NetBackup™ for HCL Domino Administrator's Guide

for UNIX, Windows, and Linux

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COHESITY

NetBackup™ for HCL Domino Administrator's Guide

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- Log in to the Cohesity Support Portal to create a new case.
- Click the (**?**) icon on the Cohesity UI and select Support Portal.

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- To monitor your open cases, log in to the portal and click the **Cases** tab on the home page. This page should have all the case statuses and updates. You can also view individual case status.

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   Note: Cohesity cannot process hardware replacement requests for partner hardware.

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4. If needed, Cohesity Support can join a three-way call with the partner and the customer.
5. The customer informs Cohesity Support on the progress of the partner's case.

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Chapter 1

Introduction to NetBackup for Domino

This chapter includes the following topics:

- About the features for NetBackup for Domino
- About supported Notes database configurations
- About the Notes database files that can be backed up

About the features for NetBackup for Domino

NetBackup for Domino provides online backups and restores of Notes databases and individual mailboxes when Domino server has been installed. This capability is provided as an add-on or extension to the NetBackup client software.

Table 1-1 Features of NetBackup for Domino

Feature	Description
Tight NetBackup integration	Tight integration with NetBackup indicates the following: ■ An administrator already familiar with NetBackup can easily configure backups and restores Notes databases and transaction log extents. ■ Features and strengths of the NetBackup product suite are also available with NetBackup for Domino. These features include software data compression, scheduled and user-directed operations, and multiple data stream backups. Many of these features are described in detail in the NetBackup Web UI Administrator's Guide.
Central administration	Administrators can define Notes policies, back up and restore Notes databases, and back up and restore archive-style transaction log extents from a central location.

Table 1-1 Features of NetBackup for Domino *(continued)*

Feature	Description
Media management	Notes database backups are saved directly to a wide variety of storage devices that the NetBackup master server supports.
Online backups	Notes databases, mailboxes, and transaction logs can be backed up without taking down the Domino server. This feature ensures the availability of Notes services and data during the backup.
Automated backups	Administrators can set up schedules for automatic, unattended backups for local or remote clients across the network. These backups can be full or incremental and are managed entirely by the NetBackup server from a central location. The administrator also can manually back up clients.
Restore operations	An administrator that uses the NetBackup client can browse Notes database and mailbox backups and select the ones to restore.
Redirected restores of databases	Backups can be restored a different path.
Transaction logging	NetBackup for Domino takes advantage of the ability of Domino to log transactions against one or more databases and mailboxes. Transaction logging may be circular style, linear style, or archive style.
Point in time recovery	Transaction logging enables NetBackup for Domino to perform a point-in-time recovery of a logged databases and mailboxes.
Compression of backups	Compression increases backup performance over the network and reduces the size of the backup image that is stored on the disk or tape. This feature is only supported for
Checkpoint restart for backup jobs	With checkpoint restart, NetBackup retries a failed backup from the last checkpoint rather than restart the entire job. With this feature, the NetBackup administrator can also pause a job and resume it later.
Backups of Domino Partitioned Server	Administrators can back up databases from a partitioned Domino server.
(UNIX or Linux) Backups of multiple Domino installations	Administrators can back up databases within multiple Domino installations.

About supported Notes database configurations

NetBackup for Domino supports backups and restores of Domino server and of local databases.

Logged Domino Server databases	The database agent has the ability to log transactions against one or more Notes databases. If transaction logging is enabled on the server, all logged database transactions go into a single transaction log. This log consists of one or more files or extents. Where archive-style transaction logging is used, the archived log files serve as the incremental backup for the logged databases. Transaction logging must be enabled to recover logged databases.
Unlogged Domino Server databases	An unlogged database is one in which transaction logging is not enabled, or has been disabled for specific server databases. Unlogged databases are backed up when a full backup is performed. Unlogged databases are also backed up when an incremental backup is performed and the unlogged database has been recently updated. The database can be restored only to the point of the latest database backup.
Local databases	Local databases are the Notes databases that are not located in the Domino data directory, cannot be shared, and cannot be logged. Local databases are treated similarly to unlogged Domino server databases when they are backed up and restored.

About the Notes database files that can be backed up

NetBackup for Domino supports the following database types:

- `.NTF` Notes template files
- `.NSF` Notes server files
- `.BOX` Notes mailbox files

For UNIX clients, you can allow Notes databases with other extensions to be backed up (or limit the default list of extensions). Create the file `/usr/openv/netbackup/lotus.conf`. If the `lotus.conf` file exists, the default extensions are overridden and only those databases with the extensions listed are backed up. In the `lotus.conf` file, enter each extension on a separate line. Enter only the extension with no leading period or trailing characters.

