configuration file stored on the Lotus host (for example, <code>/Lotus/backups/nml_config.txt</code> ). This attribute can be a maximum of 64 characters (a limitation of the NetWorker RAP database). Specify all the settings for the scheduled backup through the parameters in the NML configuration file, as described in <a href="#">"Task 8: Set up the NML configuration file" on page 2-12</a> .
Browse Policy	For a scheduled backup <i>only</i> , specifies the length of time that the NetWorker server retains an entry for the backup in the NetWorker client file index. If the <code>NSR_SAVESET_BROWSE</code> parameter is set in the configuration file for scheduled backup, as described in <a href="#">"Task 8: Set up the NML configuration file" on page 2-12</a> , its value <i>overrides</i> the Browse Policy attribute setting in the Client resource.
Group	For a scheduled backup <i>only</i> , specifies the NetWorker backup group to use. <a href="#">"Task 4: Configure the NetWorker Group resource" on page 2-6</a> provides more information on the backup group.
Parallelism	Specifies the maximum number of concurrent backup or restore tasks to use for a backup or restore. For a scheduled backup, this attribute can be used instead of the <code>NSR_PARALLELISM</code> parameter.
Remote Access	Specifies the name of a remote user and the fully qualified IP name of the remote system, for example, <code>root@rhost.com</code> . This attribute enables the restore of an NML backup to a different system.
Retention Policy	For a scheduled backup <i>only</i> , specifies the minimum length of time that the NetWorker server maintains information about the backup data in the NetWorker media database. If the <code>NSR_SAVESET_RETENTION</code> parameter is set in the configuration file for a scheduled backup, as described in <a href="#">"Task 8: Set up the NML configuration file" on page 2-12</a> , its value <i>overrides</i> the Retention Policy attribute setting in the Client resource.

Table 2-3 NetWorker Client resource attributes (Sheet 2 of 2)

Attribute	Description
Save Set	<p>For a scheduled backup <i>only</i>, specifies the name for the backup save set stored on the media. The name must start with the prefix NOTES:, and the prefix may be followed by any descriptive text. For example, the following are valid names:</p> <ul style="list-style-type: none"> <li>• NOTES:</li> <li>• NOTES: Monday Full Backup</li> </ul> <p>The Save Set attribute must contain only a single name — <i>not</i> multiple names.</p> <p>To specify the actual data to back up, set <i>one</i> of the following parameters in the NML configuration file:</p> <ul style="list-style-type: none"> <li>• NSR_BACKUP_LOTUS_DIR — To back up the Domino or Notes data directory, including the notes.ini file.</li> <li>• NSR_BACKUP_PATHS — To back up one or more specific directories, or files, or both.</li> </ul> <p><a href="#">Appendix A, "NML Configuration File"</a> provides details on Lotus backup parameters.</p>
Schedule	<p>For a scheduled backup <i>only</i>, specifies the NetWorker backup schedule to use. <a href="#">"Task 3: Configure the NetWorker Schedule resource"</a> on page 2-5 provides more information on the backup schedule.</p>

["Preparing to recover data"](#) on page 5-2 provides more information on how the NetWorker server uses the browse and retention policies to manage backup data and enable the data to be restored.

## Configuring an email notification

You can configure an email savegroup completion notification to provide a report of the scheduled backup.

To send an email notification of the scheduled backup results to the owner of a save set, edit the Owner Notification attribute in the NetWorker Client resource for the Domino server or Notes client. Enter a notification command directed to the login ID of the owner.

For example:

```
/usr/bin/mail -s "jupiter-mars-venus backup" jdoe
```

The *NetWorker Administration Guide* and online help for the NetWorker administration program provide information on how to use the NetWorker server interface to edit the Client resource.

---

## Task 6: Configure the other NetWorker resources

Additional NetWorker resources may be required for the NML backups and restores:

- ◆ Device resource
- ◆ Label Template resource
- ◆ Pool resource

The NetWorker server online help and the *NetWorker Administration Guide* provide more information on NetWorker resources and how to configure them by using the NetWorker Administrator program.

---

### Device resource

The NetWorker server uses a storage device to write data during a backup and to read data during a restore. The *Hardware Compatibility Guide* provides a complete list of supported storage devices.

Configure a NetWorker Device resource for each device to be used for NML backups and restores. Complete any required autochanger or silo configuration procedures. Ensure that each device also contains a labeled and mounted volume.

The *NetWorker Administration Guide* provides information on how to label and mount backup volumes in the storage devices and how to configure any required storage nodes with attached devices.

---

### Pool resource and label template

The NetWorker server directs backup data to backup volumes (pools), which provide a method of tracking and organizing the data. Each NetWorker pool is defined by its Pool resource. The Pool resource attributes determine the type of data that is written to the volumes in the pool.

For example, database backups can be directed to volumes in specific devices. Each volume belongs to a pool, and each pool has an associated label template, which is used to label the volumes in the pool.

Configure the NetWorker Pool resources and corresponding Label Template resources required for the NML backups and restores. The *NetWorker Administration Guide* provides details on pools and the corresponding NetWorker resources.



To specify the pool for an ad hoc backup of Lotus database files, use one of the following:

- ◆ The `NSR_DATA_VOLUME_POOL` parameter in the NML configuration file. [Appendix A, “NML Configuration File”](#) provides details on the configuration file.
- ◆ The `-b` option of the `nsrnotesv` backup command. [“The `nsrnotesv` command and options” on page B-4](#) provides details on the backup command.

---

**Note:** The `nsrnotesv` command option takes *precedence* over the NML configuration file parameter.

---

Do *not* set `NSR_DATA_VOLUME_POOL` for a scheduled backup. To specify the pool for a scheduled backup of database files, associate the pool with the backup group by entering the group name in the Group attribute of the corresponding NetWorker Pool resource.

To specify the pool for an ad hoc backup of Lotus transactional logs, use the `-b` option of the `nsrnotesv` backup command.

---

## Task 7: Configure firewall support

The NML software provides firewall support. The ports that the NML software uses for the firewall depend on the corresponding ports configured for the NetWorker server or client.

To configure the firewall that the NML software uses, follow the firewall configuration instructions in the *NetWorker Administration Guide* for the particular NetWorker server or client platform.

## Task 8: Set up the NML configuration file

A template of the NML configuration file is provided by the NML installation process in the directory where the NML software is installed:

- ◆ On UNIX and Linux:

```
/usr/bin/nsrnm1_config.template or  
/usr/sbin/nsrnm1_config.template
```

- ◆ On Windows:

```
%SystemDrive%\Program Files\Legato\nsr\bin\  
nsrnm1_config.template
```

You can copy this template file to any location on the Domino or Notes host, and customize the parameter settings as required for the specific NML configuration. The NML configuration file must be set by the Notes user.



### CAUTION

**Ensure that the NML configuration file is stored in a secure location, and is accessible by privileged users *only*. If possible, make this file readable and writeable by only the Notes user that performs the operation.**

**For Lotus data recovery, the NML configuration file must be located on the destination client where the database files are to be recovered.**

You must set the required parameters in the NML configuration file for use by the following:

- ◆ The **nsrnotesv** program during an NML backup of Domino or Notes data in a Domino database.
- ◆ The **nsrnotesrc** program during an NML restore of Domino or Notes data to a Domino database.
- ◆ The **nsrdocr** command during an NML restore of deleted documents to a Notes database.

To specify the pathname of the NML configuration file, use the **-z** option with the following commands as appropriate:

- ◆ **nsrnotesv** for backup
- ◆ **nsrnotesrc** for restore
- ◆ **nsrdocrc** for document-level restore



#### **CAUTION**

**A *nsrnotesv*, *nsrnotesrc*, or *nsrdocrc* command option takes *precedence* over the corresponding parameter setting in the NML configuration file for the same backup or restore operation. A parameter setting in the NML configuration file takes *precedence* over a corresponding environment variable.**

---

## Overview of the configuration file

The NML configuration file has a main Lotus section that contains specific parameter settings and starts with the keyword LOTUS.

During an NML backup or restore of Domino or Notes data, the software uses the parameter settings (or default values of parameters that are *not* set) in the Lotus section of the NML configuration file. The parameter values provide configuration information that is used by the NML backup or restore commands and procedures.

**Note:** For an NML backup or restore of Domino or Notes data, it is preferable to specify only the **-z** option with the **nsrnotesv**, **nsrnotesrc**, or **nsrdocrc** command. Specify other settings through the parameters in the Lotus section of the configuration file, rather than through the command options. The command options other than **-z** correspond to specific parameters.



#### **CAUTION**

**Do *not* set any extra parameters in the Lotus section of the NML configuration file.**

**For an NML backup operation, do *not* set any Lotus restore parameters in the Lotus section of the file.**

**For an NML restore or recovery operation, do *not* set any Lotus backup parameters in the Lotus section of the file.**

The following sections provide more information on the parameters to set in the Lotus section of the configuration file:

- ◆ [“Lotus backup parameters” on page 2-14](#)
- ◆ [“Lotus restore parameters” on page 2-20](#)

---

## Lotus backup parameters

The Lotus section of the NML configuration file (starting with keyword LOTUS) contains settings of the Lotus backup parameters. These parameters are used by the NML software during an ad hoc or scheduled backup of the Domino or Notes data.

The following Lotus backup parameters are *mandatory* in the NML configuration file:

- ◆ LOTUSUSER — Mandatory for scheduled backups on UNIX and Linux.
- ◆ Notes\_ExecDirectory — Mandatory for *all* backups.
- ◆ NSR\_BACKUP\_LOTUS\_DIR *or* NSR\_BACKUP\_PATHS — Mandatory for scheduled backups.
- ◆ NSR\_LOTUS\_DATA\_DIR *or* PATH (latter set to include the Domino data directory) — Mandatory for all backups on UNIX or Linux.
- ◆ NSR\_RESOURCE\_DIR — Mandatory for all backups on UNIX and Linux.
- ◆ PATH — Mandatory for scheduled backups.

All other Lotus backup parameters are optional in the configuration file. The following sections provide more information on specifying parameters for the different types of Lotus backups:

- ◆ [“Parameters for ad hoc backups” on page 3-2](#)
- ◆ [“Parameters for scheduled backups” on page 4-2](#)

[Appendix A, “NML Configuration File”](#) provides details on the syntax rules for the configuration file, and a complete list of all the Lotus backup parameters.

The following examples describe the Lotus parameter settings for different types of NML backup operations.

**Example 2-1 Lotus backup parameter for the backup catalog file**

The backup catalog file contains information about each file backed up during an NML backup. The catalog file is stored on the Domino or Notes host. To specify the catalog file for a backup, ensure that the NML configuration file contains the NSR\_CATALOGFILE parameter setting:

```
NSR_CATALOGFILE = pathname_of_catalog_file
```

where *pathname\_of\_catalog\_file* is the complete pathname of the backup catalog file to include detailed information about each file that is backed up.

- ◆ If the specified catalog file does *not* yet exist, it is created.
- ◆ If the specified catalog file already exists, the information is appended to the file.
- ◆ If the specified catalog file *cannot* be accessed, the backup still proceeds as usual. At the end of the backup, an error message appears for the failed catalog file operation.

The backup catalog file contains the following information about the backup:

- ◆ General information about the backup, such as the server name, client name, and volume pool used for the backup.
- ◆ The name of each file that is selected for backup.
- ◆ The status of each file (in integer format), where the status includes skipped and backed-up.
- ◆ The name of the save set that each file belongs to.
- ◆ The size of each file that is backed up.
- ◆ The total number of files backed up and total size of the backup.
- ◆ The names of all the transaction logs backed up.

For example, the following backup catalog file provides information from a full database backup:

```
Summary of NML Backup
Server: ca-william
Client: ca-william
Saveset: notes_ca-william
Status: 0
Level: 0
EndDate: Thu Aug 25 09:18:21 2005
Pool: Default
```

```

Group: Default
Compression: FALSE
Encryption: FALSE
AES Encryption: FALSE
No. Items: 145
No. TransactionLogs: 0

```

```

Saveset: notes_ca-william.legato.com_0 Size: 94 MB
NumFiles: 31 Date: Thu Aug 25 09:17:59 2005
Item: /space31/domino651/data/activity.ntf Status: 0
Size: 1237 KB(1266688) Time: Thu Aug 25 09:18:00 2005
Item: /space31/domino651/data/brasil.dic Status: 0 Size:
1251 KB(1280512) Time: Thu Aug 25 09:18:00 2005
Item: /space31/domino651/data/cluster.ncf Status: 210
Size: N/A Time: N/A (File not backed up).
Item: /space31/domino651/data/csrv50.ntf Status: 0 Size:
1064 KB(1089536) Time: Thu Aug 25 09:18:00 2005
(...)
Saveset: notes_ca-william.legato.com_1 Size: 106 MB
NumFiles: 56 Date: Thu Aug 25 09:17:59 2005
Item: /space10/dzak/tmp.dic Status: 0 Size: 1 KB(6)
Time: Thu Aug 25 09:17:59 2005
(...)
Total Files: 144, Skipped Files: 1, Txn Logs: 0 Skipped
Txn Logs: 0

```

#### Example 2-2 Lotus backup parameter for backup of databases or directories

Use the `NSR_BACKUP_PATHS` parameter setting to specify the complete pathnames of one or more Lotus database files or directories for an NML backup. [“Using wildcards” on page B-2](#) provides information on using wildcards in pathnames with the parameter.

The following parameter settings in the NML configuration file specify the backup of a single Lotus *database*:

- ◆ On UNIX or Linux:

```
NSR_BACKUP_PATHS = /lotusdata/accounting.nsf
```

- ◆ On Windows:

```
NSR_BACKUP_PATHS = c:\Lotus\Domino\data\accounting.nsf
```

The following parameter settings in the NML configuration file specify the backup of a single Lotus *directory*:

- ◆ On UNIX or Linux:

```
NSR_BACKUP_PATHS = /lotusdata
```

- ◆ On Windows:

```
NSR_BACKUP_PATHS = c:\Lotus\Domino\data
```

#### Example 2-3 Lotus backup parameter for backup of the Domino data directory

The following parameter setting in the NML configuration file specifies the backup of all the databases under the Lotus data directory:

```
NSR_BACKUP_LOTUS_DIR = TRUE
```

#### Example 2-4 Lotus backup parameter for the comfort span

A comfort span is a value that determines whether NML backs up a logged database in *full* before it backs up transaction logs during an incremental backup. The comfort span value denotes the acceptable span of logs (number of kilobytes of logs) that can be applied during the recovery of the backup.

To specify the comfort span for a database during an incremental backup, ensure that the NML configuration file contains the `NSR_COMFORT_SPAN` parameter setting:

```
NSR_COMFORT_SPAN = comfort_span_value
```

where *comfort\_span\_value* must be an integer value between 65536 and 65536000, inclusive.

---

**Note:** To enable the use of the `NSR_COMFORT_SPAN` parameter, transaction logging must be enabled in archive mode on the Domino server.

---

For example, the NML configuration file contains the following parameter settings for an incremental database backup with the comfort span option:

```
NSR_BACKUP_LEVEL = incr
NSR_COMFORT_SPAN = 196608
```

If NML determines that more than 196608 KB of logs need to be applied to recover the specified database, NML performs a full backup of the database before backing up the logs. A full backup

reduces future recovery time. Fewer transaction logs are required to recover the logged database.

#### Example 2-5 Lotus backup parameters for crossing mount points

To enable backups of Lotus databases that cross mount points, ensure that the NML configuration file contains the `NSR_CROSS_MOUNT_POINTS` parameter setting:

```
NSR_CROSS_MOUNT_POINTS = TRUE
```

For example, the NML configuration file contains the following settings for a backup of all the databases under the Lotus data directory, including the directory's mount points:

```
NSR_BACKUP_LOTUS_DIR = TRUE  
NSR_CROSS_MOUNT_POINTS = TRUE
```

#### Example 2-6 Lotus backup parameters for encryption

For a Lotus data backup, specify either the default NetWorker encryption method or 256-bit AES encryption.

- ◆ To specify that the default NetWorker encryption method is used during a backup, ensure that the NML configuration file contains the `NSR_ENCRYPTION` parameter setting:

```
NSR_ENCRYPTION = TRUE
```

- ◆ To specify that 256-bit AES encryption is used during a backup, ensure that the NML configuration file contains the `NSR_AES_ENCRYPTION` parameter setting:

```
NSR_AES_ENCRYPTION = TRUE
```



#### **CAUTION**

**The 256-bit AES encryption method is supported only if all the computers involved in the backup contain NetWorker release 7.3 or later client and server software. If NetWorker software earlier than release 7.3 is installed, the default NetWorker encryption method is used *instead* without a warning message, and the resulting backup *cannot* be considered secure.**

**Keep a record of all pass phrases used for 256-bit AES encryption. Be careful when you change the pass phrase on the NetWorker 7.3 server. If the pass phrase on the server is changed and you cannot**



**remember the pass phrase used for an NML backup, the encrypted data cannot be recovered. The *NetWorker, Release 7.3, Administration Guide* provides more information on pass phrases.**

**Example 2-7** Lotus backup parameter for exclude lists

To specify the name of a file that contains a list of paths to be excluded from an NML backup, ensure that the NML configuration file contains the NSR\_EXCLUDE\_FILE parameter setting:

```
NSR_EXCLUDE_FILE = pathname_of_exclude_file
```

where *pathname\_of\_exclude\_file* is the complete pathname of a file that contains a list of the filenames to exclude.

**Example 2-8** Lotus backup parameter for parallelism

The NML parallelism level controls the number of concurrent save streams that the NML client can send to the NetWorker server during a backup.

To specify the parallelism level of the client, ensure that the NML configuration file contains the NSR\_PARALLELISM parameter setting:

```
NSR_PARALLELISM = parallelism_level
```

For example, the NML configuration file contains the following setting for a backup with the parallelism level of two:

```
NSR_PARALLELISM = 2
```

**Example 2-9** Lotus backup parameter for a transaction log backup

To specify the type of transaction log backup to perform during a *full* NML backup, ensure that the NML configuration file contains the NSR\_BACKUP\_LOGS\_MODE parameter setting:

```
NSR_BACKUP_LOGS_MODE = log_backup_level
```

where *log\_backup\_level* is either 1 or 2.

- ◆ If the value is 1, NML backs up new transaction logs and marks them as reusable.
- ◆ If the value is 2, NML marks transaction logs as reusable *without* backing them up.

---

**Note:** The NSR\_BACKUP\_LOGS\_MODE parameter is *not* supported for incremental backups.

---



### **CAUTION**

---

**Use the setting NSR\_BACKUP\_LOGS\_MODE = 2 with extreme caution. With this setting, the transaction logs are *not* backed up and will be recycled by the Domino server.**

---

---

## Lotus restore parameters

The Lotus section of the NML configuration file (starting with keyword LOTUS) contains settings of the Lotus restore parameters. These parameters are used by the NML software during a recovery of the data in a Domino or Notes database.



### **CAUTION**

---

**For Lotus data recovery, the NML configuration file must be located on the destination client where the database files are to be recovered.**

---

The only Lotus restore parameter that is *mandatory* in the NML configuration file is Notes\_ExecDirectory. All other restore parameters are optional.

[Appendix A, “NML Configuration File”](#) provides details on the syntax rules for the configuration file, and a complete list of all the Lotus restore parameters.

The following examples describe the Lotus parameter settings for different types of NML restore operations.

#### Example 2-10 Lotus restore parameter for encryption phrases

By default, if the NSR\_ENCRYPTION\_PHRASES parameter is *not* set, the NML software obtains the encryption phrase from the NetWorker server for decrypting an encrypted backup during a Lotus restore.

The NSR\_ENCRYPTION\_PHRASES parameter must be set if both of the following are true:

- ◆ The Lotus data being restored was backed up with 256-bit AES encryption.
- ◆ The encryption phrase on the NetWorker server has changed since the Lotus data was backed up.

If both of these conditions are true, ensure that the NML configuration file contains the following NSR\_ENCRYPTION\_PHRASES parameter setting:

```
NSR_ENCRYPTION_PHRASES = original_encryption_phrase
```

where *original\_encryption\_phrase* is the encryption phrase used to originally back up the Lotus data that is to be restored.



### **CAUTION**

**The decryption of data that was backed up with 256-bit AES encryption is supported only if all the computers involved in the restore contain NetWorker release 7.3 or later client or server software. If NetWorker software earlier than release 7.3 is installed, the default NetWorker decryption method is used *instead*.**

#### Example 2-11 Lotus restore parameter for not applying logs

By default, the NML software applies the transaction logs after restoring a Lotus backup. To specify that the transaction logs are *not* applied after a Lotus restore, ensure that the NML configuration file contains the following NSR\_APPLY\_LOGS parameter setting:

```
NSR_APPLY_LOGS = FALSE
```

#### Example 2-12 Lotus restore parameter for parallelism

The NML parallelism level controls the number of concurrent save streams that the NML client can send to the NetWorker server during a restore.

To specify the parallelism level of the client, ensure that the NML configuration file contains the NSR\_PARALLELISM parameter setting:

```
NSR_PARALLELISM = parallelism_level
```

For example, the NML configuration file contains the following setting for a restore with the parallelism level of two:

```
NSR_PARALLELISM = 2
```

## Task 9: Ensure the required settings on Solaris and Linux

For ad hoc NML operations with a Domino server on Solaris or Linux *only*, perform one of the following to ensure the require settings:

- ◆ Set the environment variable `LD_LIBRARY_PATH` to the complete pathname of the Lotus program directory that contains the library files `libnotes.so` and `libndgts.so`.
- ◆ In the `/usr/lib` directory, create symbolic links to the library files `libnotes.so` and `libndgts.so` in the Lotus program directory.

---

**Note:** If you have different versions of Domino installed on the same computer, do *not* create symbolic links -- instead, set the variable `LD_LIBRARY_PATH`.

---

For example, enter both of the following commands in the `/usr/lib` directory on Solaris to create links to the library files:

```
ln -s /opt/lotus/notes/latest/sunspa/libnotes.so
libnotes.so

ln -s /opt/lotus/notes/latest/sunspa/libndgts.so
libntdgs.so
```

Ad hoc NML operations include the following:

- ◆ Ad hoc backups with the **`nsrnotesv`** command.
- ◆ Data recovery with the **`nsrnotesrc`** command.
- ◆ Document-level recovery with the **`nsrdocrc`** command.
- ◆ Operations with the NetWorker User for Lotus program.

---

## Environment variable requirements

NML 3.0 supports environment variables supported by previous NML releases. Requirements for setting environment variables include:

- ◆ On UNIX and Linux, the environment variables must be set in the same shell that runs the backup or recovery command.
- ◆ For ad hoc backup or recovery on UNIX and Linux, environment variables can be set by either of two methods:
  - At the command prompt in the shell where the backup or recovery command is run.
  - From a preestablished profile file that is used when switching to or logging on as the Lotus user. The name of the profile file changes according to the shell being used, for example, `.profile` in a standard shell or `.cshrc` in the C shell. Look in the `passwd` file for the home directory of the profile file to edit.
- ◆ Prior to the backup or recovery, ensure the environment variable settings are in effect. For example, on UNIX or Linux, use the `set` command to verify the variable settings.

---

## Example of an NML backup configuration

This section shows one example of how an environment could be configured for a Lotus Domino backup. Specifications and the configuration procedure follow.

---

### Specifications

- ◆ The Lotus Domino server is installed on the Solaris computer named `marmaris.legato.com`.
- ◆ The Lotus application library `libnotes.so` is located in the directory `/opt/lotus/notes/latest/solaris`.
- ◆ The Lotus resource directory is `/opt/lotus/notes/latest/solaris/res/C`.
- ◆ The name of the Lotus Domino user is `notes`.
- ◆ The Lotus data directory is `/Domino/data`.
- ◆ The Lotus executables directory is `/opt/lotus/bin`.
- ◆ The scheduled backups of the Domino server do *not* require any preprocessing or postprocessing scripts.

- ◆ The NetWorker client and NML software is installed on the computer marmaris.legato.com (same as the Domino server).
- ◆ The NetWorker server is installed and configured on the computer birdman.legato.com.
- ◆ The following backup schedule is required:
  - A full Domino server backup is performed every Sunday.
  - An incremental backup is performed every other day of the week.

---

## How to configure for a Lotus Domino backup

To configure the Lotus Domino backup with NML for this environment, perform the following:

1. On the NetWorker server, configure a NetWorker Schedule resource named NML\_Schedule that includes a full backup on Sunday and an incremental backup on every other day of the week.
2. On the NetWorker server, configure a NetWorker Group resource named NML\_Group that starts the backup at 1:00 a.m. every day.
3. On the NetWorker server, configure a NetWorker Client resource for the host marmaris.legato.com.
  - Specify the **nsrnotesv -z config\_filepath** command in the **Backup Command** attribute of the Client resource.
  - Specify NML\_Group in the **Group** attribute of the Client resource.
  - Specify NML\_Scheduled in the **Schedule** attribute of the Client resource.
4. On the host marmaris.legato.com, create an NML configuration file by using the configuration file template named nsrnml\_config.template, provided with the NML installation package. Copy the template to a secure location, and set the file permissions as required. The Lotus Domino user must have at least read permissions on the file.

To copy the configuration file template, enter the following command:

```
cp /usr/sbin/nsrnml_config.template  
/space10/home/notes/nml.cfg
```

To set the file permissions, enter the following command:

```
chmod 700 /space10/home/notes/nml.cfg
```

5. Edit the NML configuration file, as required. A sample configuration file named `/space10/home/notes/nml.cfg` is shown as follows.

```
#####
#
# nsrnml_config.template
#
# All rights reserved.
#
# EMC Legato NetWorker Module for Lotus (NML) 3.0
#
# This template is part of the NML software. It is
# included to help users configure NML operations. The
# file contains only the minimum number of parameters
# required to perform a given operation, for example, a
# scheduled backup. Additional parameters may be added
# when required. Check NML Administrator's Guide for a
# complete list of all supported parameters and rules for
# editing the configuration file.
#
# Make a copy of this file before attempting any
# modifications. To enable a parameter, uncomment/add it
# and specify its value.
#

#####
#
# The LOTUS section contains parameters required for
# backup and recovery of data stored in Domino server
# data directory.
#
LOTUS {
#
# REQUIRED Parameter: Notes_ExecDirectory
#
# Default value: NONE
#
# Description: Full path of the Domino server being
# backed up or restored. It is a requirement that the
# Lotus library libnotes.so is located in this
# directory.
#
# Sample:
# Notes_ExecDirectory = /opt/lotus/notes/latest/solaris
#
Notes_ExecDirectory = /opt/lotus/notes/latest/solaris
```

```
#
# REQUIRED Parameter: NSR_RESOURCE_DIR
#
# Default value: NONE
#
# Description: Full path of Domino server resource
# files.
#
# Sample:
# NSR_RESOURCE_DIR =
/opt/lotus/notes/latest/solaris/res/C
#
NSR_RESOURCE_DIR =
/opt/lotus/notes/latest/solaris/res/C

#
# REQUIRED Parameter for Scheduled Backup: LOTUSUSER
#
# Default value: NONE
#
# Description: Name of the operating system user that
# runs the Domino server being backed up.
#
# Sample:
# LOTUSUSER = notes
#
LOTUSUSER = notes

#
# Optional Parameter: PATH
#
# Default value: $PATH environment variable set in the
# running environment.
#
# Description: $PATH environment variable to be set for
# the operation. This parameter should contain the
# location of notes.ini file for Domino server being
# backed up, and other paths needed by the NML
# operation.
#
# Sample:
# PATH = /Domino/data:/opt/lotus/bin
#
PATH = /Domino/data:/opt/lotus/bin:/usr/sbin

#
# Optional Parameter for Scheduled Backup: PRECMD
#
# Default value: NONE
#
# Description: Full path of a command script to be run
# before the scheduled backup, for example, to check
```



```

# the databases for corruption. If PRECMD fails, the
# backup is aborted.
#
# Sample:
# PRECMD = /my/scripts/directory/monday_bkup_precmd
#
# PRECMD =

#
# Optional Parameter for Scheduled Backup: POSTCMD
#
# Default value: NONE
#
# Description: Full path of a command script to be run
# after the scheduled backup, for example, to check the
# status of logs. If POSTCMD fails, a warning message
# is printed, but the backup reports success.
#
# Sample:
# POSTCMD = /my/scripts/directory/monday_bkup_postcmd
#
# POSTCMD =
}

```

This completes the sample backup configuration.