The Domino server has the ability to log transactions against one or more Notes databases. All databases are logged by default when the following occurs:

- The administrator enables transaction logging.
- The database is in the Domino data directory.

All logged database transactions go into a single transaction log that consists of one or more files or extents. NetBackup supports all transaction logging styles: circular, linear, or archive.

When archive-style logging is used, the log files can serve as the incremental backup for logged databases. The database agent does not delete the transaction log extents after backup. The Domino server manages when a transaction log extent is reused.

Chapter 2

Installing NetBackup for Domino

This chapter includes the following topics:

- Planning the installation of NetBackup for Domino
- NetBackup server and client requirements
- Notes server software requirements
- License for NetBackup for Domino
- Specifying the Notes home path (UNIX)
- (UNIX or Linux) About adding new Notes installations

Planning the installation of NetBackup for Domino

Table 2-1 shows the major installation steps needed to run NetBackup for Domino. Each step contains one or more links to pertinent procedures and concepts.

Table 2-1 Installation steps for NetBackup for Domino

Step	Action	Description
Step 1	Verify the operating system and platform compatibility.	Go to the NetBackup compatibility list site. https://support.cohesity.com/s/article/article-100040093 Click on the following document: Application/Database Agent Compatibility List

Table 2-1 Installation steps for NetBackup for Domino *(continued)*

Step	Action	Description
Step 2	Verify the installation prerequisites.	See "NetBackup server and client requirements" on page 12. See "Notes server software requirements " on page 13.
Step 3	Add the license key for NetBackup for Domino.	See "License for NetBackup for Domino" on page 13.
Step 4	(UNIX or Linux) Specify the Notes home path.	See "Specifying the Notes home path (UNIX)" on page 13.

NetBackup server and client requirements

Before you install NetBackup, review the requirements for the NetBackup server and the NetBackup clients.

NetBackup server requirements

Verify that the following requirements are met for the NetBackup server:

- The NetBackup server software is installed and operational on the NetBackup server.
  See the NetBackup Installation Guide.
- Make sure that you configure any backup media that the storage unit uses. The number of media volumes that are required depends on several things:
  - The devices that are used and the storage capacity of the media.
  - The sizes of the databases that you want to back up.
  - The amount of data that you want to archive.
  - The size of your backups.
  - The frequency of backups or archives.
  - The length of retention of the backup images.

  See the NetBackup Administrator's Guide, Volume I.

NetBackup client requirements

Verify that the following requirements are met for the NetBackup clients:

- The NetBackup client software is installed on the computer that has the databases you want to back up.
- If the database is clustered, you must use the same version of NetBackup on each node in the cluster.

- To use the new features that are included in NetBackup for Domino in NetBackup 11.2.0.1, you must upgrade your NetBackup for Domino clients to NetBackup 11.2.0.1. The NetBackup media server must use the same version as the NetBackup for Domino client or a higher version than the client.

Notes server software requirements

Verify the following regarding the Notes server software on the NetBackup server or client:

- The Notes server software must be installed and operational.
  Partition servers are supported. More than one Notes installation is supported on UNIX.
  Refer to the Application/Database Agent Compatibility List for supported versions of the Notes server software.

License for NetBackup for Domino

The NetBackup for Domino agent is installed with the NetBackup client software. No separate installation is required. A valid license for the agent must exist on the primary server.

More information is available on how to add licenses.

See the NetBackup Web UI Administrator's Guide.

Specifying the Notes home path (UNIX)

After you install NetBackup with a valid license for NetBackup for Domino, run this script on the computer where the Notes vendor software is installed. With this script, NetBackup can gather additional information about your Notes environment.

To specify the Notes home path

1. Change to the following directory:

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

2. Run the following script:

   ```
   ./lotusnotes_config
   ```

3 Supply the home path for the database installation.

For example:

```
/opt/lotus
```

4 Add any other database installations, or enter `n` if you are finished.

(UNIX or Linux) About adding new Notes installations

If you install a new Notes installation after you install NetBackup, you need to add this new installation to the NetBackup configuration. This action ensures that all new Notes installations are included in backup operations.

Chapter 3

Configuring NetBackup for Domino

This chapter includes the following topics:

- About configuring NetBackup for Domino
- Configuring Notes fast restores
- Configuring host properties for a Notes client
- About configuring a backup policy for a Notes database
- Configuring a backup policy for Notes database supporting files
- Perform a manual backup

About configuring NetBackup for Domino

Complete the procedures in Table 3-1 to configure your environment.

Table 3-1 Steps to configure NetBackup for Domino

Step	Action	Description
Step 1	Configure Domino fast restores.	See "Configuring Notes fast restores" on page 16.
Step 2	Configure the host properties for the Notes clients.	See "Configuring host properties for a Notes client" on page 17.
Step 3	Configure a backup policy.	See "About configuring a backup policy for a Notes database" on page 19.

Table 3-1 Steps to configure NetBackup for Domino *(continued)*

Step	Action	Description
Step 4	Configure a backup policy for database supporting files.	See "Configuring a backup policy for Notes database supporting files" on page 30.
Step 5	Test the configuration settings.	See "Perform a manual backup" on page 31.

Configuring Notes fast restores

During Domino restores, the NetBackup for Domino agent automatically restores any reused transaction logs that are required for recovery. Typically one transaction log extent is restored at a time and recovery is completed for the transactions in that log. Because the restore of the log and application of transactions is a sequential process, the restore and recovery performance is slow. NetBackup prefetches the required transaction logs before recovery. Then multiple transaction logs can be restored at a time and made available for recovery.

Review the following recommendations:

- Sufficient disk space must be available for the specified number of logs in the transaction log cache location.
- The transaction log cache directory and the Domino transaction log directory should be on the same file system. This configuration ensures that the transaction logs are "moved" to the Domino transaction log directory at the time of recovery rather than being "copied." (Copying is time consuming.)
- You should create the cache directory before you start a restore job.

To configure Domino fast restores

1. Configure the transaction log cache path.

   This location is where NetBackup temporarily stores the prefetched transaction logs.

   See "About the transaction log cache path" on page 17.

2. Configure the maximum number of logs to restore.

   This setting determines how many transaction logs are restored in a single restore job during recovery.

   See "About the maximum number of logs to restore" on page 17.

About the transaction log cache path

NetBackup restores the prefetched transaction logs to the directory that is specified by this parameter.

See "Configuring host properties for a Notes client" on page 17.

Note the following when you configure the transaction log cache directory:

- Create the cache directory before you start a restore job. If the specified path does not exist it is created during restore.
- The user must have write permission for the folder or the restore job fails with a Status 5 error.
- If a path is not specified, transaction logs are restored to the original location, the Domino transaction log directory.
- If the value of **Maximum number of logs to restore** is less than or equal to 1, this path is ignored. The logs are not prefetched; one transaction log extent per job is restored to the Domino server's log directory.
- If there is not sufficient space to restore the specified number of logs, NetBackup tries to restore only the number of logs that can be accommodated. This calculation is done only if the cache directory is present before the restore job is started.
  See "About the maximum number of logs to restore" on page 17.

About the maximum number of logs to restore

This value specifies the maximum number of transaction logs restored in a single restore job during recovery.

See "Configuring host properties for a Notes client" on page 17.

Note the following when you configure the maximum logs to restore:

- If negative value or 0 is specified or if the value is not specified, then the default value of 1 is used.
- If the value is greater than 1 the transaction logs are prefetched only. If the value is less than 1, one transaction log extent per job is restored to the Domino server's log directory.

Configuring host properties for a Notes client

The following instructions describe how to define the properties for a Notes client in the NetBackup web UI.

To define properties for a Notes client

1. Open the NetBackup web UI.
2. On the left, click **Hosts > Host properties**.
3. Select the client.
4. If necessary, click **Connect**. Then click **Edit client**.
5. Depending on the operating system, click **Windows client > Lotus Notes** or **UNIX client > Lotus Notes**.
6. Provide the necessary information.

   See "Lotus Notes properties" on page 18.
7. Click **Save** to save your changes.

Lotus Notes properties

To access this setting, in the web UI select **Hosts > Host properties**. Select the client and click **Edit client**. Then click **Windows clients > Lotus Notes** or **UNIX client > Lotus Notes**.

The **Lotus Notes** properties apply to the currently selected client that runs NetBackup for Domino.