---

## Starting the backup

To start the backup:

1. Ensure that the **nsrnotesv -z *config\_filepath*** command appears in the **Backup Command** attribute of the Client resource on the NetWorker server
2. Start the backup group from the NetWorker Administrator program.



---

This chapter provides information on how to use the NetWorker Module for Lotus (NML) software to perform ad hoc backups of Lotus data from either the command line or the NetWorker User for Lotus program. The NetWorker User for Lotus is available on Windows *only*.

This chapter includes the following sections:

- ◆ About ad hoc backups..... 3-2
- ◆ Parameters for ad hoc backups ..... 3-2
- ◆ Ad hoc backups from the command line ..... 3-3
- ◆ Ad hoc backups from NetWorker User for Lotus ..... 3-5
- ◆ Monitoring ad hoc backups..... 3-12
- ◆ Ad hoc backup information in the NetWorker indexes ..... 3-12
- ◆ Bootstrap and index backups for recovery of the server..... 3-12

---

## About ad hoc backups

An ad hoc NML backup is initiated by the user on the Domino or Notes host. The backup is performed by either entering the **nsrnotesv** command at the operating system command line or by running the NetWorker User for Lotus program.

“[NML backups](#)” on [page 1-6](#) provides information on the differences between ad hoc and scheduled NML backups.

“[Parameters for ad hoc backups](#)” on [page 3-2](#) provides information on the parameters to set for ad hoc backups.

The following sections provide information on the two types of ad hoc backups:

- ◆ “[Ad hoc backups from the command line](#)” on [page 3-3](#)
- ◆ “[Ad hoc backups from NetWorker User for Lotus](#)” on [page 3-5](#)

---

## Parameters for ad hoc backups

For ad hoc Lotus backups with NML, it is preferable to set specific parameters in the NML configuration file *instead* of using the corresponding options of the **nsrnotesv** backup command.

However, the use of command options with the **nsrnotesv** backup command is still supported, as described in [Appendix B, “NML Commands and Command Options”](#).

[Appendix A, “NML Configuration File”](#) provides details on all the Lotus backup parameters supported for ad hoc backups.

The following parameters are *mandatory* in the NML configuration file for ad hoc backups:

- ◆ Notes\_ExecDirectory
- ◆ NSR\_LOTUS\_DATA\_DIR *or* PATH (UNIX and Linux only; PATH set to include the Domino data directory)
- ◆ NSR\_RESOURCE\_DIR (UNIX and Linux *only*)

---

**Note:** For ad hoc backups to a *remote* NetWorker server, the NSR\_SERVER parameter must be set to the hostname of the remote server.

---

[Example 3-1](#) describes the parameters for an ad hoc backup of the Lotus data directory. “[Lotus backup parameters](#)” on page 2-14 provides more examples of backup parameters.

#### Example 3-1 NML configuration file parameters for an ad hoc backup

The following parameter settings in the NML configuration file specify an ad hoc backup on Windows with the NetWorker server named mars.emc.com.

```

LOTUS {
  Notes_ExecDirectory = "C:\Program Files\Lotus\Domino"
  NSR_SERVER = mars.emc.com
  NSR_SAVESET_BROWSE = "2 year"
  NSR_SAVESET_RETENTION = "3 year"
  NSR_BACKUP_LOTUS_DIR = TRUE
}

```

The Lotus data directory is backed up. The browse policy is set to two years, and the retention policy to three years.

## Ad hoc backups from the command line

The following sections provide information about ad hoc NML backups performed from the command line.

### About ad hoc backups from the command line

The NML command-line interface is used for the following:

- ◆ Ad hoc backups on UNIX and Linux clients. (The NetWorker User for Lotus program does *not* exist on UNIX or Linux.)
- ◆ Ad hoc backups on Windows clients. You use the command-line interface rather than the graphical interface of the NetWorker User for Lotus program.

To perform an ad hoc NML backup from the command line, enter the **nsrnotesv** command with the **-z** option and any other appropriate options, as described in [Appendix B, “NML Commands and Command Options”](#).

## Database backups

Before you begin, ensure that the basic configurations are set, including the required NetWorker resources and NML parameters. [Chapter 2, “Software Configuration Procedures”](#) provides more details.

To back up specific Lotus database files, specify the filenames and filepaths with one of the following:

- ◆ The NSR\_BACKUP\_PATHS parameter in the NML configuration file (preferred method).

The following sections provide more information on the NSR\_BACKUP\_PATHS parameter:

- [Example 2-2, “Lotus backup parameter for backup of databases or directories,” on page 2-16](#)
- [“NSR\\_BACKUP\\_PATHS” on page A-6](#)
- ◆ The `nsrnotesv` backup command at the DOS or UNIX command-line prompt.  
[“The nsrnotesv command and options” on page B-4](#) provides more information on the `nsrnotesv` command.



### CAUTION

**On UNIX and Linux, the `nsrnotesv` backup command must be run by the Domino user that runs the Domino server that is being backed up. Do *not* run the `nsrnotesv` command as root.**

If performing an ad hoc backup to a *remote* NetWorker server, specify the server name with the NSR\_SERVER parameter in the NML configuration file.

To back up database files whose filenames contain spaces, place quotation marks around each filepath. For example (on Windows):

- ◆ With the NSR\_BACKUP\_PATHS parameter:

```
NSR_BACKUP_PATHS =
    "c:\Lotus\Domino\data\accounting 1998.nsf"
```

- ◆ With the `nsrnotesv` backup command:

```
nsrnotesv "c:\Lotus\Domino\data\accounting 1998.nsf"
```

[“Using wildcards” on page B-2](#) provides information on using wildcards in pathnames.

---

## Canceling a backup from the command line

To cancel an ad hoc backup in progress from the command line, press **Ctrl + C**.



### CAUTION

**If a backup is canceled before completion, none of the backed-up data may be recoverable. Restart the canceled backup process from the beginning and ensure that the backup completes successfully without interruption.**

---

---

## Ad hoc backups from NetWorker User for Lotus

The following sections provide information about ad hoc NML backups performed from the NetWorker User for Lotus program on Windows *only*.

---

### About NetWorker User for Lotus backups


The NetWorker User for Lotus program is used for ad hoc backups on Windows clients when you prefer to use the graphical interface of the NetWorker User for Lotus program rather than the command-line interface.

To start the NetWorker User for Lotus program, select **Programs>Legato NetWorker>NetWorker User for Lotus** from the **Start** menu.

---

### About the Backup window

To display the **Backup** window, perform *one* of the following from the NetWorker User for Lotus main window:

- ◆ From the **Operation** menu, select **Backup**.
- ◆ Click the **Backup** button. 
- ◆ Press **Alt + B**.

[Figure 3-1 on page 3-6](#) shows the **Backup** window of the NetWorker User for Lotus program.

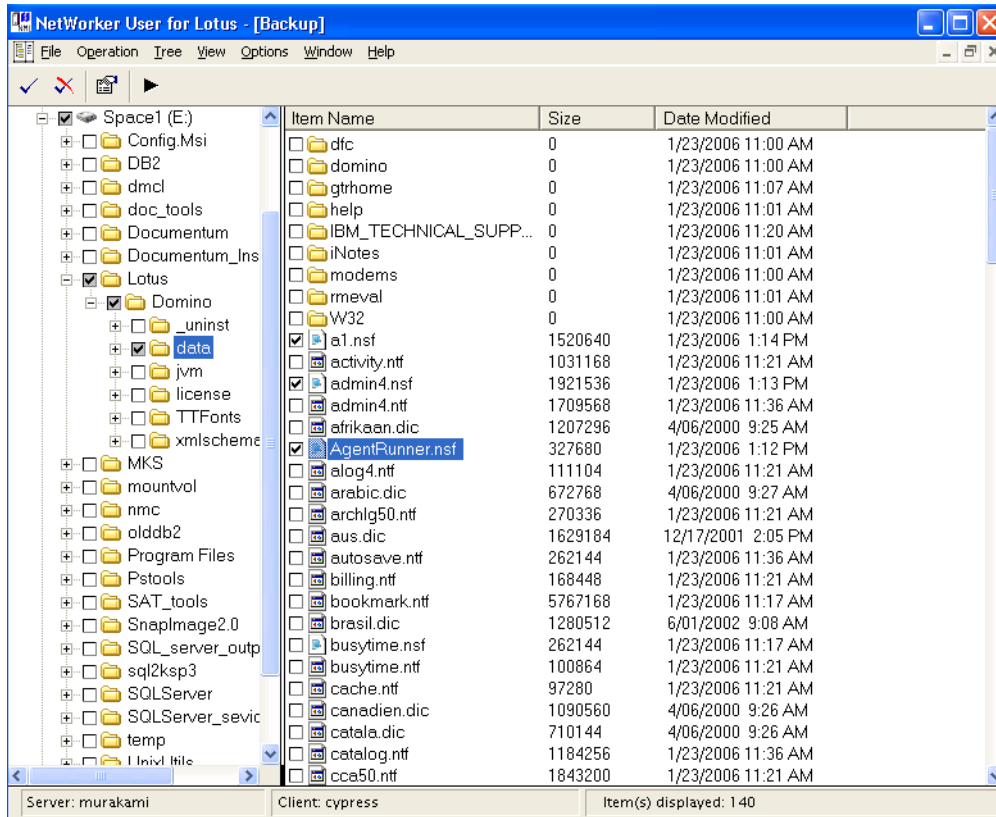


Figure 3-1 Backup window

To view a list of files available for backup, select a directory in the left pane. The directory's contents appear in the right pane.





Right-clicking an item in either pane of the **Backup** window displays a pop-up menu with the following options:

- ◆ **Start**, which starts the recovery operation.
- ◆ **Font**, which enables you to change the font of the display.
- ◆ **Backup Options**, which displays the **Backup Options** dialog box.



Table 3-1 on page 3-7 describes the **Backup** window toolbar buttons.

Table 3-1 Backup window toolbar buttons

Button	Operation	Description
	Mark	Marks the selected (highlighted) files for backup.
	Unmark	Unmarks the selected marked files.
	Backup Options	Displays the options for backup compression and encryption, and the text box for specifying the configuration file pathname.
	Start	Starts the backup of marked files.

## Database backups

Before you begin, ensure that the basic configurations are set, including the required NetWorker resources and NML parameters in the configuration file. [Chapter 2, “Software Configuration Procedures”](#) provides more details.

To perform an ad hoc backup of specific Lotus database files from the NetWorker User for Lotus program:

1. Ensure that the NetWorker server services are running.
2. In the **NetWorker User for Lotus** window, select **Backup** from the **Operation** menu.

The **Backup** window appears, as shown in [Figure 3-1 on page 3-6](#).

3. Specify the database files to back up by using one of the following methods:
  - Select the files, and click the **Mark** toolbar button.
  - Select the checkbox (add a check mark) beside each file.

To unmark files, use one of the following methods:

Select the marked files, and click the **Unmark** toolbar button.

- Clear the checkboxes (remove the check marks) beside the files.

4. To specify the location of the NML configuration file:
  - a. In the **Backup** window, select **Backup Options** from the **Options** menu.

The **Backup Options** dialog box appears, as shown in [Figure 3-2 on page 3-8](#).

- b. Enter the complete pathname of the configuration file in the **Configuration File** text box.
  - c. Click **OK**.

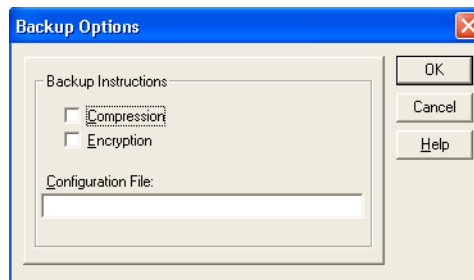


Figure 3-2 Backup Options dialog box

5. To specify data compression or encryption:
  - a. From the **Options** menu, select **Backup Options**.
  - b. In the **Backup Options** dialog box, select the appropriate option:
    - **Compression** — Specifies that NML compresses the backup data before it is moved over the network or written to tape.
    - **Encryption** — Specifies that NML encrypts the backup data before it is moved over the network or written to tape. The default NetWorker encryption method is used. To specify 256-bit AES encryption, set the parameter `NSR_AES_ENCRYPTION` in the NML configuration file, as described in [“NSR\\_AES\\_ENCRYPTION” on page A-5](#).
  - c. Click **OK**.

**Note:** Parameters specified in the **Backup Options** dialog box take precedence over the corresponding parameters specified in the NML configuration file.

- To start the backup, click the **Start** toolbar button.

The **Backup Status** window appears and displays information about the backup operations performed, as shown in [Figure 3-3 on page 3-9](#).

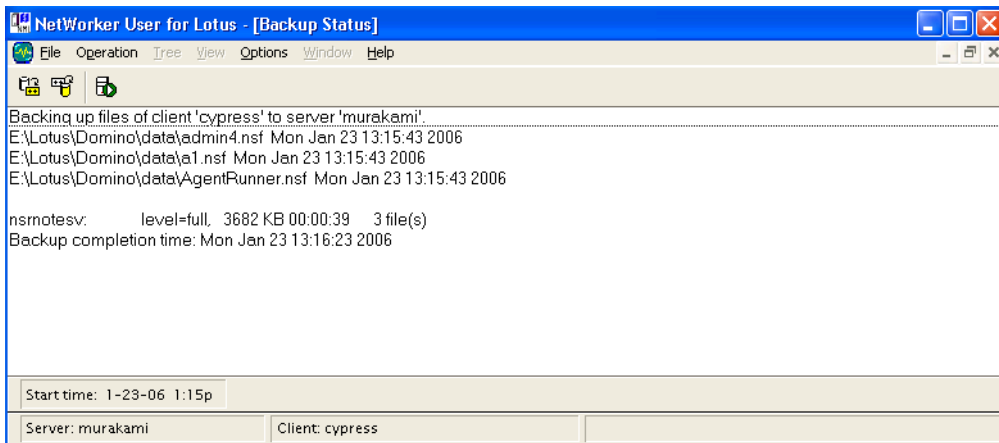


Figure 3-3 Backup Status window

## Incremental backups

The NML software supports incremental backups with the NetWorker User for Lotus program.

To perform an incremental ad hoc backup from the NetWorker User for Lotus program:

- Ensure that the NML configuration file contains the required parameter setting for the backup level:
 

```
NSR_BACKUP_LEVEL = incr
```
- Follow the steps outlined for database backups in [“Database backups” on page 3-7](#).

---

## Connecting to a different NetWorker server

To connect the NetWorker User for Lotus program to a different NetWorker server to back up files, use *one* of the following methods:

- ◆ If the NetWorker User for Lotus program is *not* already running, enter the following command to start the NetWorker User for Lotus program and enter the server's name:

```
nwbml -s NetWorker_server
```

where *NetWorker\_server* is the name of the NetWorker server to back up the files.

---

**Note:** If the program cannot connect to the NetWorker server, the following message appears:

```
Unable to connect to server 'server_name'. Do you want to connect to another server?
```

To connect to the default NetWorker server, click **Yes**. To return to the command prompt, click **No**.

---

- ◆ If the NetWorker User for Lotus program is already running:
  - a. In the NetWorker User for Lotus program, select **Select NetWorker Server** from the **Operation** menu.

The **Change Server** dialog box appears.
  - b. In the **Change Server** dialog box:
    - Either select the server from the list or type the name of the server, and click **OK**.
    - To refresh the list of NetWorker servers, click **Update List**.
- ◆ To change the default NetWorker server that the NetWorker User for Lotus uses to back up files:
  - a. Right-click the NetWorker User for Lotus program icon and select **Properties** from the menu.
  - b. In the **Properties** window, enter the following in the **Target** text box on the **Shortcut** tab:

```
-s NetWorker_server
```

where *NetWorker\_server* is the name of the NetWorker server to back up the files, as shown in [Figure 3-4 on page 3-11](#).

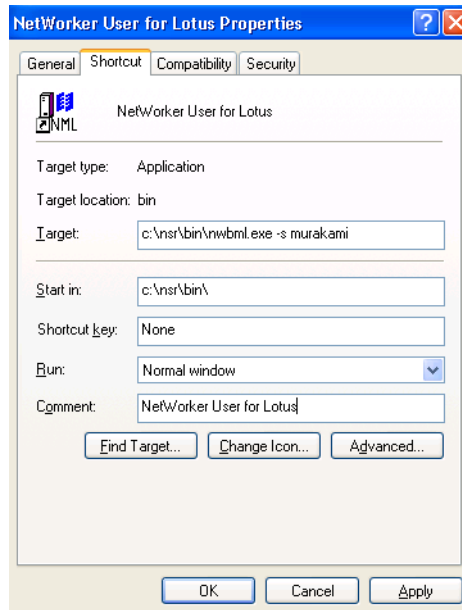


Figure 3-4 NetWorker User for Lotus properties window

## Canceling a backup from NetWorker User for Lotus

To cancel an ad hoc backup in progress from the NetWorker User for Lotus program, select **End Backup** from the **File** menu.



### CAUTION

**If a backup is canceled before completion, none of the backed-up data may be recoverable. Restart the canceled backup process from the beginning and ensure that the backup completes successfully without interruption.**

---

## Monitoring ad hoc backups

To monitor the status of ad hoc backups, use the NetWorker Administrator program. The program displays the following:

- ◆ Progress and completion messages that advise when a backup is complete.
- ◆ Error and diagnostic messages when a backup does not complete.

The *NetWorker Administration Guide* provides more information on viewing these types of messages when using the NetWorker Administrator program.

[Appendix C, “Troubleshooting”](#) provides information on how to display and interpret NML diagnostic and error messages.

---

## Ad hoc backup information in the NetWorker indexes

During a Lotus data backup with the NML software, the NetWorker server stores backup entries in the NetWorker client index under the notes namespace of the Domino or Notes host.

In the NetWorker media database, the backup entries for all Lotus backup objects (for example, database files, operating system files, and transaction logs) start with the prefix notes for ad hoc backups.

To match the NetWorker client index and media database entries, use the save time value with the appropriate NetWorker index utilities.

---

## Bootstrap and index backups for recovery of the server

By default, ad hoc backups of Lotus databases do *not* back up the NetWorker client file indexes and NetWorker server bootstrap.

To back up the NetWorker client file indexes and the server bootstrap, perform scheduled backups. If a scheduled backup is never performed, you must back up the client file indexes and bootstrap *manually* (ad hoc).

To manually back up the client file indexes and server bootstrap, use the **savegrp** command from the NetWorker server:

```
savegrp -l full -O -P printer_name -c client_name
```

where:

- ◆ *printer\_name* is the name of the printer where the bootstrap information is printed.
- ◆ *client\_name* is the name of the NML client.

The following provides more information on the **savegrp** command:

- ◆ *NetWorker Command Reference Guide*
- ◆ **savegrp** man page on UNIX

The client file indexes and server bootstrap file are crucial for recovering data to Lotus database systems in the event of a disaster on the NetWorker server.

To ensure maximum protection of critical data, perform scheduled backups of the NetWorker server on a regular basis.





## Scheduled Backup Procedures

This chapter provides information on how to configure and use the NetWorker Module for Lotus (NML) software to perform scheduled backups. It also outlines the procedures for testing, canceling, and monitoring scheduled NML backups.

This chapter includes the following sections:

- ◆ [About scheduled backups](#) ..... 4-2
- ◆ [Configuration requirements for scheduled backups](#) ..... 4-2
- ◆ [Parameters for scheduled backups](#)..... 4-2
- ◆ [Performing scheduled backups](#) ..... 4-4
- ◆ [Canceling a scheduled backup](#)..... 4-6
- ◆ [Monitoring scheduled backups](#) ..... 4-6
- ◆ [Scheduled backup information in the NetWorker indexes](#)..... 4-7

---

## About scheduled backups

The most reliable way to protect Lotus data is to configure the NetWorker server to run scheduled NML backups of the data on a regular basis. For example, the scheduled backups might include a daily incremental backup and a weekly full backup of the Lotus data.

A scheduled NML backup is initiated automatically by the NetWorker server according to the schedule specified by the NetWorker Group and Schedule resources.

---

## Configuration requirements for scheduled backups

To enable a scheduled backup, these requirements must be met:

- ◆ The proper NetWorker Client, Group, Schedule, and other resources are configured on the NetWorker server.
- ◆ The appropriate backup parameters are set in the NML configuration file.
- ◆ The resources and parameters are configured properly according to the [“Software configuration roadmap” on page 2-2](#).

To configure the NetWorker Client resource for a scheduled backup, follow the instructions in [“Task 5: Configure the NetWorker Client resource” on page 2-7](#).

[“Scheduled backups of partitioned Domino servers” on page 7-5](#) provides information on configuring Client resources for scheduled backups on partitioned Domino servers.

---

## Parameters for scheduled backups

For scheduled Lotus backups with NML, set specific parameters in the NML configuration file *instead* of using the corresponding options of the **nsrnotesv** backup command.

[Appendix A, “NML Configuration File”](#) provides details on all the backup parameters supported for scheduled backups.

The following Lotus backup parameters are *mandatory* in the NML configuration file for scheduled backups:

- ◆ LOTUSUSER (UNIX and Linux *only*)
- ◆ Notes\_ExecDirectory
- ◆ NSR\_BACKUP\_LOTUS\_DIR *or* NSR\_BACKUP\_PATHS
- ◆ NSR\_RESOURCE\_DIR (UNIX and Linux *only*)
- ◆ PATH (set to include the Domino data directory)

All other Lotus backup parameters are optional in the configuration file for scheduled backups.

For a scheduled NML backup, the Backup Command attribute of the Client resource must contain the following:

```
nsrnotesv -z config_filepath
```

where *config\_filepath* is the complete pathname of the configuration file.

[“Example of an NML backup configuration” on page 2-23](#) provides an example of how to configure the NetWorker resources and backup parameters for a scheduled backup.

---

## Preprocessing and postprocessing commands

The optional parameter PRECMD specifies the complete pathname of a file containing a preprocessing script to be run before the **nsrnotesv** command backs up any data. If the preprocessing command fails (returns a nonzero value), the scheduled backup does *not* proceed (**nsrnotesv** does *not* run at all).

The optional parameter POSTCMD specifies the complete pathname of a file containing a postprocessing script to be run after the **nsrnotesv** command backs up all the data. If **nsrnotesv** fails, the postprocessing command still runs. If the postprocessing command fails, a warning message is generated, but the scheduled backup succeeds because all the data is backed up.

The following examples show how to use the parameters PRECMD and POSTCMD for scheduled NML backups.

**Example 4-1 Preprocessing command (Windows)**

The following sample preprocessing script, stored in the file `C:\Program Files\Legato\nsr\bin\shutdown_service.bat`, shuts down a Windows service to prevent the service from interfering with the scheduled backup.

```
REM Shut Down Norton Antivirus Client
net stop "norton antivirus client"
```

The NML configuration file contains the following PRECMD parameter setting to specify the preprocessing script for the scheduled backup:

```
PRECMD =
C:\Program Files\Legato\nsr\bin\shutdown_service.bat
```

**Example 4-2 Postprocessing command (Windows)**

The following sample postprocessing script, stored in the file `C:\Program Files\Legato\nsr\bin\startup_service.bat`, restarts the Windows service after the scheduled backup.

```
REM Restart the Norton Antivirus Client
net start "norton antivirus client"
```

The NML configuration file contains the following POSTCMD parameter setting to specify the postprocessing script for the scheduled backup:

```
POSTCMD =
C:\Program Files\Legato\nsr\bin\startup_service.bat
```

---

## Performing scheduled backups

Before performing scheduled backups with the NML software, ensure that ad hoc backups with the NML software can be performed successfully. [Chapter 3, “Ad Hoc Backup Procedures”](#) provides information on ad hoc backups.

When creating backup schedules for Lotus data backups, remember the following:

- ◆ The NML software supports only the following backup levels:
  - Full, which backs up all specified files, regardless of whether or not they have changed since the last backup.
  - Incremental, which backs up transaction logs and database files that are *not* logged, and have changed since the last full backup.
- ◆ The NML software does *not* support NetWorker level 1 to 9 backups. If you set the backup level in the Schedule resource to a value of 1 to 9, the NML backup *fails*.
- ◆ If the backup level is set to *skip* in the Schedule resource, the NetWorker server does *not* start an NML backup on that day.

[“Task 3: Configure the NetWorker Schedule resource” on page 2-5](#) provides information on creating backup schedules.

After performing a successful backup, perform a test recovery. The following chapters provide recovery instructions:

- ◆ [Chapter 5, “Recovery from the Command Line”](#)
- ◆ [Chapter 6, “Recovery from NetWorker User for Lotus”](#)

---

## Testing scheduled backups

After the required configurations are complete, test a scheduled NML backup as follows:

1. Start the NetWorker Administrator program as the root user on UNIX or Linux, or as the administrator on Windows.
2. Select the appropriate NetWorker server to perform the backup.
3. Select the correct group name for the backup.
4. Start the scheduled backup for the specified group.

The NetWorker software immediately backs up the clients in the backup group.

The *NetWorker Administration Guide* and online help for the NetWorker Administrator program provide details on how to use the server interface to perform these steps.

---

## Canceling a scheduled backup

To cancel a scheduled backup in progress, select **Stop** for the backup group in the NetWorker Administrator program interface. The *NetWorker Administration Guide* provides more details on how to stop a backup group.



### **CAUTION**

**If a backup is canceled before completion, none of the backed-up data may be recoverable. Restart the canceled backup process from the beginning and ensure that the backup completes successfully without interruption.**

---

## Monitoring scheduled backups

NetWorker software displays messages in the NetWorker Administrator program for each database file backed up. After a backup is complete, a Backup Completed message appears.

If the backup takes a long time and no new messages appear in the status window, the database being backed up is very large, or there is no backup volume mounted on the server.

To see if a backup volume is mounted, check the **Pending** area in the NetWorker Administrator program display.

---

## Scheduled backup reports

NetWorker software provides the following types of reports about the results of a scheduled backup:

- ◆ If the parameter NSR\_CATALOGFILE is set in the NML configuration file, information about each file that is backed up is written to the specified catalog file. [Example 2-1, “Lotus backup parameter for the backup catalog file,” on page 2-15](#) provides details on the backup catalog file.