For UNIX servers: If you have multiple installations of Domino server, the values in the client properties only apply to one installation. For other installations, specify the installation path and location of the `notes.ini` file with the `LOTUS_INSTALL_PATH` and `NOTES_INI_PATH` directives in the backup policy.

Table 3-2 Lotus Notes client host properties

Client host properties	Description
Maximum number of logs to restore	The maximum number of logs that can be prefetched in a single restore job during recovery. Specify a value greater than 1. A value less than or equal to 1, does not gather transaction logs during recovery. One transaction log extent per job is restored to the Domino server's log directory.

Table 3-2 Lotus Notes client host properties *(continued)*

Client host properties	Description
Transaction log cache path	A path where NetBackup can temporarily store the prefetched transaction logs during recovery. If you do not specify a path, during recovery NetBackup restores the logs to the Domino server's transaction log directory. Note the following: ■ If the specified path does not exist then it is created during restore. ■ The user must have write permission for the folder. ■ Transaction logs are restored to the original location, the Domino transaction log directory, if a path is not specified. ■ If the value of **Maximum number of logs to restore** is less than or equal to 1 then this path is ignored. The logs are not prefetched; one transaction log per job is restored to the Domino Server's log directory. ■ If there is not sufficient space to restore the specified number of logs, NetBackup tries to restore only the number of logs that can be accommodated.
INI path	The `notes.ini` file that is associated with the Domino partitioned servers used to back up and restore the Notes database. This setting does not apply to non-partitioned servers. ■ On Windows: If the `notes.ini` file is not located in the default directory, indicate its location. ■ On UNIX: If the `notes.ini` is not located in the directory that is specified in the **Path**, indicate its location here. Include the directory and the `notes.ini` file name.
Path	The path where the Notes program files reside on the client. NetBackup must know where these files are to perform backup and restore operations. ■ On Windows: The path for program directory (where `nserver.exe` resides). ■ On UNIX: A path that includes the Domino data directory, the Notes program directory, and the Notes resource directory.

About configuring a backup policy for a Notes database

A backup policy for a database defines the backup criteria for a specific group of one or more clients.

These criteria include the following:

- Storage unit and media to use
- Policy attributes
- Backup schedules
- Clients to be backed up
- Items to be backed up, including a list of databases and directives

To back up the database environment, define at least one Lotus-Notes policy with the appropriate schedules. A configuration can have a single policy that includes all clients, or there can be many policies, some of which include only one client.

If you have both UNIX and Windows clients, create at least two policies: one exclusively for UNIX clients and another exclusively for Windows clients. In addition to the Lotus-Notes policy, configure a Standard or MS-Windows policy to back up database supporting files.

See "Configuring a backup policy for Notes database supporting files" on page 30.

Most requirements for database policies are the same as for file system backups. In addition to the policy attributes for this database agent, other attributes are available that you should consider.

See the NetBackup Administrator's Guide, Volume I.

Add a policy for Notes

This topic describes how to create a policy to protect a database.

To create a policy to backup database supporting files, you need to perform a different procedure.

See "Configuring a backup policy for Notes database supporting files" on page 30.

To add a policy for Notes

1. Open the NetBackup web UI.
2. On the left, select **Protection > Policies**. Then select **Add**.
3. Type a unique name for the new policy.
4. From the **Policy type** list, select **Lotus-Notes**.
5. Complete the entries on the **Attributes** tab.

   See "About policy attributes" on page 21.
6. Add other policy information as follows:
   - Add schedules.
     See "Add schedules to a NetBackup for Domino policy" on page 22.

- Add clients.
  See "Add clients to a policy" on page 25.
- Add database objects to the backup selections list.
  See "Adding backup selections to a Notes policy" on page 25.

7 When you have completed the policy configuration, select **Create**.

About policy attributes

With a few exceptions, policy attributes for a Lotus-Notes policy are managed in the same way as for most other policy types. Certain policy attributes vary according to your specific backup strategy and system configuration.

For more information on policy attributes, see the NetBackup Administrator's Guide, Volume I.