- ◆ A list of messages is displayed in the Group Details window of the NetWorker Administrator program. These messages appear in three lists:
  - Pending Savesets
  - Completed Savesets (UNIX or Linux) or Successful Savesets (Windows)
  - Failed Savesets (UNIX or Linux) or Unsuccessful Savesets (Windows)

---

**Note:** In NetWorker 7.3 and later, the Group Details window does *not* provide information on the NML backup save sets. However, the messages.log and savegrp.log files provide information on the backup save sets.

---

- ◆ If configured, a savegroup completion notification is sent through email when the scheduled backup completes. (The notification contains information that is also displayed in the Group Details window.) [“Configuring an email notification” on page 2-9](#) provides information on configuring a savegroup completion notification.
- ◆ A printout of the NetWorker server bootstrap file for the backup session is created. The *NetWorker Administration Guide* provides more information on the bootstrap file.

---

## Scheduled backup information in the NetWorker indexes

The NetWorker server maintains information about each backup in its online indexes. [“About the NetWorker software” on page 1-3](#) provides more information about the NetWorker indexes.

Query the indexes by entering the NetWorker commands, **nsrinfo** and **mminfo**.

- ◆ To query the NetWorker client file index and obtain information on files that are part of the backup save sets, use the **nsrinfo** command. For example:

```
nsrinfo -n notes hostname
```

where *hostname* is the hostname of the Domino server or Notes client.

**Note:** The Operate NetWorker privilege is required to use the NetWorker command **nsrinfo** to access information in the client file index. [“Task 2: Verify the NetWorker user group privileges” on page 2-4](#) provides details on user group privileges.

- ◆ To query the NetWorker media database and obtain information on the backup save sets, use the **mminfo** command. For example:

```
mminfo -v -c hostname
```

The *NetWorker Command Reference Guide* and the UNIX man pages provide more information on these NetWorker commands.

The information from a scheduled NML backup provided by each of the NetWorker commands is shown in the following examples. The NetWorker 7.3 server is cypress and the Domino server with NetWorker client software is aeolus:

- ◆ The client file index contains the following type of information, where format of the **nsrinfo** command output in NetWorker 7.3 is different from previous NetWorker releases:

```
nsrinfo -s cypress -n notes aeolus
```

```
scanning client `aeolus' for all savetimes from the
notes namespace
NOTES:/space/notesdata/iNotes/, date=1132345520 Fri
Nov 18 15:25:20 2005
NOTES:/space/notesdata/help/, date=1132345520 Fri Nov
18 15:25:20 2005
NOTES:/space/notesdata/copydbs/, date=1132345520 Fri
Nov 18 15:25:20 2005
NOTES:/space/notesdata/, date=1132345520 Fri Nov 18
15:25:20 2005
NOTES:/space/, date=1132345520 Fri Nov 18 15:25:20
2005
NOTES:/, date=1132345520 Fri Nov 18 15:25:20 2005
(...)
NOTES:/space/notesdata/perweb50.ntf, date=1132345481
Fri Nov 18 15:24:41 2005
NOTES:/space/notesdata/polcysyn.ntf, date=1132345481
Fri Nov 18 15:24:41 2005
NOTES:/space/notesdata/polska.dic, date=1132345481
Fri Nov 18 15:24:41 2005
NOTES:/space/notesdata/pubnames.ntf, date=1132345481
Fri Nov 18 15:24:41 2005
143 objects found
```



- ◆ The media database contains the following type of information:

```
mminfo -s cypress -v -c aeolus
```

```

volume      client date      time      size
aeoluspl.002  aeolus  11/18/2005  3:25:20 PM  7 KB
aeoluspl.002  aeolu   11/18/2005  3:24:44 PM  95 MB
aeoluspl.002  aeolus  11/18/2005  3:24:43 PM  100 MB
aeoluspl.002  aeolus  11/18/2005  3:24:42 PM  90 MB
aeoluspl.002  aeolus  11/18/2005  3:24:41 PM  92 MB

```

```

ssid      fl lvl name
4219353265  cb  full  NOTES:_browselist
4236130443  cb  full  NOTES:_2
4252907659  cb  full  NOTES:_1
4269684875  cb  full  NOTES:
4286462091  cb  full  NOTES:_3

```

In the media database, the prefix NOTES: is always included in the backup save set name.

Crosscheck the client file index and media database entries by using the backup save time. For example:

```
mminfo -c aeolus -t 1132345520
```

```
nsrinfo -n notes -t '11/18/2005 3:25:20 PM' aeolus
```



---

This chapter provides information on how to configure and use the NetWorker Module for Lotus (NML) software to recover Lotus data and files by using the recovery commands or the Lotus Notes client program.

This chapter includes the following sections:

- ◆ [Preparing to recover data](#)..... 5-2
- ◆ [About recovery from the command line](#) ..... 5-3
- ◆ [Parameters for data recovery](#) ..... 5-4
- ◆ [Performing data recovery](#) ..... 5-4
- ◆ [Recovery of database and directory links](#) ..... 5-8
- ◆ [Directed recovery to a different client or location](#)..... 5-9
- ◆ [Using and disabling recovery prompts](#) ..... 5-10
- ◆ [Performing document-level recovery](#) ..... 5-11
- ◆ [Canceling a recovery from the command line](#)..... 5-18
- ◆ [Lotus disaster recovery](#) ..... 5-18

---

## Preparing to recover data

During an NML backup, the NetWorker server adds an entry for each backup save set in the online client file index and records the location of the data in the media database. These entries provide information required to recover every Lotus data object that was backed up.

The NetWorker server maintains entries as follows:

- ◆ The client file index entry is maintained until the *browse* policy specified for the client's save set expires.
- ◆ The media database entry is maintained until the *retention* policy specified for the client's save set expires.

When the retention policies for all the save sets on a backup volume expire, the volume becomes recyclable and eligible for automatic relabeling by the NetWorker server. The save set entries, however, remain in the media database until the volume is actually relabeled. When the volume is relabeled, the data on it becomes inaccessible and can no longer be recovered.

---

### Important considerations

- ◆ The browse policy period should be long enough to retain the client file index entries for the NML backups.
- ◆ The retention policy period should be longer than the browse policy period (this is a NetWorker requirement).
- ◆ The NML software does *not* perform save set recovery.
- ◆ The NML software uses both the client file index and media database entries to recover NML backups.

After a browse policy expires, the NetWorker **scanner** program can be used to rebuild the online indexes. An NML backup comprises save sets that contain the backed-up file data. If the backup index is lost, information about the save sets must be re-created in the index with the **scanner** program. Otherwise, backups *cannot* be recovered.

The *NetWorker Administration Guide* provides more information on how the NetWorker server uses browse and retention policies to manage backup data and track the location and status of the data on backup volumes.

---

## About recovery from the command line

The NML command-line interface is used for the following recovery operations:

- ◆ Recoveries on UNIX and Linux clients. (There is no graphical user interface for performing backups and recoveries on UNIX and Linux.)
- ◆ Recoveries on Windows clients. You use the command-line interface rather than the graphical interface of the NetWorker User for Lotus program.
- ◆ Document-level recovery of deleted Notes documents. You can recover the deleted documents for a Lotus Notes database on the *local* host. [“Performing document-level recovery” on page 5-11](#) provides details on document-level recovery.

---

**Note:** To recover selected (modified) Notes documents on either a *local* Notes host or a *remote* Domino host, perform the document-level recovery through the Lotus Notes client GUI (Windows *only*).

---

Recovery of Lotus data from the command line is performed with the **nsrnotesrc** command, as described in [“The nsrnotesrc recovery command” on page B-7](#).

Document-level recovery of deleted Notes documents from the command line is performed with the **nsrdocr** command, as described in [“The nsrdocr document-level recovery command” on page B-10](#).



### **CAUTION**

---

**On UNIX and Linux, the nsrnotesrc or nsrdocr recovery command must be entered by the Domino user that runs the Domino server, usually the user specified when Lotus Domino was installed. Do *not* enter the command as the root user. The Domino user then owns the recovered files.**

---

---

## Important considerations

- ◆ The required NetWorker server services must be running. The *NetWorker Administration Guide* provides more information on the services.
- ◆ You *cannot* perform in-place recovery of a logged database when the original database is still present. Either delete the original database, or direct the recovery to a new location and change (zap) the database instance ID.

---

## Parameters for data recovery

For a Lotus data recovery with NML, set specific parameters in the NML configuration file *instead* of using the corresponding options of the **nsrnotesrc** or **nsrdocrc** command.

The use of command options with the **nsrnotesrc** and **nsrdocrc** commands is also still supported, as described in the following:

- ◆ [“The nsrnotesrc recovery command” on page B-7](#)
- ◆ [“The nsrdocrc document-level recovery command” on page B-10](#)

The recovery commands support the Lotus restore parameters described in [Appendix A, “NML Configuration File”](#).

The parameter `Notes_ExecDirectory` is the only Lotus restore parameter that is *mandatory* in the NML configuration file. [“Lotus restore parameters” on page 2-20](#) and the remaining sections of this chapter provide examples of parameters for different types of Lotus data recoveries.

---

## Performing data recovery

Before you begin a Lotus data recovery, ensure that the appropriate configurations are set, including the required NML parameters and environment variables. [Chapter 2, “Software Configuration Procedures”](#) provides details on the required configurations.

To specify the Lotus database files for recovery, set the `NSR_BACKUP_PATHS` parameter in the NML configuration file.

Place quotation marks around any filepaths or time values that contain spaces in the following:

- ◆ The NSR\_BACKUP\_PATHS parameter setting.
- ◆ The NSR\_RECOVER\_TIME parameter setting.
- ◆ The `nsrnotesrc` command options.



### **CAUTION**

**Filepaths are case-sensitive. If you are uncertain about the case of filenames, use the `nsrinfo` command to verify the backup entries in the NetWorker client file index.**

The following examples describe the parameters for Lotus database recoveries. In each case, after the parameters are set in the NML configuration file, perform the recovery by entering the following command at the command-line prompt:

```
nsrnotesrc -z config_filepath
```

where `config_filepath` is the complete pathname of the configuration file.

#### Example 5-1 Recovery of a previous database version

By default, the NML software recovers the most recent backup available. The following parameter setting in the NML configuration file specifies a recovery of an earlier version of a database.

```
LOTUS {
  Notes_ExecDirectory = /opt/lotus/notes/latest/solaris
  NSR_RECOVER_TIME = "Wed December 14 2005 14:23"
}
```

The NSR\_RECOVER\_TIME parameter value is the time in `nsr_getdate` format of the database backup to be restored.

**Note:** The browse time *cannot* be earlier than the time of the first backup because the client file index does *not* have any entries before that time.

**Example 5-2 Recovery of specific Lotus databases**

The following parameter settings in the NML configuration file specify a recovery of Lotus database files named `account.nsf` and `names.nsf`:

- ◆ On UNIX or Linux:

```
NSR_BACKUP_PATHS = /lotusdata/account.nsf,
                  /lotusdata/names.nsf
```

- ◆ On Windows:

```
NSR_BACKUP_PATHS = C:\Lotus\Domino\data\account.nsf,
                  C:\Lotus\Domino\data\names.nsf
```

**Example 5-3 Recovery of all Lotus data in a directory**

The following parameter settings in the NML configuration file specify a recovery of all the Lotus database files within the directory `/space/notesdata/mail`.

- ◆ The NetWorker client where the files originated is `jupiter.emc.com`.
- ◆ The NetWorker server from which the backup is recovered is `mars.emc.com`.

```
LOTUS {
  Notes_ExecDirectory = /opt/lotus/notes/latest/solaris
  NSR_BACKUP_PATHS = /space/notesdata/mail
  NSR_CLIENT = jupiter.emc.com
  NSR_SERVER = mars.emc.com
}
```

**Example 5-4 Recovery of all Lotus database files**

The following parameter settings in the NML configuration file specify a recovery of *all* the Lotus database files associated with a given NetWorker client.

```
LOTUS {
  Notes_ExecDirectory = /opt/lotus/notes/latest/solaris
  NSR_BACKUP_PATHS = NOTES:
  NSR_RECOVER_TIME = "Tue December 13 2005 19:23"
}
```

The `NSR_RECOVER_TIME` parameter value is the time in `nsr_getdate` format when a full backup was performed on the client.



**CAUTION**

**Use the NOTES: option with caution because the NML software attempts to restore the data for *all* partitions of a partitioned Domino server, or for *all* Domino installations when there are multiple Domino installations on the client.**

**Note:** If the NOTES: option is used *without* specifying the backup time, only the latest versions of all the backed-up Lotus databases are recovered.

Example 5-5 Recovery of a database with a change of the DBIID

When recovering a database that may still be in use, use the NSR\_DBIID parameter to change (or *zap*) the DBIID. The Domino server does *not* allow two databases to exist with the same instance ID. Changing the DBIID and relocating the database to another directory prevents error messages from appearing in the Recovery Manager in the Domino server.

The following parameter settings in the NML configuration file specify a recovery of the backed-up database named budget2005.nsf to the directory C:\tmpdir and a change of the DBIID:

```

LOTUS {
  Notes_ExecDirectory = C:\Lotus\Domino\Data
  NSR_BACKUP_PATHS = C:\Lotus\Domino\Data\budget2005.nsf
  NSR_DBIID = 1
  NSR_RELOCATION_DEST = C:\tmpdir
}

```

**CAUTION**

**After you change the DBIID of a recovered database, you *cannot* recover any subsequent changes to the database until the next full backup is performed. Perform a full ad hoc backup after changing the DBIID of a recovered database. If an incremental backup is the next backup performed on a database after a DBIID change, NML automatically performs a full backup of the database file instead.**

**Example 5-6 Recovery of a full backup without the transaction logs**

The following parameter settings in the NML configuration file specify a recovery of the full backup of database accounting.nsf to the directory C:\temp and a change of the database's DBIID, *without* applying the transaction logs:

```

LOTUS {
  Notes_ExecDirectory = C:\Lotus\Domino\Data
  NSR_APPLY_LOGS = FALSE
  NSR_BACKUP_PATHS = C:\Lotus\Domino\Data\accounting.nsf
  NSR_DBIID = 1
  NSR_RELOCATION_DEST = C:\temp
}

```

If you recover a point-in-time full backup of a database by using the parameter NSR\_RECOVER\_TIME *without* the parameter setting NSR\_APPLY\_LOGS=FALSE, the following error message might appear:

```

Recovery Manager: Backup was later than recovery point in
time.

```

In this case, use the parameter setting NSR\_APPLY\_LOGS=FALSE to prevent the error message.

---

## Recovery of database and directory links

By default, the **nsrnotesrc** command follows all links during a recovery operation. When the **nsrnotesrc** command recovers a link file, the database or directory that the link points to is also recovered.

If the NSR\_FOLLOW\_LINKS parameter is set to FALSE in the NML configuration file, the **nsrnotesrc** command does *not* follow links. When the **nsrnotesrc** command recovers a link file, the database or directory that the link points to is *not* recovered. By default, the file that a link points to is recovered to the location that it was backed up from.

If the NSR\_RELOCATION\_DEST parameter is set in the NML configuration file, the database file that a link points to is recovered to the specified relocation directory. During this recovery, the relative directory structure of the database file is also recovered, as shown in [Example 5-7, "Relocation of a linked database," on page 5-9](#).

### Example 5-7 Relocation of a linked database

The link file `/space1/notes/data/link.nsf` points to the database file `/space2/notes/data.nsf`. When the link file is backed up, the database file `data.nsf` is also backed up by default. When the link file and database file are recovered and the parameter `NSR_RELOCATION_DEST` is set to `/space3/new`, the files are relocated to the following locations:

- ◆ Recovered link file:  
`/space3/new/space1/notes/data/link.nsf`
- ◆ Recovered database file (pointed to by the link file):  
`/space3/new/space2/notes/data.nsf`

---

## Directed recovery to a different client or location

This section describes how to direct a recovery from the command line to a different client, or to a different location on the same client.

**Note:** If you are recovering logged database files, add the `NSR_DBIID` parameter setting to change the DBIID of the recovered files.

---

### How to recover to a different client

To recover a database file to a different NetWorker client than where the files originated:

1. Ensure that the target client has the same organization name, site name, domain name, and configuration as the original client.
2. Ensure that the target client is specified in the **Remote Access** attribute of the NetWorker Client resource for the original client.
3. On the target client:
  - a. Ensure that the NML configuration file has the following parameter setting:

```
NSR_CLIENT = client_name
```

where *client\_name* is the hostname of the NetWorker client where the files originated.

- b. Ensure that the NML configuration has any other required parameter settings, as described in [“Parameters for data recovery” on page 5-4](#).
- c. Enter the command **nsrnotesrc -z config\_filepath** to perform the recovery.

---

## How to recover to a different location on the same client

By default, the destination for recovered files is the directory where the files originated on the NetWorker client. The following parameter setting in the NML configuration file specifies a different destination directory:

```
NSR_RELOCATION_DEST = destination_path
```

where *destination\_path* is the complete pathname of the new directory for the recovered files.

The previous examples illustrate the use of the parameter NSR\_RELOCATION\_DEST. When recovered files are relocated with the parameter, the relative directory structure of the files is preserved, as described in [Example 5-7 on page 5-9](#).

---

## Using and disabling recovery prompts

Unless a directed recovery is performed to a different directory, recovery with the **nsrnotesrc** command prompts the user with the following type of message when an existing file has the same name as the file being recovered:

```
D:\Lotus\Domino\data\db.nsf file exists, overwrite (n, y, N, Y) or rename (r, R) [r]?
```

In response to the prompt, type one of the following options:

- ◆ The **y** (overwrite) option causes the existing file to be replaced. An error results if you attempt in-place recovery of a database with archive transaction logging enabled.
- ◆ The **Y** (overwrite) option causes *all* existing files to be replaced *without* any further interactive prompting. An error results if you attempt in-place recovery of a database with archive transaction logging enabled.

- ◆ The **n** (no change) option causes recovery of the file to be skipped.
- ◆ The **N** (no change) option causes recovery of all files to be skipped *without* any further interactive prompting.
- ◆ The **r** (rename) option causes the following:
  - For a database that is *not* logged, the existing file is renamed with a tilde (~) added to the start of the filename. The backed-up file is restored with its *original* name.
  - For a logged database, the existing file is *not* renamed. The backed-up file is restored with a name that begins with a tilde (~).
- ◆ The **R** (rename) option causes the same action as the **r** option, but the action occurs on all files *without* any further interactive prompting.



### CAUTION

**During a directed recovery to a different directory on the same client, the `nsrnotesrc` command does *not* prompt the user when an existing file has the same name as the file being recovered. Instead, the existing file is overwritten.**

To disable prompting for existing files during recovery, set the following parameter in the NML configuration file:

```
NSR_AUTO_RESTORE = TRUE
```

To set the default prompting response, set the following parameter in the NML configuration file:

```
NSR_RECOV_INTERACT = {nNyYrR}
```

## Performing document-level recovery

Document-level recovery enables a user to specify and recover individual Lotus documents. However, the NML software *cannot* recover design documents in a Lotus database.

- ◆ You can perform document-level recovery from the Lotus Notes client GUI (*Windows only*). This recovers modified or deleted Notes documents in either of the following:
  - A *local* Notes or Domino database
  - A *remote* Domino database

Document-level recovery through the Notes client allows recovery only up to the time of the selected backup.

During the document-level recovery through the Notes client, the specified database backup is restored to a temporary directory on the local host (that runs the Notes client). The documents are extracted from the backup and moved into the target database. At the end of the recovery:

- The restored database is deleted from the temporary directory by using a Notes API call.
- If the database was the *only* file in the temporary directory, the directory is also deleted. (This is Notes API behavior.)
- ◆ You can perform document-level recovery from the command line through the **nsrdocrc** command. This action recovers deleted Notes documents *only* (not modified Notes documents) in a *local* database.

Document-level recovery from the command line allows recovery to any point-in-time if the following applies:

- The database is logged.
- Backups of the database and transaction logs are available.

---

## Requirements for document-level recovery

The requirements for document-level recovery depend on how you perform the recovery.

### Document-level recovery through the Lotus Notes client

The document-level recovery feature must be added to the Lotus Notes client, as described in the *NetWorker Module for Lotus Installation Guide*. The database with the documents to be recovered can be physically located on either the local computer or a remote Domino server, but the database must be accessible through the Notes client.

If the documents are to be recovered in a remote Domino database, the user that runs the Notes client must be:

- ◆ Listed in the Remote Access attribute in the NetWorker Client resource of the remote Domino server.
- ◆ Granted administrative privileges on the remote Domino server.

The recovery computer must have the NML software installed.

## Document-level recovery through the command line

The database with the documents to be recovered must be physically located on the local computer that is performing the recovery. The recovery computer must have the NML software installed.

---

## How to recover a document through the Notes client

To recover deleted or modified documents from a database file:

1. Ensure that the NetWorker server services are running.
2. If recovering documents in a *remote* Domino database, ensure that the following apply:
  - The user that runs the Notes client program on the local host is:
    - Listed in the **Remote Access** attribute in the NetWorker Client resource of the remote Domino server.
    - Granted administrative privileges on the remote Domino server.
  - A NetWorker Client resource is configured on the same NetWorker server for the host where Notes client program runs.
3. Start the Lotus Notes client GUI.
4. Open the database that contains the documents to recover.
5. Select the documents to recover. (Skip this step if you are recovering deleted documents.)
6. From the **Actions** menu, select either **NML-Restore Selected Documents** or **NML-Restore Deleted Documents**. (NML represents NetWorker Module for Lotus.)

The NetWorker Module for Lotus dialog box appears, as shown in [Figure 5-1 on page 5-15](#). For a successful recovery, each text box in the dialog box must contain a valid value, as required. (The Encryption Phrase text box can be empty.)

7. In the NetWorker Module for Lotus dialog box, perform the following:
  - a. In the **Database** text box, specify the complete pathname of the database that has the documents to recover. The database may be located on one of the following:
    - A *local* Domino server or Notes client
    - A *remote* Domino server

“[Document-level recovery of database links](#)” on page 5-17 provides details on recovering documents from a linked database.
  - b. In the **Temporary Directory for Restore** text box, specify a temporary directory on the local host, where the database backup is to be restored.
  - c. In the **NetWorker Server** text box, specify the hostname of NetWorker server that contains the backup to restore.
  - d. In the **NetWorker Client** text box, specify the name of the NetWorker client file index that contains information about the backup to be restored.

---

**Note:** If the database is located on a remote host, the default name listed in the **NetWorker Client** text box might not be correct. This can result in an XBSA failure.

---

- e. In the **Show Backups in Last** text box, specify the number of past days (since the current date) for which to display backup information on the specified database. For example, the value 5 causes backups from the past five days to be displayed.
- f. Click **Refresh** to display a list of the database backups under **List of Backups**.
- g. In the **List of Backups** display, select a database backup to be restored.
- h. In the **Encryption Phrase** text box, enter the encryption phrase that was used to back up the database *if* the datazone pass phrase on the NetWorker server changed since the backup.

---

**Note:** Encryption keys entered in the text box are cached in memory and continue to be used for recoveries until the Notes client program is exited and restarted.

---



8. To start the recovery process, click **Restore**.
9. When the recovery is complete, press **F9** to refresh the Lotus Notes screen and display the recovered files.

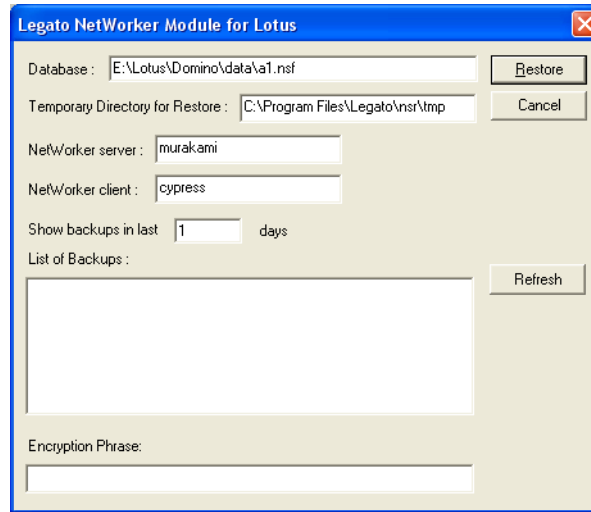


Figure 5-1 Lotus Notes client dialog box

## How to recover a document through the command line

To recover deleted documents from a database file:

1. Ensure that the NML configuration file contains the required parameter settings. For example:

```
NSR_BACKUP_PATHS = database_pathname
NSR_RECOVER_TIME = recover_time
NSR_RELOCATION_DEST = destination_pathname
NSR_SERVER = server_name
```

where:

- *database\_pathname* is the complete pathname of the database.
- *recover\_time* is the time (in *nsr\_getdate* format) up to which the documents are recovered.

- *destination\_pathname* is the complete pathname of the directory to which the documents are recovered.
- *server\_name* is the hostname of the NetWorker server from which the documents are recovered.

[Appendix A, “NML Configuration File”](#) provides details on the NML configuration file.

2. Enter the **nsrdocr** command:

```
nsrdocr -z config_filepath
```

where *config\_filepath* is the complete pathname of the NML configuration file.

[“The nsrdocr document-level recovery command” on page B-10](#) provides details on the **nsrdocr** command and options.



### **CAUTION**

**On UNIX and Linux, the nsrdocr command must be entered by the Domino user that runs the Domino server, usually the user specified when Lotus Domino was installed. Do *not* enter the command as the root user.**

#### Example 5-8 Recovering deleted documents for a logged database

To recover deleted documents in the database file F:\Lotus\Domino\data\account.nsf that was backed up on December 13 from the client saturn to the server mars:

1. Enter the **nsrinfo** command to obtain the backup time of the directory that contains account.nsf:

```
nsrinfo -s mars -n notes saturn | grep "Dec 13"
```

```
NOTES:/F:/Lotus/Domino/data/, date=984492446 Tue Dec
13 08:07:26 2005 ...
NOTES:/F:/Lotus/Domino/data/account.nsf,
date=984492440 Tue Dec 13 08:07:20 2005
```

2. Ensure that the NML configuration file contains the following parameter settings, including the backup time of the F:\Lotus\Domino\data directory:

```
NSR_BACKUP_PATHS = F:\Lotus\Domino\data\account.nsf
NSR_RECOVER_TIME = 984492446
NSR_RELOCATION_DEST = D:\tempdir
NSR_SERVER = mars
```

3. To perform the document recovery, enter the **nsrdocrc** command:

```
nsrdocrc -z config_filepath
```

**Note:** Recovering deleted documents from one large database to another large database can take considerable time.

## Document-level recovery of database links

To perform a document-level recovery of a linked database, specify the complete pathname of the link file (that points to the database) in either of the following ways:

- ◆ Specify the link filepath in the **Database** field of the Lotus Notes client, as described in [“How to recover a document through the Notes client” on page 5-13](#).
- ◆ Specify the link filepath with the NSR\_BACKUP\_PATHS parameter setting, as described in [“How to recover a document through the command line” on page 5-15](#).