Table 3-3 Policy attributes for NetBackup for Domino policies

Attribute	Description
Policy type	Determines the types of clients that can be backed up with the policy. For Notes databases, select the policy type **Lotus-Notes**.
Take checkpoints every	Enable this feature to have NetBackup take checkpoints during the backup jobs for the policy. The checkpoint frequency indicates how often NetBackup takes a checkpoint during a backup. The default is 15 minutes. The **Schedule backup attempts** global attribute indicates the number of times that NetBackup attempts a failed backup. See the NetBackup Administrator's Guide, Volume 1 for more information on these options.
Compress	Enables the compression of backups. This option is only supported for NetBackup for Domino clients for Windows. A Domino client on UNIX cannot perform compression. If you want to use compression and have both Windows and UNIX clients, create two backup policies. Use one policy for Windows clients and one policy for UNIX clients. For more information on the advantages and disadvantages of compression, see the NetBackup Administrator's Guide, Volume I.
Allow multiple data streams	Specifies that NetBackup can divide automatic backups for each client into multiple jobs. Each job backs up only a part of the list of backup selections. The jobs are in separate data streams and can occur concurrently. The number of available storage units, multiplex settings, and the maximum jobs parameters determine the total number of streams and how many can run concurrently. Not all directives in the backup selections list allow for multiple database streams.
Keyword phrase	A textual description of a backup. Useful for browsing backups and restores.

Add schedules to a NetBackup for Domino policy

Each policy has its own set of schedules. These schedules control the initiation of automatic backups and also specify when user operations can be initiated.

To add a schedule to a NetBackup for Domino policy

1. Open the policy and select the **Schedules** tab.
2. Select **Add**.
3. Specify a unique name for the schedule.
4. Select the **Type of backup**.

   See "NetBackup for Domino backup types" on page 23.
5. Specify the other properties for the schedule.

   See "Schedule properties" on page 22.
6. Select **Add**.

Schedule properties

This topic describes the schedule properties that have a different meaning for database backups than for file system backups. Other schedule properties vary according to your specific backup strategy and system configuration. Additional information about other schedule properties is available. See the NetBackup Administrator's Guide, Volume I.

Table 3-4 Description of schedule properties

Property	Description
Type of backup	Specifies the type of backup that this schedule can control. The selection list shows only the backup types that apply to the policy you want to configure. See "NetBackup for Domino backup types" on page 23.
Schedule type	You can schedule an automatic backup in one of the following ways: ■ **Calendar** The **Calendar** option lets you schedule the backup operations that are based on specific dates, recurring week days, or recurring days of the month. ■ **Frequency** The **Frequency** specifies the period of time that can elapse until the next backup operation begins on this schedule. For example, assume that the frequency is 7 days and a successful backup occurs on Wednesday. The next full backup does not occur until the following Wednesday. Typically, incremental backups have a shorter frequency than full backups.

Table 3-4 Description of schedule properties *(continued)*

Property	Description
Retention	Specifies a retention period to keep backup copies of files before they are deleted. The retention level also denotes a schedule priority within the policy. A higher level has a higher priority. Set the time period to retain at least two full backups of your database. In this way, if one full backup is lost, you have another full backup to restore. For example, if your database is backed up once every Sunday morning, you should select a retention period of at least 2 weeks.
Effect of type of schedule on retention period	The type of schedule you select affects the retention period as follows: ■ Frequency-based scheduling Set a retention period that is longer than the frequency setting for the schedule. For example, if the frequency setting is set to one week, set the retention period to be more than one week. The NetBackup scheduler compares the latest record of the automatic backup schedule to the frequency of that automatic backup schedule. This comparison is done to determine whether a backup is due. So if you set the retention period to expire the record too early, the scheduled backup frequency is unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog accumulates unnecessary records. ■ Calendar-based scheduling The retention period setting is not significant for calendar-based scheduling.

NetBackup for Domino backup types

In a policy's schedule you define the type of backups you want to perform.

See "Add schedules to a NetBackup for Domino policy" on page 22.

Table 3-5 Description of NetBackup for Domino backup types

Type of backup	Description
Full backup	Backs up all the Notes databases that are identified in the backup selections list. Available transaction logs extents are also backed up if the `BACKUP_TRANSACTION_LOGS` directive is specified in the list. The inactive transaction log extents are marked as ready to reuse after they are successfully backed up. The Domino server handles the actual recycling of transaction log extents.

Table 3-5 Description of NetBackup for Domino backup types *(continued)*

Type of backup	Description
Differential Incremental backup	The type of database affects the backup, as follows: ■ Unlogged databases or local databases Backs up all unlogged databases or local databases that were modified since the last full or incremental backup. The last modification date, not the time stamp or date stamp of the database file, determines the time the database was last modified. ■ Logged databases (archival-style logging enabled) Backs up only those logged databases that were assigned a new DBIID since the last full or incremental backup. ■ Logged databases (circular-style and linear-style logging enabled) Backs up all logged databases that were modified or assigned a new DBIID since the last full or incremental backup. The last modification date, not the time stamp or date stamp of the database file, determines the time the database was last modified. ■ Transaction logs Backs up all transaction log extents that are identified as available for backup by the Domino server. The inactive transaction log extents are marked as ready to reuse when the backup completes successfully.
Cumulative Incremental backup	The type of database affects the backup, as follows. Note that the last modification date, not the time stamp or date stamp of the database file, determines the time the database was last modified. ■ Unlogged databases or local databases Backs up all unlogged databases or local databases that were modified since the last full backup. ■ Logged databases (archival-style logging enabled) Backs up only those logged databases that were assigned a new DBIID since the last full backup. ■ Logged databases (circular-style and linear-style logging enabled) Backs up all logged databases that were modified or have been assigned a new DBIID since the last full backup. ■ Transaction logs Backs up all transaction log extents that are identified as available for backup by the Domino server. The transaction log extents are not marked as ready to reuse when the backup is completed.

Table 3-5 Description of NetBackup for Domino backup types *(continued)*

Type of backup	Description
User backup	A user backup is similar to a snapshot of the databases at a given point in time. Transaction log extents are not marked as ready to be recycled after they are successfully backed up. The content of ongoing full and incremental backups is not impacted. A user backup is not automatically scheduled and must be initiated on the target client machine. You may also want to create a separate policy for user backup schedules. This way you can easily separate user-directed and scheduled backups.

Add clients to a policy

The clients list contains a list of the clients that are backed up during an automatic backup. A NetBackup client must be in at least one policy but can be in more than one.

If you want to back up multiple clients, the Domino server install path and the `notes.ini` location must be identical for each client. If not, the clients must be backed up through separate policies.

For a NetBackup for Domino policy, clients you want to add must have the following items installed or available:

- The Domino server or Notes client
- NetBackup client or server

To add clients to a policy

1. Open the policy and select the **Clients** tab.
2. Select **Add**.
3. Type the name of the client and select the hardware and operating system of the client.
4. Select **Add**.

Adding backup selections to a Notes policy

The backup selections list names the databases and directives that NetBackup includes in automatic backups of the clients that are included in the policy. NetBackup uses the same backup selection list for all clients that are backed up by the policy.

You should back up the following files:

- All files in the Domino data directory
- Any databases that reside outside of the Domino data directory
- All `.ID` files
- All `notes.ini` files

To create a list of items to back up, perform the following procedures:

- See "Adding directives to the backup selections list" on page 26.
- See "Adding Notes databases to the backup selections list" on page 28.

The agent only backs up the databases and directives in the backup selections lists. To exclude databases from a backup, place them outside the Domino data directory.

See "About excluding Notes databases from backups" on page 29.

To back up database links and directory links correctly, you must include the local and the linked directory in the backup selections list.

See "About backups of Notes database links and directory links" on page 30.

Backups of Windows network shared folders and UNIX NFS directories

NetBackupcan back up Windows network shared folders and UNIX NFS directories. This capability is useful when Notes databases reside on network storage such as NAS filers. See the NetBackup Administrator's Guide, Volume I for detailed instructions on how to back up network drives and the **Follow NFS** policy attribute.

Adding directives to the backup selections list

The following procedure describes how to add directives to the backup selections list.

To add directives to the backup selections list

1. Select the **Backup selections** tab.
2. Select **Add**.
3. Choose from the following options:

   See "About directives for Notes policies" on page 27.

   - To add all the directives, go to **Directive set** and then select **Add to list**.

To add a single directive, go to **Pathname or directive**, select a directive, then select **Add to list**.

4 When you are finished adding directives or modifying the list, select **Add**.

Any pathnames or directives you specified are appended to the backup selections list.

About directives for Notes policies

You can add directives to the backup selections list to indicate database objects you want to back up. More information is available on backup selections.

Table 3-6 Notes directives in the backup selections list

Directive	Description
ALL_LOTUS_DATABASES	**Note:** This directive is supported only on UNIX clients. Performs the backup on all Notes databases on each of the selected clients. `ALL_LOTUS_DATABASES` means both local databases and Domino server databases. **Note:** Using the `ALL_LOTUS_DATABASES` directive can have tremendous performance issues on clients with large or multiple local drives. In this case, specify more specific directories or databases in the backup selections list. For example, specify the Domino data directory.
BACKUP_TRANSACTION_LOGS	Backs up all transaction log extents that Domino server identifies as available for backup.