**Note:** Document-level recovery of directory links is *not* supported.

If the directory link file C:\Domino\data\link.dir points to the directory D:\Lotus\dir that contains a database db22.nsf, perform a document-level recovery of the database by specifying the complete pathname of the database D:\Lotus\dir\db22.nsf (not the directory link) in either of the following ways:

- ◆ Specify the database path in the **Database** field of the Lotus Notes client. (In this case, the **Database** field contains an incorrect pathname by default.)
- ◆ Specify the database path with the NSR\_BACKUP\_PATHS parameter setting.

### Example 5-9 Document-level recovery of a database link

The database link file C:\Domino\data\link.nsf points to the database D:\Lotus\Domino\data\db1.nsf. A document-level

recovery of the database can be performed with either the Lotus Notes client or the **nsrdocr** command as follows:

- ◆ The link filepath C:\Domino\data\link.nsf is specified in the **Database** field of the Lotus Notes client.
- ◆ The link filepath is specified with the NSR\_BACKUP\_PATHS parameter, and other required parameters (including NSR\_RECOVER\_TIME) are set in the configuration file. The recovery is performed by entering the **nsrdocr** command:

```
nsrdocr -z config_filepath
```

---

## Canceling a recovery from the command line

If a recovery was initiated by either the **nsrnotesrc** or **nsrdocr** command, cancel the recovery in progress from the command line by pressing **Ctrl + C**.



### **CAUTION**

**Using any other method to cancel a recovery in progress can corrupt the database being recovered. If you cancel a recovery, rerun it to ensure that the database files are successfully recovered.**

---

## Lotus disaster recovery

This section provides instructions for disaster recovery in the event that any of the following are damaged or lost:

- ◆ Lotus transaction logs
- ◆ Lotus Notes client
- ◆ Domino server data or binaries
- ◆ NML binaries

[Chapter 7, “Multiple Installations, Partitioned Domino Servers, and Cluster Support”](#) provides information on disaster recovery procedures for partitioned Domino servers.

The *NetWorker Disaster Recovery Guide* provides more information on using NetWorker software for disaster recovery.

---

## Recovery of a Lotus installation and databases

To recover a computer that has lost the Lotus installation and databases:

1. Reinstall the Lotus Notes client or Domino server in the same location as before, but do *not* configure it.
2. Recover the notes.ini file by using the **nsrnotesrc** command with the parameter setting `NSR_NO_NOTES_INIT = TRUE` in the NML configuration file.

For example, to recover the notes.ini file on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_SERVER = NetWorker_server_name
NSR_BACKUP_PATHS = C:\Lotus\Domino\notes.ini
NSR_NO_NOTES_INIT = TRUE
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

- c. When prompted whether to overwrite the current notes.ini file, enter **y**. (To prevent the prompting, you can set the parameter `NSR_RECOV_INTERACT = Y` in the configuration file.)

3. Recover all the databases by using the `NOTES:` option. You *must* recover the databases to a new location by using the **nsrnotesrc** command with the parameter setting `NSR_RELOCATION_DEST = destination_path` in the NML configuration file.

For example, to recover all the databases:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_SERVER = NetWorker_server_name
NSR_BACKUP_PATHS = NOTES:
NSR_RELOCATION_DEST = destination_pathname
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

4. After the databases are recovered, copy them to the Lotus data directory, and start the Lotus Notes client or Domino server.
5. Once the disaster recovery process is complete, perform a full backup of the Domino server to avoid any future loss of data.

---

## Recovery of a Lotus installation, databases, and transaction logs

To recover database backups up to the last committed transaction in the archived transaction logs, the following requirements must be met:

- ◆ The Domino server to be recovered must have had Lotus transactional logging enabled and set to Archive style.
- ◆ A backup of an up-to-date notes.ini file is available for the Domino server.
- ◆ A set of recoverable database backup files is available.
- ◆ The archived log extents (transaction log files) are backed up and available, from the time of the last full backup.

To recover a computer that has lost the Lotus installation, databases, and transaction logs:

1. Reinstall the Domino server in the same location as before, but do *not* configure it.
2. Recover the Domino notes.ini file by using the **nsrnotesrc** command with the parameter setting `NSR_NO_NOTES_INIT = TRUE` in the NML configuration file.

For example, to recover the notes.ini file on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_SERVER = NetWorker_server_name
NSR_BACKUP_PATHS = C:\Lotus\Domino\notes.ini
NSR_NO_NOTES_INIT = TRUE
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

- c. When prompted whether to overwrite the current notes.ini file, enter **y**. (To prevent the prompting, you can set the parameter `NSR_RECOV_INTERACT = Y` in the configuration file.)

3. Check the Domino notes.ini file to determine the original log directory for the server, as specified by the TRANSLOG\_Path setting. Ensure that this directory exists and it contains no old files.
4. Recover the *last* archived log extent backed up since the last full backup. Recover the log file to a temporary directory by using the **nsrnotesrc** command with the following restore parameters set in the NML configuration file:

```
NSR_NO_NOTES_INIT = TRUE
NSR_NUMBER_LOGS = 1
NSR_RELOCATION_DEST = temporary_directory_path
```

For example, to recover the archived log file to the temporary directory D:\temp\Lotus directory on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_NO_NOTES_INIT = TRUE
NSR_NUMBER_LOGS = 1
NSR_RELOCATION_DEST = D:\temp\Lotus
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

5. Copy the recovered log files from the temporary directory to the original log directory for the server, as specified by the TRANSLOG\_Path setting.
6. Enable the creation of the control file by setting the following parameter in the Domino notes.ini file:

```
TRANSLOG_Recreate_Logctrl=1
```
7. Prepare the data directory by first recovering all of the required database files into a temporary directory.
8. After the databases are recovered, copy them to the Lotus data directory.
9. For a Domino server on Windows, copy the recovered notes.ini file to its original directory. By default, the notes.ini file is *not* located in the data directory.
10. Start the Domino server.
11. Once the disaster recovery process is complete, perform a full backup of the Domino server to avoid any future loss of data.





---

This chapter provides information on how to use the NetWorker User for Lotus program to recover Lotus database files on Windows.

This chapter includes the following sections:

- ◆ About recovery from NetWorker User for Lotus ..... 6-2
- ◆ About the Recover window..... 6-2
- ◆ Parameters for data recovery ..... 6-4
- ◆ Performing data recovery ..... 6-5
- ◆ Connecting to a different NetWorker server ..... 6-13
- ◆ Directed recovery ..... 6-14
- ◆ Canceling a recovery from NetWorker User for Lotus..... 6-18

---

## About recovery from NetWorker User for Lotus

“[Preparing to recover data](#)” on [page 5-2](#) provides information on how the NetWorker server creates and maintains entries for backup save sets in the online indexes, and how these entries provide information required to recover Lotus data backups.

The NetWorker User for Lotus program is used for the following recovery operations:

- ◆ Recoveries on Windows clients. You use the graphical interface of the NetWorker User for Lotus program rather than the command-line interface.
- ◆ Directed recovery. The Lotus database files are recovered to a client computer by initiating the recovery from another client.


To start the NetWorker User for Lotus program, select **Programs>Legato NetWorker>NetWorker User for Lotus** from the **Start** menu.

---

## About the Recover window

You can configure and run recoveries of Lotus database files from the **Recover** window of the NetWorker User for Lotus program.

To display the **Recover** window, perform *one* of the following from the NetWorker User for Lotus main window:

- ◆ From the **Operation** menu, select **Recover**.
- ◆ Click the **Recover** button. 
- ◆ Press **Alt + R**.

[Figure 6-1](#) on [page 6-3](#) shows the **Recover** window of the NetWorker User for Lotus program.

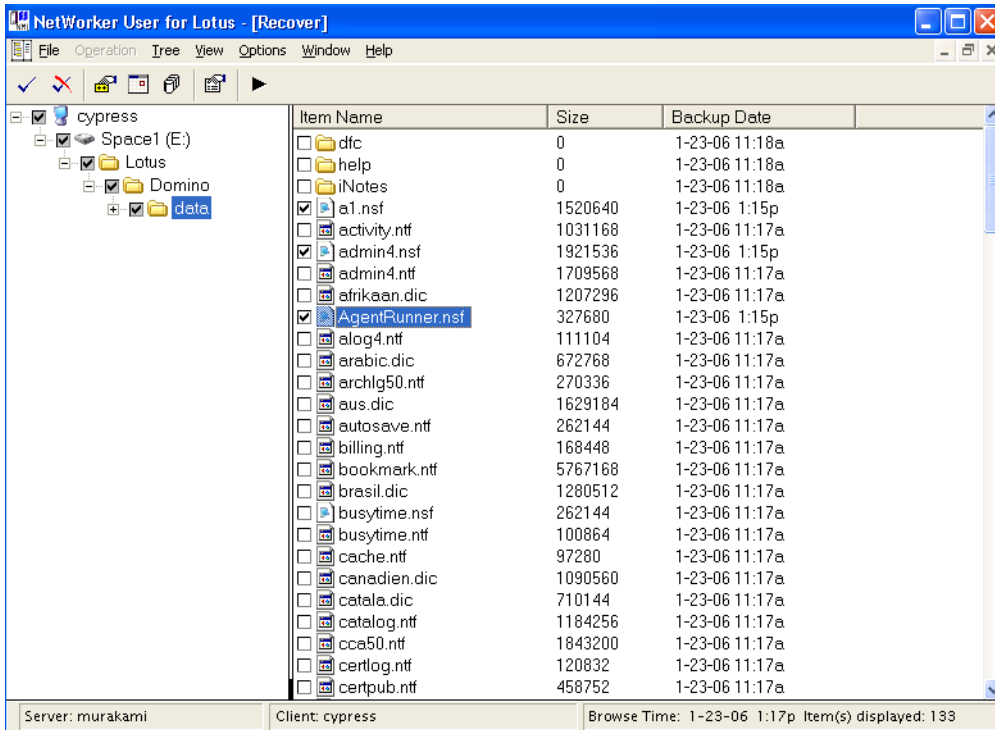


Figure 6-1 Recover window

To view a list of files available for recovery, select a directory in the left pane. That directory's contents appear in the right pane.








**Note:** When a file does *not* exist on the computer (it has been deleted since the backup), the file's icon may appear incorrectly as a folder icon in the **Recover** window, instead of an "unidentified file" icon or the expected icon for the given type of file. This incorrect icon display does *not* affect the success of the file recovery.

Right-clicking an item in either pane of the **Recover** window displays a pop-up menu with the following options:

- ◆ **Start**, which starts the recovery operation.
- ◆ **Font**, which enables you to change the font of the display.
- ◆ **Recover Options**, which displays the **Recover Options** dialog box.

Table 6-1 on page 6-4 describes the **Recover** window toolbar buttons.

Table 6-1 Recover window toolbar buttons

Button	Operation	Description
	Mark	Marks the selected (highlighted ) files for recovery.
	Unmark	Unmarks the selected marked files.
	Required Volumes	Lists the backup volumes that need to be mounted to recover the marked files.
	Change Browse Time	Specifies a date and time for recovery of the marked files.
	View Versions	Displays all versions that have been backed up for the selected marked files.
	Recover Options	Displays the options for relocating recovered data, changing the database instance ID, and applying transaction logs with the recovery, and the text box for specifying the configuration file pathname.
	Start	Starts the recovery of marked files.

## Parameters for data recovery

For a Lotus data recovery with the NetWorker User for Lotus program, you can set specific parameters in the NML configuration file.



### CAUTION

**For Lotus data recovery, the NML configuration file must be located on the destination client where the database files are to be recovered.**

The following Lotus restore parameters are supported with the NetWorker User for Lotus program:

- ◆ Notes\_ExecDirectory
- ◆ NSRNML\_RECOVCMD
- ◆ NSR\_NO\_BUSY\_ERRORS
- ◆ NSR\_RELOCATION\_DEST
- ◆ PATH

[Appendix A, “NML Configuration File”](#) provides information on these Lotus restore parameters.

The parameter `Notes_ExecDirectory` is the only Lotus restore parameter that is *mandatory* in the NML configuration file. [“Lotus restore parameters” on page 2-20](#) and the remaining sections of this chapter provide examples of parameters for different types of Lotus data recoveries.

You must specify the location of the NML configuration file in the **Recover Options** dialog box of the NetWorker User for Lotus program, as described in [“Performing data recovery” on page 6-5](#).

---

## Performing data recovery

Before you begin a Lotus data recovery, ensure that the appropriate configurations are set, including the required NML parameters. The following provides information on the required configurations:

- ◆ [Chapter 2, “Software Configuration Procedures”](#)
- ◆ [“Parameters for data recovery” on page 6-4](#)

To recover a Lotus database by using the NetWorker User for Lotus program:

1. Ensure that the NetWorker server services are running.
2. In the **NetWorker User for Lotus** window, select **Recover** from the **Operation** menu.

The **Recover** window appears, as shown in [Figure 6-1 on page 6-3](#).

3. To view the different database versions or change the browse time, use the instructions in the following:
  - [“How to view the database versions” on page 6-8](#)
  - [“How to change the browse time” on page 6-8](#)
4. Specify the files to recover by using one of the following methods:
  - Select the files, and click the **Mark** toolbar button.
  - Select the checkbox (add a check mark) beside each file.

To unmark files, use one of the following methods:

- Select the marked files, and click the **Unmark** toolbar button.
  - Clear the checkboxes (remove the check marks) beside the files.
5. To specify the location of the NML configuration file:
    - a. In the **Recover** window, select **Recover Options** from the **Options** menu.  
 The **Recover Options** dialog box appears, as shown in [Figure 6-2 on page 6-6](#).
    - b. Enter the complete pathname of the configuration file in the **Configuration File** text box.
    - c. Click **OK**.

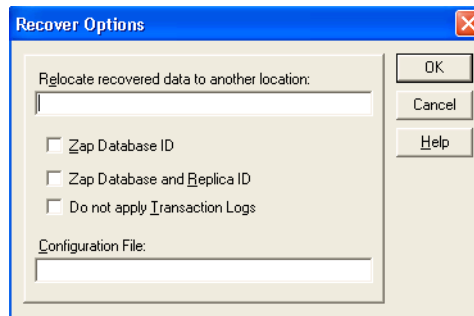


Figure 6-2 Recover Options dialog box

**Note:** All the values set in the **Recover Options** dialog box overwrite the corresponding parameter values set in the configuration file.

6. If you wish to recover a logged database, use the instructions in [“How to recover logged databases” on page 6-10](#).

7. Specify the recover options to use, as described in these procedures:
  - “How to relocate recovered data” on page 6-10
  - “How to change the database ID” on page 6-11
  - “How to change the database ID and replica ID” on page 6-11
  - “How to recover without applying transaction logs” on page 6-12
8. Determine the backup volumes for the recovery, and ensure that the volumes are loaded and mounted. “How to determine the required volumes” on page 6-12 provides more information.
9. To begin the recovery process, click the **Start** toolbar button.

The **Recover Status** window appears and displays information about the recovery operations performed, as shown in [Figure 6-3 on page 6-7](#).

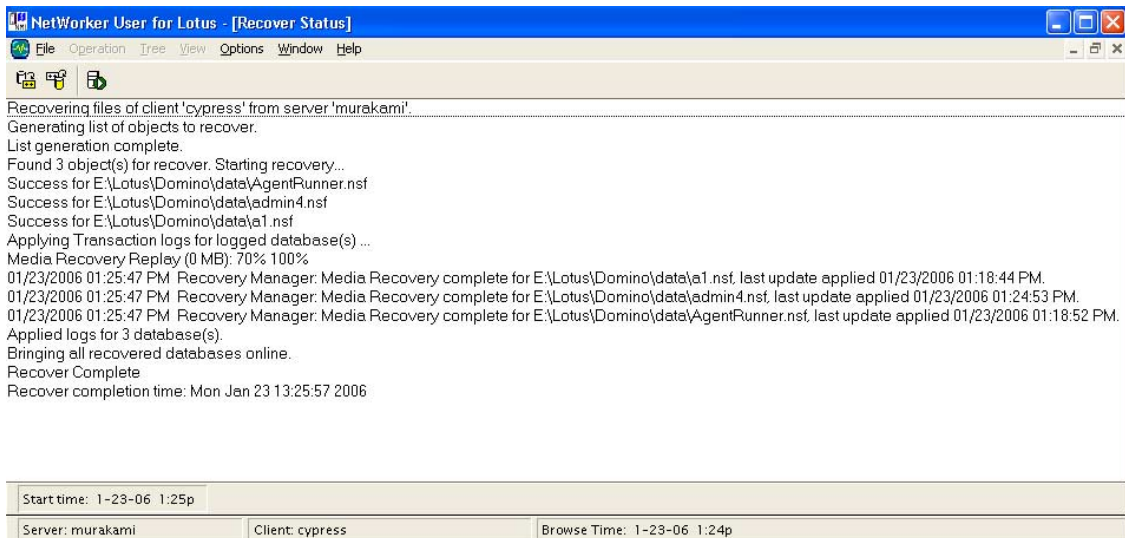


Figure 6-3 Recover Status window

## How to view the database versions

To view the versions of a directory or file that have been backed up:

1. In the **Recover** window, select the database file or directory to recover.
2. From the **View** menu, select **Versions**.

The **Versions** window appears, as shown in [Figure 6-4 on page 6-8](#). The window displays the backup history of the currently selected database. Versions are sorted according to backup time, with the most recent backup at the top of the list.

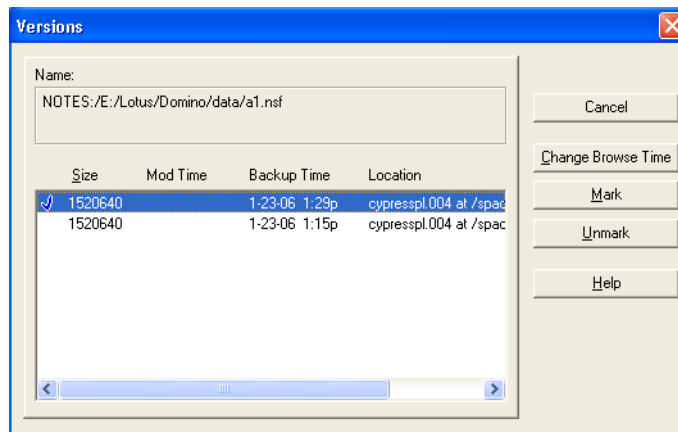


Figure 6-4 Versions window

## How to change the browse time

From the **Recover** window of the NetWorker User for Lotus program, you can browse the entries in the NetWorker client file index for each file previously backed up. You can view the entries for the backed-up files from a specific point in time.

To change the browse time:

1. In the Recover window, select **Change Browse Time** from the **View** menu.

The **Change Browse Time** dialog box appears, as shown in [Figure 6-5 on page 6-9](#).



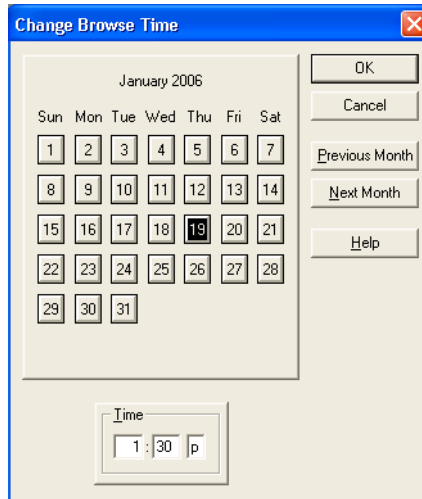


Figure 6-5 Change Browse Time dialog box

2. Set a new date by selecting a day from the calendar.
3. Click **Previous Month** or **Next Month** to change from the current month.
4. In the **Time** text box, enter a time to browse, where:
  - The hour and minutes entries are based on a 12-hour clock.
  - The entry **a** represents A.M.
  - The entry **p** represents P.M.

The browse time *cannot* be earlier than the time of the first backup because the client file index does not have entries before that time. To verify the browse and retention policies, check the Client resources for the Lotus client or server by using the NetWorker Administrator program.

---

## How to recover logged databases

The Domino server does *not* support in-place recovery of logged databases.

To recover a logged database on a Domino server, *either* delete the database before the recovery *or* perform the following:

1. Recover the logged database to a temporary directory and change (zap) the database ID during the recovery by using the instructions in the following:
  - “[How to relocate recovered data](#)” on page 6-10
  - “[How to change the database ID](#)” on page 6-11
2. Delete the original database from the Domino server.
3. Copy the recovered database from the temporary directory to the location of the original database.

---

## How to relocate recovered data

By default, when you recover Lotus data, the NML software copies the data from the backup volume to the original directory.

To relocate the recovered data by designating a different directory:

1. In the **Recover** window, select **Recover Options** from the **Options** menu.

The **Recover Options** dialog box appears, as shown in [Figure 6-2 on page 6-6](#).

2. In the **Relocate Recovered Data to Another Location** text box, enter the destination directory for the data recovery. This relocation path overwrites the NSR\_RELOCATION\_DEST parameter setting if it exists in the configuration file.
3. Click **OK**.



### **CAUTION**

**If an existing datafile in the relocation directory has the same name as the one being recovered, NML *overwrites* the file without prompting.**

---

---

## How to change the database ID

To change (zap) the database ID for a recovered database:

1. In the **Recover** window, select **Recover Options** from the **Options** menu.

The **Recover Options** dialog box appears, as shown in [Figure 6-2 on page 6-6](#).

2. Select **Zap Database ID**.
3. Click **OK**.



### **CAUTION**

After you change the database instance ID (DBIID) of a recovered database file, you *cannot* recover any subsequent changes to the database until the next full backup is performed. For the best results, perform a full ad hoc backup after changing the DBIID of a recovered database. However, if an incremental backup is the next backup performed on a database after a DBIID change, the NML software automatically performs a full backup of the database file instead.

---

---

## How to change the database ID and replica ID

To change (zap) both the database ID and replica ID for a recovered database:

1. In the **Recover** window, select **Recover Options** from the **Options** menu.

The **Recover Options** dialog box appears, as shown in [Figure 6-2 on page 6-6](#).

2. Select **Zap Database and Replica ID**.
3. Click **OK**.

---

## How to recover without applying transaction logs

To recover a database *without* applying transaction logs:

1. In the **Recover** window, select **Recover Options** from the **Options** menu.

The **Recover Options** dialog box appears, as shown in [Figure 6-2 on page 6-6](#).

2. Select **Do Not Apply Transaction Logs**.
3. Click **OK**.

---

## How to determine the required volumes

To determine the volumes required for a recovery:

1. In the **Recover** window, mark the database files to recover.
2. From the **View** menu, select **Required Volumes**.

The **Required Volumes** window appears with the backup volumes listed, as shown in [Figure 6-6 on page 6-12](#).

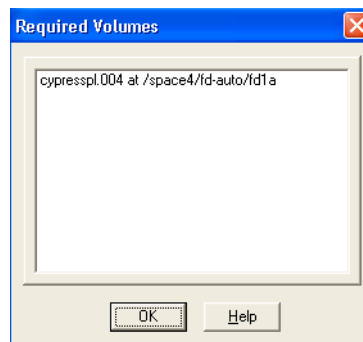


Figure 6-6 Required Volumes window

## Connecting to a different NetWorker server

To connect to a different server from NetWorker User for Lotus, use *one* of the following methods:

- ◆ If the NetWorker User for Lotus program is *not* already running:

1. Start the NetWorker User for Lotus program, and connect to the selected server by entering the following command:

```
nwbml -s server_name
```

where *server\_name* is the name of the NetWorker server from which to recover files.

If the server cannot be connected, the following message appears:

```
Unable to connect to server 'server_name'. Do you  
want to connect to another server?
```

2. Select **Yes** to connect to the default NetWorker server, or select **No** to return to the command prompt.

- ◆ If the NetWorker User for Lotus program is already running:

1. In the NetWorker for Lotus program, select **Select NetWorker Server** from the **Operation** menu.

The **Change Server** dialog box appears.

2. In the **Change Server** dialog box, either select or enter the name of the server, and click **OK**. To refresh the list of NetWorker servers, click **Update List**.

- ◆ To change the default NetWorker server that the NetWorker User for Lotus uses to back up files:

1. Right-click the **NetWorker User for Lotus** program icon and select **Properties**.

2. In the **Target** text box on the **Shortcut** tab, add the following option:

```
-s server_name
```

where *server\_name* is the name of the NetWorker server to back up the files. [Figure 3-4 on page 3-11](#) provides an example of the **Target** attribute setting.

---

## Directed recovery

A directed recovery allows you to initiate the recovery of Lotus database files from another computer where the NetWorker User for Lotus program is running.

In the sections that follow, these terms refer to the client computers involved in a directed recovery:

- ◆ *Source client* — The computer where the backup of the Lotus database files was performed.
- ◆ *Destination client* — The computer to recover Lotus database files to.
- ◆ *Performing client* — The computer where you initiate the directed recovery by using the NetWorker User for Lotus program.

There are two types of directed recovery:

- ◆ Remote recovery — The Lotus database files are recovered to the source client, which is the *same* computer as the destination client. The remote recovery is initiated from the performing client, which is a *different* computer. [“Remote recovery” on page 6-14](#) provides details on configuring and running a remote recovery.
- ◆ Directed recovery to a new destination — The Lotus database files are recovered to the performing client, which is the *same* computer as the destination client. The source client is a *different* computer. [“Directed recovery to a new destination” on page 6-17](#) provides details on configuring and running a directed recovery to a new destination.

---

## Remote recovery

This section describes how to configure and run a remote recovery.

### How to configure a remote recovery

To configure a remote recovery:

1. On the NetWorker server, create a NetWorker Client resource for the performing client, if one does *not* yet exist.

2. In the **Remote Access** attribute of the Client resource for the source client, specify a valid user and hostname for the performing client:

```
user=user_name, host=performing_computer_name
```

The *NetWorker Administration Guide* provides more information on creating a NetWorker Client resource and setting the **Remote Access** attribute.

3. On the source client, edit the **nsrnml\_remrecov** script accordingly. The comments in the script file provide details on editing the script.

---

**Note:** The script file is installed in the NML installation directory. On Windows, the script file is named `nsrnml_remrecov.bat`. On UNIX and Linux, the script file is named `nsrnml_remrecov`.

---

4. On the performing client, set the `NSRNML_RECOVCMD` parameter in the NML configuration file to the name of the **nsrnml\_remrecov** script that you modified on the source client. If this variable is *not* set, the NetWorker User for Lotus program uses **nsrnml\_remrecov** for UNIX or Linux clients, by default.
5. In the `/nsr/res/servers` file on a UNIX source/destination client *only*, specify the hostname of the performing client.
6. On a Linux or Solaris source/destination client *only*, perform one of the following:

- In the `/usr/lib` directory, create symbolic links to the library files `libnotes.so` and `libndgts.so` in the Lotus program directory.

For example, enter the following commands in the `/usr/lib` directory on Solaris:

```
ln -s /opt/lotus/notes/latest/sunspa/libnotes.so
libnotes.so
```

```
ln -s /opt/lotus/notes/latest/sunspa/libndgts.so
libntdgs.so
```

- Set the environment variable `LD_LIBRARY_PATH` to the complete pathname of the Lotus program directory that contains the library files `libnotes.so` and `libndgts.so`.

## How to run a remote recovery

To run a remote recovery:

1. On the performing client, start the NetWorker User for Lotus program.
2. From the **Operation** menu, select **Directed Recover**.

The **Source Client** window appears, as shown in [Figure 6-7](#) on [page 6-16](#).

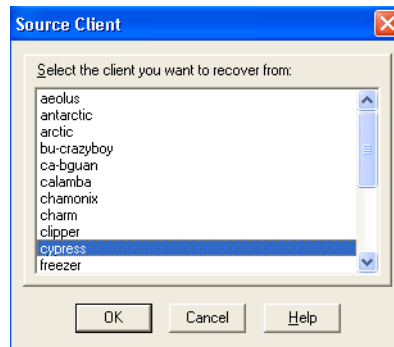


Figure 6-7 Source Client window

3. In the **Source Client** window, select the source client to recover from, and click **OK**.

The **Destination Client** window appears, as shown in [Figure 6-8](#) on [page 6-16](#).

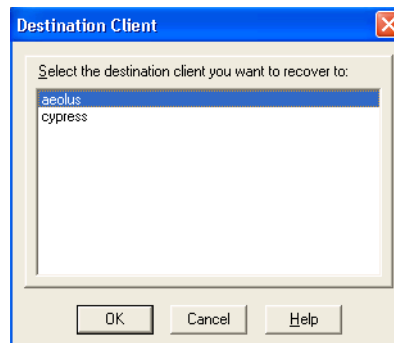


Figure 6-8 Destination Client window



4. In the **Destination Client** window, select the client to recover to. In this case, the destination client is the *same* computer as the source client.
5. If required, set the recover options. To do this, select **Recover Options** from the **Options** menu.
6. In the **Recover** window, mark the files to recover.

---

**Note:** With a UNIX source/destination client, the total length of all pathnames marked for recovery must *not* exceed the limit of 10 KB. Otherwise, the remote recovery of the UNIX client *fails*.

---

7. To start the recovery, click the **Start** toolbar button.

---

## Directed recovery to a new destination

This section describes how to configure and run a directed recovery to a new destination.



### CAUTION

**To recover a logged database to a new destination for *disaster recovery*, you must install the Domino server and recover the transaction logs to the new destination first. Otherwise, the application of transaction logs fails and the recovered database is not up-to-date.**

**To recover a logged database to a new destination for *regular recovery*, you *cannot* apply the transaction logs because the logs are not available in the new destination.**

---

## How to configure a directed recovery to a new destination

To configure a directed recovery to a new destination:

1. On the NetWorker server, create a NetWorker Client resource for the performing client, if one does *not* yet exist.
2. In the **Remote Access** attribute of the Client resource for the source client, specify a valid user and hostname for the destination client:

```
user=user_name, host=destination_computer_name
```

The *NetWorker Administration Guide* provides more information on creating a NetWorker Client resource and setting the **Remote Access** attribute.

## How to run a directed recovery to a new destination

To run a directed recovery to a new destination:

1. On the performing client, start the NetWorker User for Lotus program.

2. From the **Operation** menu, select **Directed Recover**.

The **Source Client** window appears, as shown in [Figure 6-7 on page 6-16](#).

3. In the **Source Client** window, select the source client to recover from, and click **OK**.

The **Destination Client** window appears, as shown in [Figure 6-8 on page 6-16](#).

4. In the **Destination Client** window, select the client to recover to. In this case, the destination client is the *same* computer as the performing client.
5. If required, set the recover options. To do this, select **Recover Options** from the **Options** menu.

---

**Note:** If you are recovering a logged database, select **Do Not Apply Transaction Logs** in the **Recover Options** dialog box. If this is a disaster recovery of a logged database, install the Domino server and recover the transaction logs in the new destination first.

---

6. In the **Recover** window, mark the files to recover.
7. To start the recovery, click the **Start** toolbar button.

---

## Canceling a recovery from NetWorker User for Lotus

To cancel a recovery in progress from the NetWorker User for Lotus program, select **End Recover** from the **File** menu.

This method does *not* cancel a remote recovery of a Windows client. A workaround in this case is to terminate the nsrnmml\_remrecov process through the Task Manager on the remote Windows client.



### **CAUTION**

**The use of any other method to cancel a recovery in process can corrupt the database. If you cancel a recovery, rerun it to ensure that the database files are successfully recovered.**

---

## Multiple Installations, Partitioned Domino Servers, and Cluster Support

This chapter provides information on how to configure and run NetWorker Module for Lotus (NML) backup and recovery operations with multiple Domino installations on UNIX, partitioned Domino servers, and supported clusters.

This chapter includes the following sections:

- ◆ [Multiple Domino Installations on UNIX](#)..... 7-2
- ◆ [Partitioned Domino servers](#)..... 7-4
- ◆ [Cluster support](#)..... 7-11

---

## Multiple Domino Installations on UNIX

To operate the NML software in an environment that contains multiple Domino installations on a single UNIX host:

1. Install the NML software according to the instructions in the *NetWorker Module for Lotus Notes Installation Guide*.
2. To perform a backup or recovery operation with multiple Domino installations on UNIX, follow the instructions in the preceding chapters of this guide. Consider the following important notes:
  - [“Ad hoc backups with multiple Domino installations” on page 7-2](#)
  - [“Scheduled backups with multiple Domino installations” on page 7-3](#)
  - [“Recovery with multiple Domino installations” on page 7-3](#)

---

### Ad hoc backups with multiple Domino installations

To perform an ad hoc backup with multiple Domino installations:

1. Ensure that the required backup parameters (for example, `Notes_ExecDirectory`) in the NML configuration file are set to the correct values for the specific Domino server *only*. [Appendix A, “NML Configuration File”](#) provides details on the parameters in the configuration file.
2. Ensure that the backup is run by the same user that operates the Domino server that is being backed up.
3. On Linux and Solaris, set the environment variable `LD_LIBRARY_PATH` to the complete pathname of the Lotus program directory that contains the library file `libnotes.so` belonging to the given installation.

---

## Scheduled backups with multiple Domino installations

To perform a scheduled backup with multiple Domino installations:

1. Create a separate NML configuration file for each Domino installation. Each configuration file must include the required parameters for the specific Domino installation, such as LOTUSUSER, Notes\_ExecDirectory, and NSR\_LOTUS\_DATA\_DIR.
2. On the NetWorker server, create a separate NetWorker Client resource for each Domino installation. In the Client resource:
  - In the **Backup Command** attribute, enter the value `nsrnotesv(.exe) -z config_filepath`, where `config_filepath` is the configuration file pathname for the specific installation.
  - In the **Save Set** attribute, enter a unique name for the specific installation.

---

## Recovery with multiple Domino installations

To perform a recovery with multiple Domino installations:

1. Ensure that the required restore parameters (for example, Notes\_ExecDirectory) are set in the NML configuration file to the correct values for the specific Domino server *only*. [Appendix A, “NML Configuration File”](#) provides details on the parameters in the configuration file.
  - a. Set the PATH parameter to include the directory of the Domino server to be recovered that contains the notes.ini file — *not* the data directories of any other Domino servers.
  - b. When recovering all the Lotus data for a specific Domino server, set the NSR\_BACKUP\_PATHS parameter to specify each top-level directory that contains the data for that Domino server. For example:

```
NSR_BACKUP_PATHS = /space1/notesdata1,  
/space1/linkdata1
```

---

**Note:** Do *not* specify just NOTES: for the NSR\_BACKUP\_PATHS parameter. NML then attempts to recover all the Lotus data for all the Domino servers on the host.

---

- c. When performing a disaster recovery, set the `NSR_LOG_DIR` parameter to specify the transaction log directory for the specific Domino server, even if it is not a partitioned Domino server. For example:

```
NSR_LOG_DIR = transaction_log_dirpath
```

2. Ensure that the recovery is run by the same user that operates the Domino server to be recovered.
3. On Linux and Solaris, set the environment variable `LD_LIBRARY_PATH` to the complete pathname of the Lotus program directory that contains the library file `libnotes.so` belonging to the given installation.

---

## Partitioned Domino servers

To perform backups and recovery of partitioned Domino servers, follow the instructions in the preceding chapters of this guide.

Consider the following important notes:

- ◆ [“Ad hoc backups of partitioned Domino servers” on page 7-4](#)
- ◆ [“Scheduled backups of partitioned Domino servers” on page 7-5](#)
- ◆ [“Recovery of partitioned Domino servers” on page 7-6](#)
- ◆ [“Disaster recovery of partitioned Domino servers” on page 7-7](#)

---

## Ad hoc backups of partitioned Domino servers

To enable ad hoc backups of partitioned Domino servers from either the command line or the NetWorker User for Lotus program (latter on Windows only), set the required parameters in the NML configuration file. [Appendix A, “NML Configuration File”](#) provides details on the NML configuration file.

1. Set the mandatory Lotus backup parameters for the partition, such as `Notes_ExecDirectory` and `NSR_RESOURCE_DIR`.
2. Set the `NSR_LOTUS_DATA_DIR` parameter to specify which partitioned Domino server to back up.

3. Set *one* of the following to specify the actual data to back up:
  - NSR\_BACKUP\_LOTUS\_DIR — To back up the entire partition.
  - NSR\_BACKUP\_PATHS — To back up one or more specific directories, or files, or both.

For ad hoc backups from the NetWorker User for Lotus program, specify the complete pathname of the NML configuration file in the Configuration File field of the Backup Options dialog box.

---

## Scheduled backups of partitioned Domino servers

To configure scheduled backups of partitioned Domino servers, create the following for *each* partition of a Domino server to be backed up:

1. Create a separate NML configuration file either manually (with a text editor) or by using the NML configuration wizard. Ensure that the configuration file includes the mandatory Lotus backup parameters and other required parameters for the partition. [Appendix A, “NML Configuration File”](#) provides details on the NML configuration file.
2. In the configuration file for the partition, set the following parameters:
  - NSR\_LOTUS\_DATA\_DIR — Set to the complete pathname of the data directory of the partition. For example:  
`NSR_LOTUS_DATA_DIR = /disk2/notesdata1`
  - *One* of the following to specify the actual data to back up:
    - NSR\_BACKUP\_LOTUS\_DIR — To back up the entire data directory.
    - NSR\_BACKUP\_PATHS — To back up one or more specific directories, or files, or both.
3. Create a NetWorker Client resource for the partition with the required attribute settings by using either the NetWorker Administrator program or the NML configuration wizard.

“[Software configuration roadmap](#)” on page 2-2 provides details on the configuration procedures.

- a. In the **Name** attribute, specify the hostname of the computer, *not* the name of the Domino server partition.
- b. In the **Backup Command** attribute, specify the **nsrnotesv(.exe) -z config\_filepath** command, where *config\_filepath* is the complete pathname of the NML configuration file for the partition.
- c. In the **Save Set** attribute, specify a descriptive name for the backup save set to be stored on the media. The **Save Set** value must start with the NOTES: prefix. “[Task 5: Configure the NetWorker Client resource](#)” on page 2-7 provides details on the **Save Set** attribute.

For example, you could enter the following in the **Save Set** attribute:

- When backing up the entire data directory for the partition:  
`NOTES:partition1_/disk2/notesdata1`
- When backing up a database named db.nsf for the partition:  
`NOTES:partition1_/disk2/notesdata1/db.nsf`

---

## Recovery of partitioned Domino servers

To enable recovery of partitioned Domino servers, set the required parameters in the NML configuration file. [Appendix A, “NML Configuration File”](#) provides details on the NML configuration file.

1. Set the PATH parameter to include the directory of the partitioned Domino server to be recovered that contains the notes.ini file. It does *not* include the data directories of any other partitioned Domino servers.
2. When recovering all the Lotus data for a partitioned Domino server, use the NSR\_BACKUP\_PATHS parameter to specify each top-level directory that contains the data for the partition to be recovered. For example:

```
NSR_BACKUP_PATHS = NOTES:M:\Lotus\p1data
NOTES:M:\Lotus\p1linkdata
```



---

**Note:** Do *not* specify just NOTES: for the NSR\_BACKUP\_PATHS parameter. NML then attempts to recover all the Lotus data for all the Domino servers on the host.

---



---

## Disaster recovery of partitioned Domino servers

To perform disaster recovery of partitioned Domino servers, follow the appropriate instructions.

### Recovery of a Lotus installation and databases on a partitioned Domino server

To recover a partitioned Domino server that has lost the Lotus installation and databases, recover each Domino server partition separately as follows:

1. Reinstall the Domino server in its previous location, but do *not* configure it.
2. Ensure that the PATH parameter in the NML configuration file lists the Domino data directory of the partition to be recovered *before* the data directory of any other Domino server partition. [Appendix A, “NML Configuration File”](#) provides details on the NML configuration file.
3. Recover the notes.ini file for the Domino server partition by using the **nsrnotesrc** command with the parameter setting NSR\_NO\_NOTES\_INIT = TRUE in the NML configuration file.

For example, to recover the notes.ini file on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_SERVER = NetWorker_server_name
NSR_BACKUP_PATHS = C:\Lotus\Domino\data1\notes.ini
NSR_NO_NOTES_INIT = TRUE
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

- c. When prompted whether to overwrite the current notes.ini file for the partition, enter **y**.
4. Recover all the databases for the server partition by using the **nsrnotesrc** command with the required parameter settings in the NML configuration file. Specify the partition's datapath in the

NSR\_BACKUP\_PATHS parameter. You *must* recover the databases to a new location by specifying the NSR\_RELOCATION\_DEST parameter.

For example, to recover all the databases on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_CLIENT = client_name
NSR_BACKUP_PATHS = C:\Lotus\Domino\data1
NSR_RELOCATION_DEST = D:\temp\Lotus\Server1
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

5. After the databases are recovered, copy them to the Lotus data directory for the appropriate Domino server partition.
6. For each Domino server partition, repeat steps 2 through 5.
7. Once all the Domino server partitions have been recovered, start each Domino server.

### Recovery of a Lotus installation, databases, and transaction logs on a partitioned Domino server

To recover database backups on a partitioned Domino server up to the last committed transaction in the archived transaction logs, the following requirements must be met:

- ◆ The Domino server partitions to be recovered must have had Lotus transactional logging enabled and set to archive mode.
- ◆ A backup of an up-to-date notes.ini file is available for *each* server partition.
- ◆ A set of recoverable database backup files is available for *each* server partition.
- ◆ The archived log extents (transaction log files) for *each* server partition are backed up and available, from the time of the last full backup.

To recover a partitioned Domino server that has lost the Lotus installation, databases, and transaction logs:

1. Reinstall the Domino server in its previous location, but do *not* configure it.
2. Ensure that the PATH parameter in the NML configuration file lists the Domino data directory of the partition to be recovered *before* the data directory of any other Domino server partition. [Appendix A, “NML Configuration File”](#) provides details on the NML configuration file.
3. Recover the notes.ini file for the Domino server partition by using the **nsrnotesrc** command with the parameter setting NSR\_NO\_NOTES\_INIT = TRUE in the NML configuration file.

For example, to recover the notes.ini file on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_SERVER = NetWorker_server_name
NSR_BACKUP_PATHS = C:\Lotus\Domino\data1\notes.ini
NSR_NO_NOTES_INIT = TRUE
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

- c. When prompted whether to overwrite the current notes.ini file for the partition, enter **y**.

4. Check the notes.ini file to determine the original log directory of the Domino server partition, as specified by the TRANSLOG\_Path setting. Ensure that this directory exists and it contains no old files.
5. Recover the *last* archived log extent backed up for the partition since the last full backup. Recover the log file to a temporary directory by using the **nsrnotesrc** command with the following restore parameters set in the NML configuration file:

```
NSR_LOG_DIR =
original_log_dirpath_of_partition_being_recovered
NSR_NO_NOTES_INIT = TRUE
NSR_NUMBER_LOGS = 1
NSR_RELOCATION_DEST = temporary_dirpath
```

For example, to recover the archived log file to the temporary directory D:\temp\Lotus directory on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_LOG_DIR = C:\Lotus\Domino\data1\logs1
NSR_NO_NOTES_INIT = TRUE
NSR_NUMBER_LOGS = 1
NSR_RELOCATION_DEST = D:\temp\Lotus
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

6. Copy the recovered log file from the temporary directory to the original log directory for the server partition, as specified by the TRANSLOG\_Path setting in the notes.ini file.
7. Enable the creation of the control file by setting the following parameter in the notes.ini file for the server partition:  
TRANSLOG\_Recreate\_Logctrl=1
8. Recover all the required database files for the server partition into a temporary directory.

For example, to recover all the database files on Windows:

- a. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_CLIENT = client_name
NSR_BACKUP_PATHS = NOTES:partition_datapath
NSR_RELOCATION_DEST = temporary_dirpath
```

- b. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

9. Overwrite the data directory for the server partition with the contents of this temporary data directory.
10. For each Domino server partition, repeat steps 2 through 9.
11. Once all the Domino server partitions have been recovered, start each Domino server.

## Cluster support

The NML software supports two types of configurations on all clusters that are supported by the NetWorker and Domino server software:

- ◆ Active-passive configuration — The Domino server runs on the active physical node. Other nodes are passive nodes that wait to take over if the active node fails.
- ◆ Active-active configuration — Each node has a Domino server on it, and the node is able to take over if other nodes in the cluster fail.

The appropriate Lotus and cluster documentation provides more information on active-passive and active-active configurations.

The following sections describe how to perform backups and recovery on supported clusters:

- ◆ [“Ad hoc backups on clusters” on page 7-11](#)
- ◆ [“Scheduled backups on clusters” on page 7-12](#)
- ◆ [“Recovery on clusters” on page 7-13](#)

### Ad hoc backups on clusters

To perform an ad hoc backup from the command line of a Domino server on a supported cluster, follow the instructions in [“Ad hoc backups of partitioned Domino servers” on page 7-4](#). Ensure that in the NML configuration file for the backup, the NSR\_CLIENT parameter is set to the name of the virtual host.

**Note:** Do *not* use the NetWorker User for Lotus program to perform an ad hoc backup on a cluster because the index is then saved using the physical node name.

---

## Scheduled backups on clusters

In the following procedure, the physical nodes *clus\_phys1* and *clus\_phys2* are clustered together to form the virtual node *clus\_vir1*.

To configure a scheduled backup of a Domino server on a supported cluster:

1. Ensure that the Lotus software is installed on the cluster computers according to the Lotus cluster documentation.
2. Ensure that the NetWorker client software is installed on the physical nodes *clus\_phys1* and *clus\_phys2*.
3. Create the NML configuration file in one of the following locations:
  - On a virtual host's shared disk.
  - In the same location on the local disk of each physical host. (A copy of the configuration file must exist in the same location on each physical host.)

The configuration file must contain the mandatory Lotus backup parameters and any other required parameter settings. Ensure that the file includes this parameter setting in the Lotus section:

```
NSR_CLIENT = clus_vir1
```

[Appendix A, "NML Configuration File"](#) provides details on the NML configuration file.

4. On the NetWorker server:
  - a. Create a default NetWorker Client resource for each of the physical nodes, for example, *clus\_phys1* and *clus\_phys2*.
  - b. Create a NetWorker Client resource for each Domino virtual host. There must be at least one resource for an active-passive configuration, and at least two resources for an active-active configuration (one for each Domino partition). In each Client resource of a virtual host:
    1. In the **Save Set** attribute, specify the data to be backed up. For example:
      - For an active-passive configuration, specify NOTES:
      - For an active-active configuration, specify NOTES:/partition\_data\_dir

Table 2-3 on page 2-8 provides details on the **Save Set** attribute.

2. In the **Backup Command** attribute, specify the **nsrnotesv(.exe) -z config\_filepath** command, where *config\_filepath* is the complete pathname of the NML configuration file.
3. In **Browse Policy** attribute, specify the browse policy period, as described in Table 2-3 on page 2-8.
4. In the **Group** attribute, specify the NetWorker group for the scheduled backup.
5. In the **Remote Access** attribute, specify the names *Lotus\_user@clus\_phys1* and *Lotus\_user@clus\_phys2*.
6. In **Retention Policy** attribute, specify the retention policy period, as described in Table 2-3 on page 2-8.

---

## Recovery on clusters

To recover Lotus data on a supported cluster, perform a directed recovery from the virtual host, *clus\_vir1*, to the local computer.

- ◆ “Directed recovery to a different client or location” on page 5-9 provides instructions on how to perform a directed recovery from the command line.
- ◆ “Directed recovery to a new destination” on page 6-17 provides instructions on how to perform a directed recovery from the NetWorker User for Lotus program.

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**Note:** In this case, there is *no* limitation on applying transaction logs for a regular recovery (mentioned on page 6-17) because the transaction logs are on the shared disks.

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## NML Configuration File

This appendix provides information on the parameters that can be set in the NetWorker Module for Lotus (NML) configuration file. It outlines the syntax rules for the configuration file contents, and the default and valid values that can be assigned to all the supported parameters in the configuration file.

This appendix includes the following sections:

- ◆ [Syntax rules for the NML configuration file](#) ..... A-2
- ◆ [Lotus backup parameters](#) ..... A-4
- ◆ [Lotus restore parameters](#) ..... A-11

## Syntax rules for the NML configuration file

As mentioned in [“Task 8: Set up the NML configuration file” on page 2-12](#), the NML configuration file has a main Lotus section that starts with the keyword LOTUS.

The Lotus section of the configuration file contains parameter settings that are used by NML during a backup (either ad hoc or scheduled) or restore of Domino or Notes data that is stored in traditional (*not* DB2) format. Throughout this appendix, this is referred to as a traditional or Lotus backup or restore.

[Example A-1 on page A-3](#) provides an example of an NML configuration file.

The contents of the NML configuration file must conform to the following syntax rules:

- ◆ The keyword LOTUS (*not* case-sensitive) starts a block of Lotus parameters for an NML traditional backup or restore. The following sections provide information on Lotus parameters:
  - [“Lotus backup parameters” on page A-4](#)
  - [“Lotus restore parameters” on page A-11](#)
- ◆ The keyword LOTUS must be followed by an opening left brace ({}).
- ◆ A block of parameters started by the keyword LOTUS must be terminated by a closing right brace (}).
- ◆ A block of parameters enclosed by braces *cannot* be nested inside another block of parameters.
- ◆ Each parameter setting must be in one of the following formats:  
*NAME = value*  
*NAME = value1, value2, value3*  
where:
  - *NAME* is the parameter name.
  - *value, value1, value2, value3* are values assigned to the parameter.
- ◆ Multiple values for a parameter must be separated by commas.

- ◆ The values of a parameter can be specified over multiple lines if each line ends in a comma. For example:

```
NAME = value1,
      value2,
      value3
```

- ◆ If the line specifying a parameter does *not* end in a comma, the next line must contain a new parameter setting.
- ◆ White space is ignored.
- ◆ Text on a line after the # symbol (where # is *not* enclosed in quotes) is considered a comment, and is ignored. A comment may appear after a parameter setting on the same line.
- ◆ A space, comma, or # symbol *in* a parameter value must be surrounded by single quotes ( ' '), double quotes(" "), or backwards quotes ( ` ).
- ◆ Parameter names and values are case-sensitive, unless specified otherwise in this appendix.

#### Example A-1 Sample NML configuration file

The following sample shows an NML configuration file that contains parameters in the Lotus section. The LOTUS keyword starts the Lotus section.

```
#
# The LOTUS section contains parameters required for
# backup of data stored in Domino server data directory.
#
LOTUS {
    NSR_BACKUP_LOTUS_DIR = TRUE
    NSR_BACKUP_LOGS_MODE = 1
    PATH = "C:\Program Files\Legato\nsr\bin"
    #
    # Spaces in a parameter value must be enclosed within
    # single, double, or backwards quotation marks.
    #
    Notes_ExecDirectory="C:\Program Files\lotus"
}
```

## Lotus backup parameters

Table A-1 on page A-4 lists all the supported Lotus backup parameters, which are used by the NML software during an ad hoc or scheduled backup of Domino or Notes data in a Lotus database.

The table provides the following information for each parameter:

- ◆ The definition of the parameter.
- ◆ The default value of the parameter.
- ◆ The valid values that can be assigned to the parameter.

The parameters must be set in the Lotus section (initiated by the LOTUS keyword) of the NML configuration file, as described in “Syntax rules for the NML configuration file” on page A-2.

Table A-1 Lotus backup parameters (Sheet 1 of 8)

Lotus backup parameter	Definition	Default and valid values
LOTUSER	<i>Mandatory</i> only for a <i>scheduled</i> backup on UNIX or Linux. Specifies the name of the Lotus Domino or Notes user.	<ul style="list-style-type: none"> <li>• Undefined (default).</li> <li>• A valid name of the Lotus Domino or Notes user.</li> </ul>
NML_BACKUP_TIMEOUT	<p><i>Optional</i>. Specifies a timeout value in seconds during which NML retries a backup when in-place compaction of a Lotus database is in progress on the Domino server. NML cannot back up a database during compaction. NML retries the database backup after every five seconds, until either the compaction is complete or the timeout is reached. If the timeout is reached first:</p> <ul style="list-style-type: none"> <li>• If NSR_SKIPDBERRORS = TRUE, NML skips the database and proceeds to back up the next database.</li> <li>• If NSR_SKIPDBERRORS = FALSE, NML fails the backup with an error.</li> </ul> <p>This parameter is <i>deprecated</i> (supported only for backwards compatibility), and will be removed from NML in the future.</p>	<ul style="list-style-type: none"> <li>• 30 (default) = Timeout value of 30 seconds.</li> <li>• An integer value = Timeout value in seconds.</li> </ul>

Table A-1 Lotus backup parameters (Sheet 2 of 8)

Lotus backup parameter	Definition	Default and valid values
Notes_ExecDirectory	<p><i>Mandatory.</i> Specifies the complete pathname of the Lotus Domino or Notes directory that contains the application library.</p> <p>This parameter corresponds to the Notes_ExecDirectory environment variable that can be set for ad hoc NML operations.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of the Lotus Domino or Notes directory that contains the libnotes.xx or nnotes.dll library file.</li> </ul>
NSR_AES_ENCRYPTION	<p><i>Optional.</i> Specifies whether the Lotus data is encrypted by NML by using 256-bit AES encryption during the backup before being sent over the network.</p> <p><b>Note:</b> Keep a record of all pass phrases used for 256-bit AES encryption. Be careful when you change the pass phrase on the NetWorker 7.3 server. If the pass phrase on the server is changed and you cannot remember the pass phrase used for an NML backup, the encrypted data cannot be recovered. The <i>NetWorker, Release 7.3, Administration Guide</i> provides more information on pass phrases.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = The Lotus data is <i>not</i> encrypted with 256-bit AES encryption during the backup.</li> <li>TRUE = The Lotus data is encrypted with 256-bit AES encryption during the backup.</li> </ul>
NSR_BACKUP_ALL_EXTENSIONS	<p><i>Optional.</i> Specifies whether all Lotus files or only the default set of Lotus files (with specific filename extensions) are backed up.</p> <p>This parameter corresponds to the <b>-A</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = Only Lotus files with names ending in .box, .dic, .dsk, .id, .ncf, .njf, .nsf, and .ntf and the notes.ini file in the specific directory are backed up.</li> <li>TRUE = All Lotus files (with names ending in all extensions) are backed up.</li> </ul>
NSR_BACKUP_LEVEL	<p><i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the level of ad hoc NML backup to perform.</p> <p>This parameter corresponds to the <b>-I</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>full (default) = Perform a full backup.</li> <li>incr = Perform an incremental backup.</li> </ul>

Table A-1 Lotus backup parameters (Sheet 3 of 8)

Lotus backup parameter	Definition	Default and valid values
NSR_BACKUP_LOGS_MODE	<p><i>Optional.</i> Do <i>not</i> set for an incremental backup — set for a full backup <i>only</i>. Specifies the level of transaction log backup to perform during a full backup. This parameter corresponds to the <b>-G</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>1 = The transaction logs are backed up and marked as reusable.</li> <li>2 = The transaction logs are marked as reusable, but are <i>not</i> backed up.</li> </ul>
NSR_BACKUP_LOTUS_DIR	<p><i>Optional.</i> Specifies whether the default set of files in the Lotus Domino or Notes data directory is backed up.</p> <ul style="list-style-type: none"> <li>On UNIX and Linux, the data directory is defined as the first Lotus data directory that <b>nsrnotesv</b> finds in the parameter PATH.</li> <li>On Windows, the data directory is defined as the first Lotus data directory that <b>nsrnotesv</b> finds in the Windows registry.</li> </ul> <p><b>Note:</b> This parameter <i>cannot</i> be used with the parameter NSR_BACKUP_PATHS or the <b>nsrnotesv path&lt;x&gt;</b> command.</p> <p>This parameter corresponds to the <b>-R</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = Only Lotus directories and files explicitly specified with the <b>nsrnotesv</b> command are backed up.</li> <li>TRUE = The Lotus data directory is backed up. On Windows, the notes.ini file is included in the backup, whether or not it resides in the default data directory.</li> </ul>
NSR_BACKUP_PATHS	<p><i>Optional.</i> For backup, specifies the complete pathnames of one or more directories, or files, or both. "<a href="#">Using wildcards</a>" on page B-2 provides details on using wildcards in the pathnames.</p> <p><b>Note:</b> This parameter <i>cannot</i> be used with the NSR_BACKUP_LOTUS_DIR parameter or the <b>nsrnotesv -R</b> command.</p> <p>This parameter corresponds to the <b>path&lt;x&gt;</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>For backup, the valid complete pathnames of one or more directories, or files, or both. Multiple names must be separated by commas. The pathnames must <i>not</i> include the NOTES: prefix.</li> </ul>
NSR_CATALOGFILE	<p><i>Optional.</i> Specifies the complete pathname of the backup catalog file, which contains detailed information about each file that is backed up.</p> <p>This parameter corresponds to the <b>-F</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of a backup catalog file.</li> </ul>

Table A-1 Lotus backup parameters (Sheet 4 of 8)

Lotus backup parameter	Definition	Default and valid values
NSR_CLIENT	<p><i>Optional.</i> Required for backups of clusters. Specifies the name of the NetWorker client file index to use for an ad hoc NML backup.</p> <p>This parameter corresponds to the <code>-c</code> option of the <code>nsrnotesv</code> command.</p>	<ul style="list-style-type: none"> <li>The hostname of the NetWorker client where the NML software is installed (default).</li> <li>A valid hostname of a NetWorker client.</li> </ul>
NSR_COMFORT_SPAN	<p><i>Optional.</i> Specifies the comfort span value to use for an incremental backup.</p> <p><a href="#">Example 2-4, "Lotus backup parameter for the comfort span," on page 2-17</a> provides details on the comfort span.</p> <p>This parameter corresponds to the <code>-a</code> option of the <code>nsrnotesv</code> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>An integer value between 65536 and 65536000, inclusive.</li> </ul>
NSR_COMPRESSION	<p><i>Optional.</i> Specifies whether the Lotus data is compressed by NML during a backup.</p> <p>This parameter corresponds to the <code>-C</code> option (with uppercase C) of the <code>nsrnotesv</code> command.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = The Lotus data is <i>not</i> compressed during the backup.</li> <li>TRUE = The Lotus data is compressed during the backup.</li> </ul>
NSR_CROSS_MOUNT_POINTS	<p><i>Optional.</i> Specifies whether the NML software crosses mount points during a backup.</p> <p>This parameter corresponds to the <code>-x</code> option of the <code>nsrnotesv</code> command.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = The backup does <i>not</i> cross mount points.</li> <li>TRUE = The backup crosses mount points.</li> </ul>
NSR_DATA_VOLUME_POOL	<p><i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the NetWorker volume pool to use for an ad hoc backup.</p> <p>This parameter corresponds to the <code>-b</code> option of the <code>nsrnotesv</code> command.</p>	<ul style="list-style-type: none"> <li>The most appropriate pool, as selected by the NetWorker server (default).</li> <li>A valid name of a NetWorker volume pool.</li> </ul>
NSR_DEBUG_FILE	<p><i>Optional.</i> Specifies the complete pathname of the log file that receives debug information during a backup.</p> <hr/> <p><b>Note:</b> The file itself does <i>not</i> have to exist, but the complete directory path must exist.</p> <hr/> <p>The parameter <code>NSR_DEBUG_LEVEL</code> specifies the level of the debug information.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of a debug log file.</li> </ul>

Table A-1 Lotus backup parameters (Sheet 5 of 8)

Lotus backup parameter	Definition	Default and valid values
NSR_DEBUG_LEVEL	<p><i>Optional.</i> Specifies the level of debug information that is written during a backup to the log file specified by the parameter NSR_DEBUG_FILE.</p> <p><b>Note:</b> Enable debugging under the supervision of Technical Support.</p> <p>If NML cannot access a specific pathname during the backup, a warning message is printed, the backup of the file or directory is skipped (whether or not the parameter NSR_SKIPDBERRORS is set), and the backup continues. If no other errors are encountered, the backup is reported as successful.</p>	<ul style="list-style-type: none"> <li>• 0 (default) = Warnings of inaccessible pathnames only.</li> <li>• 1 to 8 = Increasingly more debug messages, with each higher level providing more messages. Error messages are always included. If NSR_SKIPDBERRORS is set to TRUE, Domino database errors are <i>not</i> included but other errors are still included.</li> <li>• All levels provide operational messages and error messages.</li> <li>• Levels 5 and greater include entry and exit messages from most of the internal NML functions.</li> <li>• Level 8 includes messages from the NetWorker dprintf() function.</li> </ul>
NSR_ENCRYPTION	<p><i>Optional.</i> Specifies whether the Lotus data is encrypted by NML during the backup. This parameter corresponds to the <b>-Z</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>• FALSE (default) = The Lotus data is <i>not</i> encrypted during the backup.</li> <li>• TRUE = The Lotus data is encrypted during the backup.</li> </ul>
NSR_EXCLUDE_FILE	<p><i>Optional.</i> Specifies the complete pathname of a file that lists file paths to exclude from a backup. This parameter corresponds to the <b>-E</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>• Undefined (default).</li> <li>• A valid complete pathname of a file that lists file paths to exclude from the backup.</li> </ul>
NSR_FOLLOW_LINKS	<p><i>Optional.</i> Specifies whether Lotus database links and directory links are backed up. This parameter corresponds to the <b>-k</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>• TRUE (default) = Lotus database and directory links are backed up.</li> <li>• FALSE = Lotus database and directory links are <i>not</i> backed up.</li> </ul>
NSR_LOTUS_DATA_DIR	<p><i>Optional.</i> Required only when there are multiple Lotus Notes datapaths on a single computer, as with a partitioned Domino server installation. Specifies the complete pathname of the directory that contains the Notes data. This parameter corresponds to the <b>-p</b> option of the <b>nsrnotesv</b> command. This parameter is <i>deprecated</i> (supported only for backwards compatibility), and will be removed from NML in the future.</p>	<ul style="list-style-type: none"> <li>• Undefined (default).</li> <li>• A valid complete pathname of the directory that contains the Domino data.</li> </ul>



Table A-1 Lotus backup parameters (Sheet 6 of 8)

Lotus backup parameter	Definition	Default and valid values
NSR_NO_BUSY_ERRORS	<i>Optional.</i> Specifies whether the NML software waits for a busy NetWorker server or fails immediately upon receiving a busy notification.	<ul style="list-style-type: none"> <li>FALSE (default) = NML software waits for the selected NetWorker server to become available.</li> <li>TRUE = NML software fails immediately when the NetWorker server is busy and not ready for a request.</li> </ul>
NSR_NOTES_CONNECT_TIMEOUT	<i>Optional.</i> Specifies a timeout value in seconds during which NML retries a backup when in-place compaction of a Lotus database is in progress on the Domino server. NML cannot back up a database during compaction. NML retries the database backup after every five seconds, until either the compaction is complete or the timeout is reached. If the timeout is reached first: <ul style="list-style-type: none"> <li>If NSR_SKIPDBERRORS = TRUE, NML skips the database and proceeds to back up the next database.</li> <li>If NSR_SKIPDBERRORS = FALSE, NML fails the backup with an error.</li> </ul>	<ul style="list-style-type: none"> <li>30 (default) = Timeout value of 30 seconds.</li> <li>An integer value = Timeout value in seconds.</li> </ul>
NSR_PARALLELISM	<i>Optional.</i> Specifies the maximum number of concurrent save streams that can be sent to the NetWorker server during a backup. This parameter corresponds to the <b>-P</b> option of the <b>nsrnotesv</b> command.	<ul style="list-style-type: none"> <li>A value determined by the NetWorker server, based on the NetWorker client and server parallelisms (default).</li> <li>An integer number.</li> </ul>
NSR_RESOURCE_DIR	<i>Mandatory</i> only on UNIX and Linux. Specifies the location of the directory that contains the Lotus resource files.	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of the Lotus directory that contains the resource files.</li> </ul>
NSR_SAVESET_BROWSE	<i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the expiration date for the browse policy of an ad hoc backup, as the date when the entry for the backup is removed from the NetWorker client index and is no longer browsable. This parameter corresponds to the <b>-w</b> option of the <b>nsrnotesv</b> command.	<ul style="list-style-type: none"> <li>The most appropriate policy date for the NML client, as selected by the NetWorker server (default).</li> <li>A valid date in <b>nsr_getdate(3)</b> format.</li> </ul>

Table A-1 Lotus backup parameters (Sheet 7 of 8)

Lotus backup parameter	Definition	Default and valid values
NSR_SAVESET_RETENTION	<p><i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the expiration date for the retention policy of an ad hoc backup, as the date when the backup save set becomes recyclable.</p> <p>This parameter corresponds to the <b>-y</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>The most appropriate policy date for the NML client, as selected by the NetWorker server (default).</li> <li>A valid date in <b>nsr_getdate(3)</b> format.</li> </ul>
NSR_SERVER	<p><i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the hostname of the NetWorker server to use for an ad hoc backup.</p> <p>This parameter corresponds to the <b>-s</b> option of the <b>nsrnotesv</b> command.</p>	<ul style="list-style-type: none"> <li>Hostame of the local physical host (default).</li> <li>A valid hostname of a NetWorker server.</li> </ul>
NSR_SKIPDBERRORS	<p><i>Optional.</i> Specifies whether NML continues a Notes database backup if a noncritical error is encountered while backing up Notes database files (<i>not</i> flat files).</p> <p>A noncritical error is one that allows NML to recover from the problem, and to continue operations without compromising the backup data integrity. A noncritical error occurs when NML cannot access a Notes database while generating a list of files to back up. In this case, the file is skipped and the backup continues. A critical error occurs later if NML cannot access the file while trying to read the data to be saved to tape. This error is critical because NML cannot safely skip the file and continue.</p> <p>During the backup of multiple databases, NSR_SKIPDBERRORS enables NML to skip backing up problematic databases while continuing to back up good databases.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = NML does <i>not</i> continue a Notes database backup if a noncritical error is encountered.</li> <li>TRUE = NML continues a Notes database backup if a noncritical error is encountered.</li> </ul> <hr/> <p><b>Note:</b> If NSR_SKIPDBERRORS is set to TRUE, check the output log after a backup to see if any databases were skipped due to errors.</p> <hr/>
PATH	<p><i>Optional.</i> Required for scheduled backups <i>only</i>. Specifies the value of the operating system environment variable PATH to use for a backup. If set, the parameter must include the location of the Lotus executables.</p> <p>This parameter supersedes any PATH specified in the environment.</p>	<ul style="list-style-type: none"> <li>PATH set in the execution system environment (default).</li> <li>A set of valid pathnames, with a colon (UNIX and Linux) or a semicolon (Windows) separating each pathname from the others.</li> </ul>

Table A-1 Lotus backup parameters (Sheet 8 of 8)

Lotus backup parameter	Definition	Default and valid values
POSTCMD	<p><i>Optional. Do not set for an ad hoc backup.</i> Specifies the complete pathname of a postprocessing script to be run <i>after</i> a scheduled backup.</p> <p>If the scheduled backup fails, the postprocessing script is still run. If the postprocessing script fails, a warning message is generated but the backup is recorded as successful.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of a postprocessing script file.</li> </ul> <p>If the value is undefined or invalid, a postprocessing script is <i>not</i> run after the scheduled backup.</p>
PRECMD	<p><i>Optional. Do not set for an ad hoc backup.</i> Specifies the complete pathname of a preprocessing script to be run <i>before</i> a scheduled backup.</p> <p>If the preprocessing script fails, an error message is generated and the scheduled backup is <i>not</i> performed.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of a preprocessing script file.</li> </ul> <p>If the value is undefined or invalid, a preprocessing script is <i>not</i> run before the scheduled backup.</p>

## Lotus restore parameters

[Table A-2 on page A-12](#) lists all the supported Lotus restore parameters, which are used by the NML software during a restore of Domino or Notes data to a Lotus database.

The table provides the following information for each parameter:

- ◆ The definition of the parameter.
- ◆ The default value of the parameter.
- ◆ The valid values that can be assigned to the parameter.

The parameters must be set in the Lotus section (initiated by the LOTUS keyword) of the NML configuration file, as described in [“Syntax rules for the NML configuration file” on page A-2](#).

Table A-2 Lotus restore parameters (Sheet 1 of 5)

Lotus restore parameter	Definition	Default and valid values
Notes_ExecDirectory	<p><i>Mandatory.</i> Specifies the complete pathname of the Lotus Domino or Notes directory that contains the application library.</p> <p>This parameter corresponds to the Notes_ExecDirectory environment variable that can be set for ad hoc NML operations.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of the Lotus Domino or Notes directory that contains the libnotes.xx or nnotes.dll library file.</li> </ul>
NSR_APPLY_LOGS	<p><i>Optional.</i> Specifies whether to apply the transaction logs after a backup is restored.</p> <p>This parameter corresponds to the <b>-X</b> option of the <b>nsrnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>TRUE (default) = The transaction logs are applied after the backup is restored.</li> <li>FALSE = The transaction logs are <i>not</i> applied after the backup is restored.</li> </ul>
NSR_AUTO_RESTORE	<p><i>Optional.</i> Specifies whether the Lotus database or file restore occurs automatically <i>without</i> user interaction.</p> <p>This parameter corresponds to the <b>-a</b> option of the <b>nsrnotesrc</b> command.</p> <p>This parameter is <i>deprecated</i> (supported only for backwards compatibility), and will be removed from NML in the future.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = The Lotus database or file restore occurs with user interaction.</li> <li>TRUE = The Lotus database or file restore occurs automatically <i>without</i> user interaction.</li> </ul>
NSR_BACKUP_PATHS	<p><i>Optional.</i> For restore, specifies <i>one</i> of the following:</p> <ul style="list-style-type: none"> <li>The complete pathnames of one or more directories, or files, or both.</li> <li>To restore <i>all</i> the backup data on a given client.</li> </ul>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>For restore, the valid complete pathnames of one or more directories, or files, or both (each with or without the prefix NOTES:). Multiple pathnames must be separated by commas.</li> <li>NOTES: by itself, which specifies to restore <i>all</i> the Lotus data backed up from the given NML client. Do <i>not</i> set for a partitioned Domino server or multiple Domino installations on a single UNIX host.</li> </ul> <p><b>Note:</b> Support of the NOTES: keyword is provided for backwards compatibility <i>only</i>.</p>

Table A-2 Lotus restore parameters (Sheet 2 of 5)

Lotus restore parameter	Definition	Default and valid values
NSR_CLIENT	<p><i>Optional.</i> Required for restores on clusters. Specifies the name of the NetWorker client file index to browse, or the hostname of the source client for an NML restore.</p> <p>This parameter corresponds to the <b>-c</b> option of the <b>nsrnotesrc</b> or <b>nsrdocrc</b> command.</p>	<ul style="list-style-type: none"> <li>The hostname of the NetWorker client where the NML software is installed (default).</li> <li>A valid hostname of a NetWorker client.</li> </ul>
NSR_DBIID	<p><i>Optional.</i> Specifies to assign either a new DBIID, or both a new DBIID and new replica ID, to a restored database.</p> <p>This parameter corresponds to the <b>-Z</b> and <b>-ZZ</b> options of the <b>nsrnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>1 = A new DBIID is assigned to the restored database.</li> <li>2 = A new DBIID and a new replica ID are assigned to the restored database.</li> </ul>
NSR_DEBUG_FILE	<p><i>Optional.</i> Specifies the complete pathname of the log file that receives debug information during a restore.</p> <p><b>Note:</b> The file itself does <i>not</i> have to exist, but the complete directory path must exist.</p> <p>The parameter NSR_DEBUG_LEVEL specifies the level of the debug information.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of a debug log file.</li> </ul>
NSR_DEBUG_LEVEL	<p><i>Optional.</i> Specifies the level of debug information that is written during a restore to the log file specified by the parameter NSR_DEBUG_FILE.</p> <p><b>Note:</b> Enable debugging under the supervision of Technical Support.</p>	<ul style="list-style-type: none"> <li>0 (default) = Warnings of inaccessible pathnames only.</li> <li>1 to 8 = Increasingly more debug messages, with each higher level providing more messages. Error messages are always included. If NSR_SKIPDBERRORS is set to TRUE, Domino database errors are <i>not</i> included, but other errors are still included.</li> <li>All levels provide operational messages and error messages.</li> <li>Levels 5 and greater include entry and exit messages from most of the internal NML functions.</li> <li>Level 8 includes messages from the NetWorker dprintf() function.</li> </ul>

Table A-2 Lotus restore parameters (Sheet 3 of 5)

Lotus restore parameter	Definition	Default and valid values
NSR_ENCRYPTION_PHRASES	<p><i>Optional.</i> Specifies one or more encryption phrases to use for decrypting Lotus data during an NML restore with the <b>nsnotesrc</b> or <b>nsrdocrc</b> command. If this parameter is <i>not</i> set, the NML restore obtains the encryption phrase from the NetWorker server.</p> <p>If <i>both</i> of the following are true, set this parameter to the phrase used to originally back up the data:</p> <ul style="list-style-type: none"> <li>The Lotus data being restored was backed up with 256-bit AES encryption.</li> <li>The encryption phrase on the NetWorker server has changed since the Lotus data was backed up.</li> </ul>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>One or more encryption phrases to use during the restore, with each separate phrase enclosed in quotes and multiple phrases separated by commas.</li> </ul>
NSR_FOLLOW_LINKS	<p><i>Optional.</i> Specifies whether Lotus database links and directory links are restored.</p>	<ul style="list-style-type: none"> <li>TRUE (default) = Lotus database and directory links are restored.</li> <li>FALSE = Lotus database and directory links are <i>not</i> restored.</li> </ul>
NSR_LOG_DIR	<p><i>Optional.</i> Specifies the complete pathname of the log directory of a partitioned Domino server for disaster recovery <i>only</i>.</p> <p>This parameter corresponds to the <b>-p</b> option of the <b>nsnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>A valid complete pathname of the log directory of the partitioned Domino server for disaster recovery.</li> </ul>
NSR_NO_BUSY_ERRORS	<p><i>Optional.</i> Specifies whether the NML software waits for a busy NetWorker server or fails immediately upon receiving a busy notification.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = NML software waits for the selected NetWorker server to become available.</li> <li>TRUE = NML software fails immediately when the NetWorker server is busy and not ready for a request.</li> </ul>
NSR_NO_NOTES_INIT	<p><i>Optional.</i> Specifies whether the Notes API is initialized during a disaster recovery.</p> <p>This parameter corresponds to the <b>-N</b> option of the <b>nsnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>FALSE (default) = The Notes API is initialized during the disaster recovery.</li> <li>TRUE = The Notes API is <i>not</i> initialized during the disaster recovery.</li> </ul>

Table A-2 Lotus restore parameters (Sheet 4 of 5)

Lotus restore parameter	Definition	Default and valid values
NSR_NUMBER_LOGS	<p><i>Optional.</i> Specifies the number of transaction logs to recover during a disaster recovery <i>only</i>. This parameter corresponds to the <b>-I</b> option of the <b>nsnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>An integer number.</li> </ul>
NSR_PARALLELISM	<p><i>Optional.</i> Specifies the maximum number of concurrent save streams that can be sent to the NetWorker server during a restore. This parameter corresponds to the <b>-P</b> option of the <b>nsnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>A value determined by the NetWorker server, based on the NetWorker client and server parallelisms (default).</li> <li>An integer number.</li> </ul>
NSR_PREFETCH_LOGS	<p><i>Optional.</i> Specifies the number of transaction log files that the NML software retrieves in advance when it is applying logs to a restored Lotus database. This parameter corresponds to the <b>-L</b> option of the <b>nsnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li>An integer number, typically in the range of 2 to 5.</li> </ul>
NSR_RECOV_INTERACT	<p><i>Optional.</i> Specifies the default overwrite response when the name of a file being restored conflicts with an existing filename. The value of the parameter must be a single letter.</p> <ul style="list-style-type: none"> <li>If the letter is lowercase, it becomes the default value that appears in brackets with the overwrite prompt.</li> <li>If the letter is uppercase, no prompts appear unless as specified for the <b>R</b> value.</li> </ul> <p>This parameter corresponds to the <b>-i</b> option of the <b>nsnotesrc</b> command.</p>	<ul style="list-style-type: none"> <li>Undefined (default).</li> <li><b>n</b> = Do not restore the current file.</li> <li><b>N</b> = Do not restore <i>any</i> files with conflicting names. No prompts appear.</li> <li><b>y</b> = Overwrite the existing file with the restored file.</li> <li><b>Y</b> = Overwrite <i>all</i> existing files with conflicting names. No prompts appear.</li> <li><b>r</b> = If restoring a logged database, do <i>not</i> rename the existing file, and restore the backed-up file with a name that begins with a tilde (~). If restoring a database that is <i>not</i> logged, rename the existing file by adding a tilde to the start of the filename, and restore the backed-up file with its <i>original</i> name.</li> <li><b>R</b> = Apply the actions of the <b>r</b> option to <i>all</i> existing files with conflicting names. No prompts appear unless a further naming conflict occurs.</li> </ul>

Table A-2 Lotus restore parameters (Sheet 5 of 5)

Lotus restore parameter	Definition	Default and valid values
NSR_RECOVER_TIME	<p><i>Optional.</i> Specifies the backup time of a database to restore. By default, NML recovers the most recent database backup.</p> <p>For document-level recovery with the <b>nsrdocr</b> command, NML performs the following:</p> <ol style="list-style-type: none"> <li>1. Restores the latest full backup prior to specified time to the temporary area.</li> <li>2. If transactional logging is <i>enabled</i> on the Domino server, applies the transaction logs to the specified time.</li> <li>3. Copies the documents to the actual database.</li> </ol> <p>This parameter corresponds to the <b>-t</b> option of the <b>nsrnotesrc</b> or <b>nsrdocr</b> command.</p>	<ul style="list-style-type: none"> <li>• Undefined (default).</li> <li>• A valid backup time in <b>nsr_getdate(3)</b> format.</li> </ul>
NSR_RELOCATION_DEST	<p><i>Optional.</i> Specifies the complete pathname of a directory to which the Lotus database files or documents are restored.</p> <p>This parameter corresponds to the <b>-d</b> option of the <b>nsrnotesrc</b> or <b>nsrdocr</b> command.</p>	<ul style="list-style-type: none"> <li>• Undefined (default).</li> <li>• A valid complete pathname of the directory to which the database files are restored.</li> </ul>
NSR_SERVER	<p><i>Optional.</i> Specifies the hostname of the NetWorker server from which the backup is restored.</p> <p>This parameter corresponds to the <b>-s</b> option of the <b>nsrnotesrc</b> or <b>nsrdocr</b> command.</p>	<ul style="list-style-type: none"> <li>• Hostname of the local physical host (default).</li> <li>• A valid hostname of a NetWorker server.</li> </ul>
PATH	<p><i>Optional.</i> Specifies the value of the operating system environment variable PATH to use for a restore. If set, the parameter must include the location of the Lotus executables, including the notes.ini file. The parameter value is concatenated to the PATH set in the environment.</p> <p>This parameter supersedes any PATH specified in the environment.</p>	<ul style="list-style-type: none"> <li>• PATH set in the execution system environment (default).</li> <li>• A set of valid pathnames, with a colon (UNIX and Linux) or a semicolon (Windows) separating each pathname from the others.</li> </ul>



## NML Commands and Command Options

This appendix provides syntax, notation, and related information about the NetWorker Module for Lotus (NML) backup and recovery commands **nsrnotesv**, **nsrnotesrc**, and **nsrdocr**.

This appendix includes the following sections:

- ◆ [NML commands](#) ..... B-2
- ◆ [Command-line conventions](#) ..... B-2
- ◆ [Using wildcards](#) ..... B-2
- ◆ [The nsrnotesv command and options](#)..... B-4
- ◆ [The nsrnotesrc recovery command](#) ..... B-7
- ◆ [The nsrdocr document-level recovery command](#)..... B-10

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## NML commands

The NML software includes the following backup and recovery commands:

- ◆ **nsrnotesv** — Backs up the specified database objects, as described in “[The nsrnotesv command and options](#)” on page B-4.
- ◆ **nsrnotesrc** — Recovers the specified database objects, as described in “[The nsrnotesrc recovery command](#)” on page B-7.
- ◆ **nsrdocrc** — Recovers individual documents from a specified database, as described in “[The nsrdocrc document-level recovery command](#)” on page B-10.

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## Command-line conventions

The NML command options must comply with the following command-line conventions:

- ◆ A command option that is *not* within brackets is *mandatory* and must appear in the command.
- ◆ A command option within square brackets ( [ ] ) is optional.
- ◆ Only *one* of the command options separated by the | symbol within braces ( { } ) is *mandatory* and must appear in the command.
- ◆ Command options are case-sensitive. Use the proper lowercase or uppercase letters for command options.
- ◆ If a command option contains a space, the option must be enclosed within quotation marks.

---

## Using wildcards

UNIX and Linux systems expand wildcards that are used within the pathnames specified as **nsrnotesv** command options. If the number of files specified by the wildcards exceeds the operating system limit, enclose the wildcards in quotes.

The NML software expands wildcards that are included in pathnames specified through the following:

- ◆ The **nsrnotesv** command options within quotes.
- ◆ The **nsrnotesv** command options *not* within quotes (on Windows *only*).
- ◆ The NSR\_BACKUP\_PATHS parameter in the NML configuration file. It is *preferable* to specify pathnames through this parameter, rather than through the **nsrnotesv** command options.

The following restrictions apply to using wildcards that are expanded by NML:

- ◆ Wildcard expansion supports only asterisks (\*) and question marks (?) in a regular expression.
  - An asterisk (\*) stands for any number of characters, including zero.
  - A question mark (?) stands for only one character.

For example:

- \*.nsf matches abc.nsf and a.nsf, but not data.ntf.
  - \*.n?f matches abc.nsf, a.nsf, and data.ntf, but not test.nf.
  - \* matches all filenames.
  - ?.nsf matches a.nsf, b.nsf, and c.nsf, but not ab.nsf.
- ◆ A wildcard can be used in the last component *only* of a pathname.

For example, the following includes an *invalid* pathname that the NML software cannot expand:

```
NSR_BACKUP_PATHS = '/local/*/*.nsf'
```

#### Example B-1 Wildcards that specify the files for backup

The following commands use wildcards to specify the files for backup:

- ◆ To specify all the files under the /lotusdata directory on UNIX or Linux:

```
nsrnotesv -z config_filepath /lotusdata/*.*
```

- ◆ To specify all the database files with the .nsf extension in the directory on Windows:

```
nsrnotesv -z config_filepath c:\Lotus\Domino\data\*.nsf
```

## The nsrnotesv command and options

The **nsrnotesv** command is the NML backup command used for both ad hoc and scheduled backups. All the command options are *optional*.

All the **nsrnotesv** command options *except* the **-z** option:

- ◆ Are supported for backwards compatibility *only*.
- ◆ Correspond to Lotus backup parameters that can be set in the NML configuration file.

To specify the settings for an NML backup, it is preferable to use the parameters in the configuration file (specified by the **-z** option) *instead* of the **nsrnotesv** command options. [Appendix A, “NML Configuration File”](#) provides details on Lotus backup parameters.

The **nsrnotesv** command uses the following syntax:

```
nsrnotesv -z config_filepath

nsrnotesv [-kxACIZ] [-a comfort_span_value]
[-b pool_name] [-c client_name] [-E exclude_filepath]
[-F backup_catalog_filepath] [-g group_name]
[-G transaction_log_option] [-p data_directory]
[-P parallelism_level] [-s server_name] [-w browse_date]
[-y retention_date] {-R | path1 [path2[...]]}
```

[Table B-1 on page B-4](#) describes the options for the **nsrnotesv** command.

Table B-1 Options for the nsrnotesv command (Sheet 1 of 4)

Option	Description
<b>-a</b> <i>comfort_span_value</i>	Specifies the comfort span value in KB to use for an incremental backup. This option corresponds to the following parameter setting: NSR_COMFORT_SPAN = <i>comfort_span_value</i>
<b>-A</b>	Specifies that all Lotus files (with filenames ending in <i>all</i> extensions) are backed up. Without the <b>-A</b> option, the only Lotus files backed up are those with filenames ending in <i>.box</i> , <i>.dic</i> , <i>.dsk</i> , <i>.id</i> , <i>.ncf</i> , <i>.njf</i> , <i>.nsf</i> , and <i>.ntf</i> and the <i>notes.ini</i> file. This option corresponds to the following parameter setting: NSR_BACKUP_ALL_EXTENSIONS = TRUE
<b>-b</b> <i>pool_name</i>	Specifies the NetWorker volume pool to use for an ad hoc backup. This option corresponds to the following parameter setting: NSR_DATA_VOLUME_POOL = <i>pool_name</i>

Table B-1 Options for the nsrnotesv command (Sheet 2 of 4)

Option	Description
<b>-c</b> <i>client_name</i>	Specifies the NetWorker client hostname to use for client indexing. (This option is specified with a lowercase <b>c</b> .) This option corresponds to the following parameter setting: NSR_CLIENT = <i>client_name</i>
<b>-C</b>	Specifies that the Lotus data is compressed by NML during a backup. (This option is specified with an uppercase <b>C</b> .) This option corresponds to the following parameter setting: NSR_COMPRESSION = TRUE
<b>-E</b> <i>exclude_filepath</i>	Specifies the complete pathname of a file that lists file paths, or directory paths, or both, to exclude from a backup. This option corresponds to the following parameter setting: NSR_EXCLUDE_FILE = <i>exclude_filepath</i>
<b>-F</b> <i>backup_catalog_filepath</i>	Specifies the complete pathname of the backup catalog file, which contains detailed information about each file that is backed up. This option corresponds to the following parameter setting: NSR_CATALOGFILE = <i>backup_catalog_filepath</i>
<b>-g</b> <i>group_name</i>	Specifies the NetWorker backup group to use for a backup. This option is <i>only</i> used by the NetWorker <b>savegrp</b> process during a <i>scheduled</i> NML backup.
<b>-G</b> <i>transaction_log_option</i>	Specifies the transaction log backup option for a full backup <i>only</i> . The valid value of <i>transaction_log_option</i> is either 1 or 2. 1 = The transaction logs are backed up and marked as reusable. 2 = The transaction logs are marked as reusable, but are <i>not</i> backed up. This option corresponds to the following parameter setting: NSR_BACKUP_LOGS_MODE = <i>transaction_log_option</i>
<b>-I</b>	Specifies an incremental backup. The default is a full backup. This option corresponds to the following parameter setting: NSR_BACKUP_LEVEL = incr
<b>-k</b>	Specifies that Lotus databases and directories pointed to by links are <i>not</i> backed up. This option corresponds to the following parameter setting: NSR_FOLLOW_LINKS = FALSE
<b>-p</b> <i>data_directory</i>	Specifies the Domino data directory. Used only for a partitioned Domino server. (This option is specified with a lowercase <b>p</b> .) This option corresponds to the following parameter setting: NSR_LOTUS_DATA_DIR = <i>data_directory</i>

Table B-1 Options for the nsrnotesv command (Sheet 3 of 4)

Option	Description
<b>-P</b> <i>parallelism_level</i>	Specifies the NML parallelism level as the maximum number of concurrent save streams that can be sent to the NetWorker server during a backup. (This option is specified with an uppercase P) This option corresponds to the following parameter setting: NSR_PARALLELISM = <i>parallelism_level</i>
<b>-R</b>	Specifies that the Lotus data directory is backed up. To back up specific Lotus directories or files, use <i>path&lt;x&gt;</i> instead of the <b>-R</b> option. This option corresponds to the following parameter setting: NSR_BACKUP_LOTUS_DIR = TRUE If <i>path&lt;x&gt;</i> or the NSR_BACKUP_PATHS parameter is used, do <i>not</i> use <b>-R</b> or the NSR_BACKUP_LOTUS_DIR parameter.
<b>-s</b> <i>server_name</i>	Specifies the hostname of the NetWorker server to use for an ad hoc backup. This option corresponds to the following parameter setting: NSR_SERVER = <i>server_name</i>
<b>-w</b> <i>browse_date</i>	Specifies the browse policy of an ad hoc backup, as the date when the entry for the backup is removed from the NetWorker client index and is no longer browsable. This option corresponds to the following parameter setting: NSR_SAVESET_BROWSE = <i>browse_date</i>
<b>-x</b>	Specifies that the NML software crosses mount points during a backup. This option corresponds to the following parameter setting: NSR_CROSS_MOUNT_POINTS = TRUE
<b>-y</b> <i>retention_date</i>	Specifies the retention policy of an ad hoc backup, as the date when the backup save set becomes recyclable. This option corresponds to the following parameter setting: NSR_SAVESET_RETENTION = <i>retention_date</i>
<b>-z</b> <i>config_filepath</i>	Specifies the complete pathname of the NML configuration file. (This option is specified with a lowercase z.)

Table B-1 Options for the nsrnotesv command (Sheet 4 of 4)

Option	Description
<b>-Z</b>	Specifies that the Lotus data is encrypted by NML before it is backed up. (This option is specified with an uppercase <b>Z</b> .) This option corresponds to the following parameter setting: NSR_ENCRYPTION = TRUE
<i>path&lt;x&gt;</i>	For backup, specifies the complete pathname of a Lotus directory or file, or pathnames of both. To specify multiple directories or files for backup, separate the <i>path&lt;x&gt;</i> entries with a space. Directories and files may be specified together on the same command line. This option corresponds to (and takes precedence over) the following parameter setting: NSR_BACKUP_PATHS = <i>path1, path2</i> If <b>-R</b> or the NSR_BACKUP_LOTUS_DIR parameter is used, do <i>not</i> use <i>path&lt;x&gt;</i> or the NSR_BACKUP_PATHS parameter.

## The nsrnotesrc recovery command

The **nsrnotesrc** command invokes the NML recovery program. All the command options are *optional* during a regular recovery.

All the **nsrnotesrc** command options *except* the **-z** option are supported for backwards compatibility *only*. The options correspond to Lotus restore parameters that can be set in the NML configuration file.

To specify the settings for an NML recovery, it is preferable to use the Lotus restore parameters in the configuration file (specified by the **-z** option) *instead* of the **nsrnotesrc** command options. All the Lotus restore parameters listed in [Appendix A, “NML Configuration File”](#) are supported with the **nsrnotesrc** command.

The **nsrnotesrc** command uses the following syntax:

```
nsrnotesrc -z config_filepath
nsrnotesrc [-aNXZ] [-c client_name]
[-d destination_pathname] [-i {nNyYrR}]
[-L number_of_logs] [-s server_name] [-t time]
{NOTES | [NOTES:]path1 [[NOTES:]path2[...]]}
```

For disaster recovery *only*:

```
nsrnotesrc -N [-c client_name] -d destination_pathname
[-l number_of_logs] [-p log_dirpath] [-s server_name]
```

[Table B-2 on page B-8](#) describes the options for the **nsrnotesrc** command.

Table B-2 Options for the nsrnotesrc command (Sheet 1 of 3)

Option	Description
<b>-a</b>	Specifies that the database or file restore occurs automatically <i>without</i> user interaction. This option corresponds to the following parameter setting: NSR_AUTO_RESTORE = TRUE
<b>-c</b> <i>client_name</i>	Specifies the name of the NetWorker client file index that is to browse or the hostname of the source client where the database files originated. This option corresponds to the following parameter setting: NSR_CLIENT = <i>client_name</i>
<b>-d</b> <i>destination_pathname</i>	Specifies the complete pathname of the directory to which the database files are restored, if the files are not restored to the original location. This option corresponds to the following parameter setting: NSR_RELOCATION_DEST = <i>destination_pathname</i>
<b>-i</b> {nNyYrR}	Specifies the default overwrite response: <b>n</b> — Do not restore the current file. <b>N</b> — Do not restore any files with conflicting names. No prompts appear. <b>y</b> — Overwrite the existing file with the restored file. <b>Y</b> — Overwrite all existing files with conflicting names. No prompts appear. <b>r</b> — If restoring a logged database, do <i>not</i> rename the existing file, and restore the backed-up file with a name that begins with a tilde (~). If restoring a database that is <i>not</i> logged, rename the existing file by adding a tilde to the start of the filename, and restore the backed-up file with its <i>original</i> name. <b>R</b> — Apply the actions of the r option to <i>all</i> existing files with conflicting names. No prompts appear unless a further naming conflict occurs. This option corresponds to the following parameter setting: NSR_RECOV_INTERACT = {nNyYrR}
<b>-I</b> <i>number_of_logs</i>	Specifies the number of transaction logs to recover. This option is used during a disaster recovery <i>only</i> . (This option is specified with a lowercase I.) This option corresponds to the following parameter setting: NSR_NUMBER_LOGS = <i>number_of_logs</i>
<b>-L</b> <i>number_of_logs</i>	Specifies the number of transaction log files that the NML software retrieves in advance from the NetWorker server when it is applying logs to the restored Lotus database. Setting this option can improve performance. The value of <i>number_of_logs</i> is typically in the range of 2 to 5. (This option is specified with an uppercase L.) This option corresponds to the following parameter setting: NSR_PREFETCH_LOGS = <i>number_of_logs</i>



Table B-2 Options for the nsrnotesrc command (Sheet 2 of 3)

Option	Description
-N	Specifies that the Notes API is <i>not</i> initialized during a disaster recovery. This option corresponds to the following parameter setting: NSR_NO_NOTES_INIT = TRUE
-p <i>log_dirpath</i>	Specifies the complete pathname of the log directory of a partitioned Domino server for disaster recovery <i>only</i> . Use this option with the -l (lowercase l) option . (This option is specified with a lowercase p.) This option corresponds to the following parameter setting: NSR_LOG_DIR = <i>log_dirpath</i>
-s <i>server_name</i>	Specifies the hostname of the NetWorker server from which the backup is restored. This option corresponds to the following parameter setting: NSR_SERVER = <i>server_name</i>
-t <i>time</i>	Specifies the backup time (in <i>nsr_getdate</i> format) of the database to be restored. For a logged database, the time may be at any point, even at a point between backups. By default, NML recovers the most recent database backup. The option is <i>mandatory</i> and must precede the names of files to restore, or the restore <i>fails</i> . (This option is specified with a lowercase t.) This option corresponds to the following parameter setting: NSR_RECOVER_TIME = <i>time</i>
-X	Specifies that the transaction logs are <i>not</i> applied to the restored Lotus files. This option corresponds to the following parameter setting: NSR_APPLY_LOGS = FALSE
-z <i>config_filepath</i>	Specifies the complete pathname of the NML configuration file. The file can be used for both regular recovery and disaster recovery. (This option is specified with a lowercase z.)
-Z	Assigns a new DBIID to the restored database. To assign <i>both</i> a new DBIID and a new replica ID to the restored database, use -ZZ instead of -Z. (This option is specified with an uppercase Z.) This option corresponds to the following parameter setting: NSR_DBIID = <i>DBIID_or_replicaID</i>

Table B-2 Options for the nsrnotesrc command (Sheet 3 of 3)

Option	Description
NOTES	Specifies that all the Notes data associated with the client is recovered, including linked databases and directories. This option is <i>not</i> used with partitioned Domino servers or multiple Domino server installations on UNIX. This option corresponds to the following parameter setting: NSR_BACKUP_PATHS = NOTES: To recover specific directories or files, use <i>path&lt;x&gt;</i> instead of <b>NOTES</b> .
[NOTES:] <i>path&lt;x&gt;</i>	For recovery, specifies the complete pathname of a Lotus directory or file or pathnames of both. To specify multiple files or directories for recovery, separate <i>path&lt;x&gt;</i> entries with a space. In previous releases of the NML software, the <i>path</i> entry had to be prefixed with <b>NOTES:</b> ( <b>NOTES:</b> <i>path</i> ). This syntax is still supported but no longer required. This option corresponds to (and takes precedence over) the following parameter setting: NSR_BACKUP_PATHS = [NOTES:] <i>path1</i> , [NOTES:] <i>path2</i>

## The nsrdocr command document-level recovery command

The **nsrdocr** command invokes the NML document-level recovery program. All the command options are optional *except* for the mandatory **-p** and **-t** options.

All the **nsrdocr** command options *except* the **-p** and **-z** option are supported for backwards compatibility *only*. Most of the options correspond to Lotus restore parameters that can be set in the NML configuration file on the destination client.

To specify the settings for an NML document-level recovery, it is preferable to use the corresponding parameters in the configuration file (specified by the **-z** option) *instead* of the **nsrdocr** command options. [Appendix A, “NML Configuration File”](#) provides details on the configuration file.

The **nsrdocr** command uses the following syntax:

```
nsrdocr -z config_filepath

nsrdocr [-c client_name] [-d temporary_dirpath]
-p database_path [-s server_name] -t time
```

[Table B-3 on page B-11](#) describes the options for the **nsrdocr** command.

Table B-3 Options for the nsrdocr command

Options	Description
<b>-c</b> <i>client_name</i>	Specifies the name of the NetWorker client file index to browse or the hostname of the source client where the database file (containing the documents) originated. This option corresponds to the following parameter setting: NSR_CLIENT = <i>client_name</i>
<b>-d</b> <i>temporary_dirpath</i>	Specifies the complete pathname of a temporary directory to recover to. The default directory is <i>/nsr/applogs</i> . This option corresponds to the following parameter setting: NSR_RELOCATION_DEST = <i>temporary_dirpath</i>
<b>-p</b> <i>database_path</i>	Specifies the complete pathname of the database whose deleted documents are to be recovered, where <i>database_path</i> is case-sensitive. This option corresponds to the following parameter setting: NSR_BACKUP_PATHS = <i>database_path</i>
<b>-s</b> <i>server_name</i>	Specifies the hostname of the NetWorker server from which the documents are recovered. This option corresponds to the following parameter setting: NSR_SERVER = <i>server_name</i>
<b>-t</b> <i>time</i>	Specifies the time up to which the documents are recovered. The <i>time</i> value must be either "now" (without the quotes, indicating the current time) or the time in <b>nsr_getdate</b> format. (This option is specified with a lowercase t.) For the document-level recovery, NML performs the following: 1. Restores the latest full backup prior to the time specified by <i>time</i> , to the temporary area. 2. Only if transactional logging is enabled on the Domino server, applies the transaction logs up to the time specified by <i>time</i> . This option corresponds to the following parameter setting: NSR_RECOVER_TIME = <i>time</i>
<b>-z</b> <i>config_filepath</i>	Specifies the complete pathname of the NML configuration file. (This option is specified with a lowercase z.)



---

This appendix provides troubleshooting information to help you configure and use the NetWorker Module for Lotus (NML) software, and information about message logs that can help in debugging and resolving problems.

This appendix includes the following sections:

- ◆ [Displaying NML version information](#) ..... C-2
- ◆ [NML log files](#) ..... C-3
- ◆ [NetWorker log files](#) ..... C-4
- ◆ [Troubleshooting the NML software](#) ..... C-4

## Displaying NML version information

This section describes how to display version information for the NML binaries.

### How to display version information on UNIX or Linux

To display NML version information on UNIX or Linux, enter one of the following commands, where *filename* is the complete pathname of the binary **nsrnotesv**, **nsrnotesrc**, or **nsrdocrc**:

- ◆ On UNIX:

```
what filename | more
```

- ◆ On Linux:

```
strings filename | grep "@(#)"
```

For example, the following command displays version information for the **nsrnotesv** binary on Solaris:

```
what /usr/sbin/nsrnotesv
```

```
/usr/sbin/nsrnotesv:
  Module Name:  EMC Legato NetWorker Module for Lotus
  Module Vers:  3.0
  Product:      NetWorker
  Release:      LNMs_H1_2005.Build.281
  Build number: 281
  Build date:   Thu Jan 12 21:08:42 2006
  Build arch.:  solaris7n
  Build info:   DBG=0,OPT=-O3 -fno-strict-aliasing
  SunOS 5.7 Generic October 1998
```

To display the NML version number, enter the appropriate command for the operating system:

- ◆ On AIX:

```
lslpp -L all | grep -i lgtonml
```

- ◆ On Linux:

```
rpm -qa | grep -i lgtonml
```

- ◆ On Solaris:

```
pkginfo -l LGTONml
```

---

## How to display version information on Windows

To display NML version information on Windows:

1. Open Windows Explorer and locate the following NML binaries:
  - **nsrdoclb.dll**
  - **nsrdocrc.exe**
  - **nsrnotesrc.exe**
  - **nsrnotesv.exe**
  - **nwbml.exe**
2. Right-click each file and select **Properties**.
3. In the **Properties** dialog box, select the **Version** tab to display the version information.

---

## NML log files

In the backup catalog file on the Domino or Notes host, NML records information about each file backed up. The NSR\_CATALOGFILE parameter specifies the complete pathname of the backup catalog file.

- ◆ If the specified file *cannot* be accessed, NML attempts to write the information to the NetWorker applog file on the client.
- ◆ If the NetWorker applog file cannot be accessed, NML writes the information to /tmp/applog (UNIX and Linux) or C:\Temp\applog (Windows), by default.

[Example 2-1 on page 2-15](#) provides more information on the backup catalog file.

In the debug log file on the Domino or Notes host, NML records debug information and error messages generated during backups and recovery.

- ◆ The NSR\_DEBUG\_FILE parameter specifies the complete pathname of the debug log file.
- ◆ The NSR\_DEBUG\_LEVEL parameter specifies the level of debug information recorded in the log file.

[“NML error messages” on page D-2](#) provides more information on the debug log file.

The NML software uses an additional log file, `xbsa.messages`, on the NML client to record messages generated by the NetWorker X/Open Backup Services Application (XBSA) library, as described in [“NetWorker XBSA error messages” on page D-8](#).

---

## NetWorker log files

The following NetWorker log files can be useful in diagnosing and troubleshooting problems:

- ◆ `daemon.log`
- ◆ `messages`
- ◆ `savegrp.log` (on Windows)

The *NetWorker Administration Guide* provides more information on the NetWorker log files.

---

## Troubleshooting the NML software

This section contains troubleshooting tips for issues encountered with the NML software.

---

### Updating NML if NetWorker client files are relocated

The NML 3.0 software must be installed in the same directory as the NetWorker client software. If the NetWorker software on the NML client is updated and the NetWorker client software directory is changed to a different location, the NML software must also be uninstalled and reinstalled to that directory, according to the instructions in the *NetWorker Module for Lotus, Release 3.0, Installation Guide*.

---

### Backing up a large number of database files

To allow the NML software to back up a large number of database files, configure the maximum shared memory to at least 100 MB. The amount of memory required depends on the applications running on the computer.

Reboot the computer after making these changes.



**Example C-1** Increasing shared memory segments

On a Solaris computer, add the following lines to the `/etc/system` file to increase shared memory segments. The following lines set the maximum size of the shared memory identifier to 100 MB, with 100 possible shared memory identifiers.

```
set shmsys:shminfo_shmmax=104857600
set shmsys:shminfo_shmmin=1
set shmsys:shminfo_shmmni=100
set shmsys:shminfo_shmseg=10
```

Additional instructions on configuring shared memory are provided in the computer's operating system documentation.

**Unreadable messages from Domino Recovery Manager**

If the configuration of the Lotus resource directory is incorrect on UNIX or Linux, the messages from the Domino Recovery Manager do *not* appear properly during the recovery of Lotus databases with the NML software.

To resolve this problem:

1. Check the locale of the shell where Domino is running. For example, on Solaris with the zh locale enabled:

**locale**

```
LANG=zh
LC_CTYPE="zh"
LC_NUMERIC="zh"
LC_TIME="zh"
LC_COLLATE="zh"
LC_MONETARY="zh"
LC_MESSAGES="zh"
LC_ALL=
```

2. Check the content of the Lotus resource directory to see if the directory for the specified locale exists. For example:

```
cd /opt/lotus/notes/latest/solaris/res
ls -l

total 4
drwxr-xr-x  2 root  other  1536 Jan 6 15:21 C
```

3. Perform *either* of the following:

- If the specified locale does exist in the Lotus resource directory, go to step 4.
- If the specified locale does *not* exist, log in as root and create a new directory by copying the current directory and using the correct name. For example:

```

su
Password: password
cp -
pr /opt/lotus/notes/latest/solaris/res/
   C /opt/lotus/notes/latest/solaris/res/zh
ls -l

total 8
drwxr-xr-x  2 root  other  1536 Jan 6 15:21 C
drwxr-xr-x  2 root  other  1536 Jan 6 15:21 zh
    
```

4. Add the full path of the new directory to the PATH parameter for the user that performs the backup and recovery.

---

### Specifying options with spaces

To back up or recover database files where there are spaces in the values for options (including filepaths, time settings, group names, and pool names) add quotation marks around each option value. For example:

```

nsrnotesrc -s NetWorker_server -t "Wed December 21 2005
14:23" /lotusdata/accounting_2005.nsf
nsrnotesv -z config_filepath "C:\notes\Monday bkup.txt"
    
```

---

### "Invalid Time Specified" error

If you attempt to restore files by using the European date format (*dd/mm/yy*), an "Invalid Time Specified" error appears. The **nsrnotesrc** command is unable to interpret European date formats. When restoring files with the **nsrnotesrc** command, the date specified for the NSR\_RECOVER\_TIME parameter or **-t** option must be in American format (*mm/dd/yy*).

For example, to restore files from a save set that is timestamped 08/26/05 15:08:34:

1. Ensure that the NML configuration file contains the following parameter settings:

```
NSR_BACKUP_PATHS = /notes/names.nsf
NSR_RECOVER_TIME = "08/26/05 15:08:34"
NSR_SERVER = spain
```

2. Enter the **nsrnotesrc** command to perform the recovery:

```
nsrnotesrc -z config_filepath
```

---

## Ad hoc backup error on a partitioned Domino server

If you attempt an ad hoc backup on an unspecified partitioned Domino server, the following error appears:

```
The call to NotesInitExtended failed: 421
(notes_sess_open|1235|7890|203)
```

This means the Lotus Notes API cannot find the notes.ini path in the current PATH parameter or environment variable.

To specify the partitioned server data directory, set the NSR\_LOTUS\_DATA\_DIR parameter in the NML configuration file. [“Ad hoc backups of partitioned Domino servers” on page 7-4](#) provides details on ad hoc backups of partitioned Domino servers.

---

## Backup failure caused by time conversion

An NML backup fails when there is a problem with the time conversion or when opening the file to obtain the modification times.

- ◆ On Windows, the date and time formats (including DateOrder and DateSeparator) are read from the country settings specified on the operating system level.
- ◆ On UNIX and Linux, the Domino server ignores these settings in the locale that would affect the format used to display a date or time or both, and instead uses defaults that are coded in the appropriate .res files.

The following notes.ini settings on the Domino server can be used to overwrite these defaults:

- ◆ DateOrder — May be set to DMY , YMD , MDY
- ◆ ClockType — May be set to 24\_HOUR

- ◆ DateSeparator — May be set to an arbitrary string and may be longer than one character, if required.
- ◆ TimeSeparator — May be set to an arbitrary string and may be longer than one character, if required.

Additional information is provided in the Domino Administrator Help.

---

### Restore problem due to NSR\_BACKUP\_PATHS on a partitioned Domino server

If the restore parameter NSR\_BACKUP\_PATHS is set to the value NOTES: for a partitioned Domino server or multiple Domino installations on a single UNIX host, the NML software attempts to restore the data for all the partitions or Domino installations, which can cause data corruption. [“NSR\\_BACKUP\\_PATHS” on page A-12](#) provides more information about the restore parameter.

---

### Failure of a document-level recovery on a remote Domino server

The NML software does *not* support document-level recovery on a remote Domino server through the **nsrdocr** command.

On Windows only, the NML software supports document-level recovery of selected (modified) and deleted Notes documents on a remote Domino server through the Notes client program.

If a remote document-level recovery through the Notes client program fails with an "Authentication failure" error, ensure that:

- ◆ The user that runs the Notes client on the local host is:
  - Listed in the Remote Access attribute in the NetWorker Client resource of the remote Domino server.
  - Granted administrative privileges on the remote Domino server.
- ◆ A NetWorker Client resource is configured on the same NetWorker server for the host where the Notes client program runs.

---

This appendix provides information on common error messages that might be encountered while using the NetWorker Module for Lotus (NML) software and the resolutions for the errors.

This appendix includes the following sections:

- ◆ [NML error messages](#) .....D-2
- ◆ [NetWorker XBSA error messages](#) .....D-8

## NML error messages

Error messages are generated by all the NML backup and recovery programs, **nsrnotesv**, **nsrnotesrc**, and **nsrdocrc**. If the parameter **NSR\_DEBUG\_LEVEL** is set to a non-zero value, error messages and debug messages are recorded in the debug log file whose complete pathname is specified by the parameter **NSR\_DEBUG\_FILE** in the NML configuration file.

**Note:** The log file specified by **NSR\_DEBUG\_FILE** does *not* have to exist, but the complete directory path of the file must exist. [“NSR\\_DEBUG\\_FILE” on page A-7](#) provides details on the log file.

When **NSR\_DEBUG\_FILE** is set, the NML programs log all debug messages to the log file. Use of the debug log file is especially important for scheduled NML backups because most of the stderr information from a scheduled backup is discarded.

Child processes log the messages to the same file as the parent process. Each message in the log file is tagged with the process ID of the process that wrote the message.

The debug level specified by the parameter **NSR\_DEBUG\_LEVEL** controls the amount of debug information written to the log file. All non-zero debug levels include operational messages and error messages.

[“NSR\\_DEBUG\\_LEVEL” on page A-8](#) provides information on the supported debug levels.

The NetWorker server also writes diagnostic information from ad hoc and scheduled backups to specific log files on the NetWorker server. The *NetWorker Administration Guide* provides information on the NetWorker log files.

---

### Error message format

When an NML command option is set incorrectly, the NML software generates a message that describes the correct ways to set the option.

#### Example D-1

Error message due to an incorrect NML command option

The following error message is generated when an invalid value is specified with the **nsrnotesrc -s** option:

```
nsrnotesrc -s server1
The NW server name 'server1' is not valid.
```

The NW server parameter (Shell: -s, File: NSR\_SERVER, Env: NSR\_SERVER) parameter specifies the hostname of the machine to use as the NW server. The hostname must contain a valid NW server installation and it must be visible on the network.

The specific error received was:  
The NW server name 'server1' is not a valid hostname.  
(lnm\_parm\_value|10|15|0)

In this example, the error message contains the string, (Shell: -s, File: NSR\_SERVER, Env: NSR\_SERVER), that lists the correct ways to set the option value:

- ◆ Shell specifies the correct command option.
- ◆ File specifies the correct parameter in the configuration file.
- ◆ Env specifies the correct environment variable.

The NML programs generate error messages in the following format:

*error\_message\_text (function\_name | error\_type | error\_code | error\_number)*

where:

- ◆ *error\_message\_text* is the text of the NML error message, as shown in the following tables:
  - [Table D-1, "NML backup error messages," on page D-4](#)
  - [Table D-2, "NML recovery error messages," on page D-5](#)
  - [Table D-3, "Error messages about the NML configuration file," on page D-7](#)
- ◆ *function\_name* is the name of the NML function that generated the error message.
- ◆ *error\_type, error\_code, error\_number* are internal numbers representing an error type or code to report to technical support, reached at <http://softwaresupport.EMC.com>.

Certain fields might be null or 0 if the information was not available at the time the error message was generated.

NML error messages can be grouped into three categories, according to the type of message generated:

- ◆ ["Error messages from NML backups" on page D-4](#)
- ◆ ["Error messages from NML recoveries" on page D-5](#)
- ◆ ["Error messages from the NML configuration file" on page D-7](#)

## Error messages from NML backups

**Table D-1 on page D-4** lists errors messages generated during an NML backup, in alphabetical order.

**Note:** The error messages listed here are those that require additional explanation.

Table D-1 NML backup error messages (Sheet 1 of 2)

Error message	Description
A NW server with a NSR client resource for <i>hostname</i> could not be located on the network.	The NML software cannot access the NetWorker server for the backup. To resolve the error, ensure that the NetWorker server name is spelled correctly and the server contains a Client resource for the NML client.
Could not open file: <i>filename</i> .	The NML software cannot open the file to back it up. To resolve the error, ensure that the file has the correct permissions.
Directory link points to its own directory.	The NML software has detected a circular link. To resolve the error, delete the directory link file or correct the path set in the file.
Duplicate entry: <i>file_pathname</i> . Ignoring.	The NML software is not adding another entry for the file to the backup list because the file is already on the list. This is an informational message only, and does <i>not</i> require a resolution.
Either nothing was specified to backup or system is down.	The NML software cannot derive a list of files to back up. To resolve the error, ensure that the ad hoc or scheduled backup is configured and performed correctly, according to the instructions in this administration guide.
Error finding last backup instance for <i>filename</i> ; error = <i>error_description</i> .	The NML software cannot find an existing backup for the file, and performs a full backup of the file. This error typically occurs during an incremental backup. To resolve the error, ensure that the NetWorker server is up and accessible to the Lotus user on the client computer.
Failed to build exclude list, ignoring exclude list entries.	The NML software cannot correctly process the file specified with the NSR_EXCLUDE_FILE parameter, so nothing is excluded from the backup. To resolve the error, ensure that the exclude list file has the correct format.
Failed to open directory link file: <i>filename</i> , errno = <i>error_number</i> .	The NML software cannot open the file. To resolve the error, ensure that the file has the correct pathname or permissions or both.
Failed to open exclude list file, errno = <i>error_number</i> .	The exclude list file does not exist or does not have the correct access permissions. To resolve the error, ensure the following: The correct pathname is specified for the exclude list file with the NSR_EXCLUDE file parameter (or the <b>-E</b> option of the <b>nsrnotesv</b> command). The exclude list file has the correct permissions.



Table D-1 NML backup error messages (Sheet 2 of 2)

Error message	Description
<i>pathname</i> is not a directory.	The <i>pathname</i> contained in the Domino directory link (.dir) file is not a directory. To correct the error, delete the .dir file from the directory if it is not used.
The call to NotesInitExtended failed: <i>Notes_API_error_number</i> .	The NML software cannot initialize the Notes session. To resolve the error, locate the error message for the given <i>Notes_API_error_number</i> and perform the appropriate corrective action.
The LoadLibrary() call failed.	The NML software cannot find or load the libnotes.xx or nnotes.dll library file. To resolve the error, ensure that the Notes_ExecDirectory parameter is set to the directory path containing the Lotus library.
The password file lookup for the user <i>Notes_user</i> failed. The user name may be invalid.	An invalid Notes user is specified with the LOTUSUSER parameter. To resolve the error, ensure that the LOTUSUSER parameter specifies the name of a Lotus Notes user that is running the server to be backed up.
The ReadFile() call failed.	The NML software cannot read the contents of a file to be backed up. To resolve the error, ensure that the file is a readable file.

## Error messages from NML recoveries

[Table D-2 on page D-5](#) lists errors messages generated during an NML recovery, in alphabetical order.

**Note:** The error messages listed here are those that require additional explanation.

Table D-2 NML recovery error messages (Sheet 1 of 2)

Error message	Description
A NW server with a NSR client resource for <i>hostname</i> could not be located on the network.	The NML software cannot access the NetWorker server for the recovery. To resolve the error, ensure that the NetWorker server name is spelled correctly and the server contains a Client resource for the NML client.
Full backup not found, cannot recover without full backup <i>filename</i> .	The NML software cannot find a full backup for the file in the NetWorker index. To resolve the error, ensure that the path for the <i>filename</i> matches the case-sensitive path in the NetWorker index.

Table D-2 NML recovery error messages (Sheet 2 of 2)

Error message	Description
No objects found for recover.	<p>Either nothing is specified for recovery or the specified items have been removed from the recovery list.</p> <p>To resolve the error, perform one of the following:</p> <ul style="list-style-type: none"> <li>Specify the required items for recovery.</li> <li>Set the parameter NSR_RELOCATION_DEST to enable in-place recovery, or set NSR_RECOV_INTERACT to y or r to enable renaming of the file.</li> </ul>
The call to NotesInitExtended failed: <i>Notes_API_error_number</i> .	<p>The NML software cannot initialize the Notes session.</p> <p>To resolve the error, locate the error message for the given <i>Notes_API_error_number</i> and perform the appropriate corrective action.</p>
The list of items to recover includes Notes databases. The NSR_NO_NOTES_INIT (-N) parameter cannot be used when recovering Notes databases.	<p>The NSR_NO_NOTES_INIT parameter (or -N option of the <b>nsrnotesrc</b> command) is specified during a database recovery.</p> <p>To resolve the error, specify either the NSR_NO_NOTES_INIT parameter or a list of databases (<i>not</i> both) for the recovery. The NSR_NO_NOTES_INIT parameter is used for a disaster recovery only.</p>
The LoadLibrary() call failed.	<p>The NML software cannot find or load the libnotes.xx or nnotes.dll library file.</p> <p>To resolve the error, ensure that the Notes_ExecDirectory parameter is set to the directory path containing the Lotus library.</p>
The log directory may only be <i>number</i> characters in length.	<p>The log directory pathname specified with the NSR_LOG_DIR parameter is too long.</p> <p>To resolve the error, specify a different (shorter) pathname with the NSR_LOG_DIR parameter.</p>
The recover time '-t' was either not specified or contained an invalid value.	<p>During a document-level recovery, the mandatory -t option is not correctly specified with <b>nsrdocrc</b> command.</p> <p>To resolve the error, specify the -t <i>time</i> option correctly by using the <b>nsr_getdate()</b> format for the time. To recover the backup to the current time, use the -t <b>now</b> option.</p>

## Error messages from the NML configuration file

Table D-3 on page D-7 lists errors messages generated about the NML configuration file, in alphabetical order. Appendix A, “NML Configuration File” provides more details on the configuration file, including the syntax rules and parameters.

Table D-3 Error messages about the NML configuration file

Error message	Description
An '=' in a NAME=VALUE pair was expected on line <i>line_number</i> . The symbol <i>symbol_name</i> was obtained instead.	An equal sign (=) is missing from the line designated by <i>line_number</i> in the configuration file. A parameter setting must be in one of the following formats: <i>parameter_name</i> = <i>value</i> <i>parameter_name</i> = <i>value1, value2, value3</i>
An extra '=' sign was found while reading the values for the <i>parameter_name</i> parameter on line <i>line_number</i> . If you would like the '=' sign to be part of a value please enclose it in quotes.	An extra equal sign (=) is included on the line designated by <i>line_number</i> in the configuration file. A parameter setting must be in one of the following formats: <i>parameter_name</i> = <i>value</i> <i>parameter_name</i> = <i>value1, value2, value3</i>
End of file was reached. There is no closing '}'.	A close brace (}) is missing from the end of the configuration file. A block of parameters started by the keyword LOTUS must be terminated by a close brace.
Expected a '{' on line <i>line_number</i> . Instead the symbol <i>symbol_name</i> was found	An open brace (}) is missing from the line designated by <i>line_number</i> in the configuration file. The keyword LOTUS must be followed by an open brace.
Expected the tokens 'LOTUS' or 'DB2' on line <i>line_number</i> . Instead the symbol <i>symbol_name</i> was found.	The required LOTUS keyword is missing from the line designated by <i>line_number</i> in the configuration file. A block of parameters must start with the keyword LOTUS.
The <i>parameter_name</i> parameter specification ends in a comma. However, a '}' was found on line <i>line_number</i> indicating the end of the parameter block. Please remove the comma or add another value to the parameter <i>parameter_name</i> .	An extra comma is included on line designated by <i>line_number</i> in the configuration file. A parameter setting must be in one of the following formats: <i>parameter_name</i> = <i>value</i> <i>parameter_name</i> = <i>value1, value2, value3</i>

Table D-3 Error messages about the NML configuration file

Error message	Description
The specification for parameter <i>parameter_name</i> in the block that ends on line <i>line_number</i> contains no values. Please add a value, remove the parameter from the file or comment it out with a '#'.	A required parameter value is missing from the parameter block that ends on the line designated by <i>line_number</i> in the configuration file.
Two values were specified without a ',' to separate them on line <i>line_number</i> .	A comma is missing from between parameter values on the line designated by <i>line_number</i> in the configuration file. Multiple parameter values must be in the following format: <i>parameter_name = value1, value2, value3</i>

## NetWorker XBSA error messages

During a backup or recovery, the NML software attempts to record messages generated by the NetWorker X/Open Backup Services Application (XBSA) library to the file specified by the parameter `NSR_DEBUG_FILE` in the NML configuration file.

The XBSA messages are printed only when the `NSR_DEBUG_LEVEL` parameter is set to the value 8. [Appendix A, “NML Configuration File”](#) provides details on the configuration file.

If the assigned location is invalid or unreachable, the message is written to one of the following locations:

- ◆ The alternate messages directory created during installation:
  - `NetWorker_install_dir\nsr\applogs` on Windows
  - `/nsr/applogs` on UNIX or Linux
- ◆ The temporary directory.

NetWorker XBSA error messages appear in the format:

*function\_name:BSA\_RC\_message\_code:error\_message\_text*

Table D-4 on page D-9 lists the error messages produced by the NetWorker XBSA library.

Table D-4 NetWorker XBSA error messages (Sheet 1 of 2)

Error message	Description
BSA_RC_ABORT_ACTIVE_NOT_FOUND No active object matched the name that was specified for a BSAObjectInactive	Indicates that no active object matching the given search parameters was found on the NetWorker server being used by the NML session.
BSA_RC_ABORT_SYSTEM_ERROR System detected error due to <i>explanation</i> . Operation aborted	Indicates one of the following: <ul style="list-style-type: none"> <li>• A general system error has occurred within an NML function call.</li> <li>• A lack of disk space has been detected.</li> </ul>
BSA_RC_APP_OBJECTOWNER_TOO_LONG The appObjectOwner field contained too many characters ( $n > n$ )	Indicates that the appObjectOwner parameter contains too many characters and may be corrupt.
BSA_RC_AUTHENTICATION_ERROR There was an authentication failure for ObjectOwner <i>ownername</i>	Indicates that the routine failed to authenticate a BSAObjectOwner with the NetWorker server used by the NML session.
BSA_RC_BAD_CALL_SEQUENCE The sequence of API calls is incorrect. Must call <i>item1</i> before <i>item2</i>	Indicates that an API call sequence was made that does not conform to the NetWorker Module Data Movement API State Diagram document.
BSA_RC_BAD_HANDLE The handle used to associate this call with a previous BSAInit() call is invalid because <i>explanation</i>	Indicates that the value passed into the function for bsaHandle contained a null pointer.
BSA_RC_BAD_PARAMETER received parameter <i>parm</i> with value, which is invalid	Indicates that an invalid parameter was received.
BSA_RC_BSA_OBJECTOWNER_TOO_LONG The bsaObjectOwner parameter contains too many characters and may be corrupt	Indicates that the appObjectOwner parameter contains too many characters and may be corrupt.
BSA_RC_BUFFER_TOO_SMALL Buffer is too small to hold the object entry to be returned. <i>n</i> bytes required for the object entry	Indicates the buffer is too small to hold the object entry to be returned.
BSA_RC_COPYGpname_TOO_LONG The copyGpname field contained too many characters ( $n > n$ )	Indicates the copyGpname parameter contains more than BSA_MAX_COPYGNAME characters and the structure could not be used for the requested operation.
BSA_RC_DESCRIPTION_TOO_LONG The description field contained too many characters ( $n > n$ )	Indicates the Description field in one of the supplied structures contained more than the BSA_MAX_DESC characters and the structure could not be used for the requested operation.
BSA_RC_INVALID_COPYTYPE The copyTypes parameter contained an unrecognized value of <i>n</i>	Indicates the copyTypes parameter contains a structure with values not contained within the NetWorker Module libraries.

Table D-4 NetWorker XBSA error messages (Sheet 2 of 2)

Error message	Description
BSA_RC_INVALID_DATABLOCK The dataBlock parameter contained inconsistent values: bufferLength: <i>n</i> , bufferPtr: <i>n</i> , numBytes: <i>n</i>	Indicates that the fields of a supplied dataBlock parameter are not consistent.
BSA_RC_INVALID_KEYWORD an entry in the environment structure is invalid ( <i>variable=value</i> )	Indicates that one of the environment strings passed into the function did not have a valid structure.

---

This glossary contains terms and definitions found in this guide. Most of the terms are specific to the NetWorker Module for Lotus (NML) software. The *NetWorker Administration Guide* provides information on terms specific to the NetWorker software.

### A

- active-active configuration** One of the two types of cluster configurations that NML software supports. In the configuration, each node has a Domino server on it, and the node is able to take over if other nodes in the cluster fail. See also “[active-passive configuration](#)”.
- active-passive configuration** One of the two types of cluster configurations that NML software supports. In the configuration, the Domino server runs on the active physical node. Other nodes are passive nodes that wait to take over if the active node fails. See also “[active-active configuration](#)”.
- ad hoc backup** A type of backup that a user initiates through the backup program on the NetWorker client. The user specifies participating files, file systems, and directories. An ad hoc backup does *not* generate a “[bootstrap](#)” save set. Ad backups may also be referred to as manual or unscheduled backups.
- administrator** The person that typically installs, configures, and maintains the NetWorker software.
- Administrators group** Windows user group whose members 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. Only members of the

Administrators group can modify Windows operating system files, maintain the built-in groups, and grant additional rights to groups.

**API** An abbreviation for application programming interface, a standard set of computer library routines designed to accomplish a particular set of tasks.

**attribute** A feature of a NetWorker resource. It is a service or information that the “resource” provides.

**autochanger** A 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 backup and recovery. The term autochanger is synonymous with autoloader, carousel, datawheel, jukebox, library, and near-line storage.

## B

**backup** The writing of saved data to a volume.

**backup group** See “[group](#)”.

**backup level** See “[level](#)”.

**backup volume** See “[volume](#)”.

**bootstrap** A save set that is essential for NetWorker disaster recovery procedures. The bootstrap is composed of three components that reside on the NetWorker server: the media database, the resource database, and a server index.

**browse policy** The policy that determines how long entries for backed-up data are retained in the online NetWorker client file index.

## C

**client** A computer that accesses the NetWorker server to back up or recover files. Clients may be workstations, computers, or file servers.

**client file index** A database of information maintained by the NetWorker server that tracks every data object, file, or file system backed up. The NetWorker server maintains a single client index file for each client computer.



<b>cluster</b>	Two or more nodes that are connected and appear to network users as a single high-availability system. A high-availability system allows the application services to continue despite most hardware or software failures. See also <a href="#">“high-availability system”</a> .
<b>command line</b>	The shell prompt, where you enter commands.
<b>D</b>	
<b>database</b>	The database instance of a third-party <a href="#">“DBMS”</a> vendor. NML backs up and restores Lotus database files.
<b>DBIID</b>	Database Instance ID property of a database.
<b>DBMS</b>	An abbreviation for Database Management System, which refers to the primary architecture of a Lotus database.
<b>device</b>	<ul style="list-style-type: none"> <li>• A storage unit that reads from and writes to storage volumes (see <a href="#">“volume”</a>) during backups and recovery. A storage unit can be a tape device, optical drive, <a href="#">“autochanger”</a>, or file connected to the <a href="#">“server”</a> or <a href="#">“storage node”</a>.</li> <li>• When dynamic drive sharing (DDS) is enabled, refers to the access path to the physical drive.</li> </ul>
<b>destination client</b>	In a directed recovery, the computer to recover Lotus database files to. See <a href="#">“directed recovery”</a> .
<b>directed recovery</b>	A recovery of Lotus database files initiated from another computer where the NetWorker User for Lotus program is running. See also <a href="#">“remote recovery”</a> .
<b>document-level recovery</b>	Recovery of individual documents from a specified database.
<b>drive</b>	When dynamic drive sharing (DDS) is enabled, refers to the physical backup object, such as a tape drive, disk, or file. See also <a href="#">“device”</a> .
<b>E</b>	
<b>enabler code</b>	A special code provided by EMC that activates the software. A base enabler is the enabler code that unlocks the base features for the purchased software. An add-on enabler is an enabler code for an additional feature or product (for example, autochanger support).

**F**

- file index** See “[client file index](#)”.
- file system**
- A file tree on a specific disk partition or other mount point.
  - The entire set of all files.
  - A method of storing files.
- fileserver** A computer with disks that provides services to other computers on the network.
- firewall** A system designed to prevent unauthorized access to or from a private network. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria. There are several types of firewall techniques. The NetWorker software supports client backups from computers that are protected by packet filtering.
- full backup** See “[level](#)”.

**G**

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

**H**

- high-availability system** A system that allows the application services to continue despite a hardware or software failure. Each cluster node has its own IP address. Each cluster node also has private (local) resources or disks that are available only to that computer.

**I**

- incremental backup** See “[level](#)”.
- instance** The combination of Lotus processes that runs when a database starts up.

**L**

- level** A measurement that determines how much data NetWorker software saves during a scheduled or ad hoc backup.
- A *full* backup includes all files, regardless of when they last changed.
  - An *incremental* backup includes only files that have changed since the last backup.

**M**

- manual backup** See “[ad hoc backup](#)”.
- media** The physical storage medium to which backup data is written. NetWorker software supports tape, magnetic or optical disk, and file systems as backup media. See also “[volume](#)”.
- media database** A database that contains indexed entries about the storage volume location and the life cycle status of all data and volumes the NetWorker server manages. See also “[volume](#)”.

**N**

- NetWorker** An EMC network-based software product to back up and recover file systems.
- NetWorker client** See “[client](#)”.
- NetWorker Module for Lotus** The NetWorker add-on module for the NetWorker server software that enables backups and restores of supported Lotus Domino and Notes databases. See also “[NML](#)”.
- NetWorker server** See “[server](#)”.
- NetWorker storage node** See “[storage node](#)”.
- NML** An abbreviation for NetWorker Module for Lotus.
- notification** A message generated and sent to the NetWorker administrator about important NetWorker events.

## O

- offline backup** A backup of Lotus database objects performed while the corresponding instance is shut down and unavailable to users.
- online backup** A backup of Lotus database objects performed while the corresponding instance is running and available to users.
- online indexes** The databases located on the NetWorker server that contain all the information pertaining to the client backups (“[client file index](#)”) and backup volumes (“[media database](#)”).
- operator** The person who monitors the server status, loads backup volumes into the server devices, and otherwise executes day-to-day tasks by using NetWorker software.

## P

- parallelism** A NetWorker feature that enables the backup or restore of save sets from several clients or many save sets from one client at the same time.
- pathname** A set of instructions to the operating system for accessing a file.
- An *absolute pathname* indicates how to find a file starting from the root directory and working down the directory tree.
  - A *relative pathname* indicates how to find a file starting from where you are now.
- performing client** The computer where you initiate a directed recovery by using the NetWorker User for Lotus program. See “[directed recovery](#)”.
- physical host** Any one of the nodes (or computers) that form a cluster.
- policy** A set of constraints that specify how long an entry is retained in an online NetWorker index. When a policy expires, the save sets associated with that policy are marked recyclable. For an NML backup, the NetWorker Client resource specifies two policies, a browse policy and a retention policy. For more information, refer to the **nsr\_policy (5)** man page or the *NetWorker Command Reference Guide*.
- pool** A feature that enables you to sort backup data to selected volumes. A pool contains a collection of backup volumes to which specific data has been backed up.

**preconfigured** Existing selections or configurations for different NetWorker features.

## R

- recover**
- A recovery method that re-creates an image of the client file systems and database on the NetWorker server.
  - A Lotus datafile recovery method that uses Lotus commands to apply transactional logs to make the database consistent.

**recyclable save set** A save set whose browse and retention policies have been reached. As a result, the save set has been removed from the media database.

**recyclable volume** A volume whose data has passed both its browse and retention policies and is now available for relabeling and use by a NetWorker server or storage node.

**remote recovery** A directed recovery where the Lotus database files are recovered to the source client, which is the *same* computer as the destination client. The remote recovery is initiated from the performing client, which is a *different* computer.

**resource** A component of the NetWorker server configuration that describes the NetWorker server and its clients. Devices, schedules, clients, groups, and policies are examples of NetWorker resources. Each resource contains a list of attributes that define the parameters to use for the specific NetWorker resource.

**resource database** A database that contains information about each of the configured NetWorker server's resources.

**restore** The process of retrieving individual Lotus datafiles from backup storage and copying the files to disk.

**retention policy** A NetWorker policy that determines how long backup entries are retained in the media database and thus recoverable.

- root**
- On UNIX, the superuser account with the user name "root" and user ID. By extension, the privileged system maintenance login on any operating system.
  - On Windows, the top node of the system directory structure, which is the home directory of the root user.

**RPC** An abbreviation for remote procedure call, which is the protocol that the NetWorker server uses to perform client requests over a network.

**S**

<b>save</b>	The NetWorker command that backs up client files to backup volumes and makes data entries in the client file index.
<b>save set</b>	A group of files or a file system from a single client computer backed up onto storage media through the NetWorker software.
<b>save set ID</b>	An internal identification number that NetWorker software assigns to a save set.
<b>save stream</b>	The data and save set information being written to a storage volume during a backup. A save stream originates from a single save set.
<b>scanner</b>	The NetWorker command used to read a backup volume when the online indexes are not available.
<b>scheduled backup</b>	A type of backup that is configured to start automatically at a specified time for a group of one or more NetWorker clients. A scheduled backup is configured through either the NML configuration wizard or the NetWorker Administrator program on the NetWorker server. A scheduled backup generates a <b>“bootstrap”</b> save set.
<b>server</b>	The computer on a network that runs the NetWorker server software, contains the online indexes, and provides backup and recovery services to the clients and storage nodes on the same network.
<b>server index</b>	A file that lists all the server files that were backed up during a scheduled backup.
<b>shared disk</b>	The storage disk that is connected between multiple nodes in the cluster.
<b>shell prompt</b>	A cue for input in a shell window where you enter a command.
<b>silo</b>	A repository for holding hundreds or thousands of volumes. Silo volumes are identified by barcodes, not by slot numbers.
<b>skip</b>	A backup level in which designated files are skipped and not backed up. See also <b>“level”</b> .
<b>source client</b>	In a directed recovery, the computer where the backup of the Lotus database files was performed. See <b>“directed recovery”</b> .

<b>ssid</b>	See “ <a href="#">save set ID</a> ”.
<b>stand-alone device</b>	A storage “ <a href="#">device</a> ” that contains a single drive for backing up data. Stand-alone devices cannot store or automatically load backup volumes.
<b>storage node</b>	A storage device physically attached to a computer other than the NetWorker server, whose backup operations are administered from the controlling NetWorker server.
<b>system administrator</b>	The person that typically installs, configures, and maintains the NetWorker software.
<b>U</b>	
<b>unscheduled backup</b>	See “ <a href="#">ad hoc backup</a> ”.
<b>user</b>	A person who uses NetWorker software from a computer to back up and recover files.
<b>V</b>	
<b>versions</b>	The date-stamped collection of available backups for any single file.
<b>volume</b>	A unit of storage media, such as a magnetic tape, an optical disk, or a file. A storage device reads from and writes to volumes, which can be physical units (for example, a labeled tape cartridge) or logical units (for example, optical media can store multiple volumes on a single physical platter).
<b>volume ID</b>	The internal identification that the NetWorker software assigns to a backup volume.
<b>volume name</b>	The name you assign to a backup volume when it is labeled.
<b>volume pool</b>	See “ <a href="#">pool</a> ”.
<b>zap</b>	Change the database instance ID or replica ID for a recovered database.





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