Table 3-6 Notes directives in the backup selections list *(continued)*

Directive	Description
NEW_STREAM	Defines a new stream of data. A stream can be any one of the following: ■ A single stream for a particular partition of a partitioned Domino server ■ Multiple streams for a single partition on a non-partitioned Domino server ■ (UNIX or Linux) A single stream for a particular installation of Domino server installed on a client The **Allow multiple data streams** attribute must be enabled for the policy on the **Attributes** tab. To backup more than one partition from a single policy, you must back up each Domino partition with a separate data stream. Use the `NEW_STREAM` directive and the `NOTES_INI_PATH=` directive for each data stream. (UNIX or Linux) To schedule a backup of multiple installations of Domino server on the same host, backup each Domino server with a separate data stream. Use the `NEW_STREAM` directive and the `NOTES_INI_PATH` and `LOTUS_INSTALL_PATH` directives for each data stream.
NOTES_INI_PATH=	Identifies the location of the `notes.ini` file that is associated with the particular server partition that is used to perform the backup. To backup a partitioned Domino server, use this directive to indicate the absolute path for the `notes.ini` file. This file should be associated with the server partition you want to use. The server partition that is specified has an effect on how a database is backed up (logged or unlogged). It also affects which set of transaction log extents is backed up. (UNIX or Linux) To configure a backup for one of the multiple installations of Domino server, use this directive to indicate the absolute path for the `notes.ini` file. This `notes.ini` file should be associated with the server installation to be used.
LOTUS_INSTALL_PATH=	Identifies the location of Notes program files that are associated with a particular installation of Domino server. (UNIX or Linux) For one of the multiple installations of Domino server, indicate the absolute path where the Notes program files are installed.

Adding Notes databases to the backup selections list

The following procedure describes how to add Notes databases to the backup selections list.

To add Notes databases to the backup selections list

1. Select the **Backup selections** tab.
2. Select **Add**.
3. Go to **List of pathnames and directives to add to the selection list**.
4. Indicate the database or directory to back up.
   - Type the full path name of a database or directory.
     You can indicate an NFS pathname or a UNC pathname. For example:
     `/export/home/lotus/data` (NFS pathname)
     `\\hostname\share\lotus\data` (UNC pathname)
     For linked databases and directories, type the pathname to the source databases or directory.
5. Continue to add any other databases and directories to the list.
6. Select **Add**.

About excluding Notes databases from backups

You can exclude specific Notes databases from the backup by using database links and directory links. This method works if the databases to which the links point are located outside of the Domino data directory.

Identify the databases you want to exclude and move them to a directory outside the Domino data path. Then, create a Domino database or a directory link to the databases. The agent only backs up files with extensions `.nsf`, `.ntf` and `.box`, and does not follow database links or directory links.

To exclude Notes database files from a backup of a Windows client

1. Expand **Hosts > Host properties**.
2. Select the client. If necessary click **Connect**. Then select **Edit client**.
3. Expand **Windows client** and select **Exclude lists**.
4. For the policy that you created to back up the database supporting files, add the following file types to the list: `.nsf`, `.ntf`, `.box`, `.TXN`.
5. Select **Save**.

To exclude Notes database files from a backup of a UNIX client

1. On each database client, create the following file:

   `/usr/openv/netbackup/exclude_list`

2. In the `exclude_list` file, add the following file types to the list: `.nsf`, `.ntf`, `.box`, `.TXN`.

About backups of Notes database links and directory links

The agent only backs up database files with `*.nsf`, `*.ntf`, and `*.box` extensions in the directories that are specified in the backup selections list of the policy. The agent does not automatically follow database links or directory links to the actual databases.

To correctly back up linked databases or linked directories outside of the Domino data directory, in the backup selections list add the following:

- The directory containing the Notes databases
- The directory containing the database link (`.nsf` file)
  OR
  The directory containing the directory link (`.dir` file)

Configuring a backup policy for Notes database supporting files

To properly back up a database environment, you must back up not only database files but also the database supporting files. Back up all local drives but exclude the database and the transaction logs from the backup.

To configure a Domino backup policy for database supporting files

1. On the left, select **Protection > Policies**.
2. Select **Add**.
3. On the **Attributes** tab, do the following:
   - Type a unique name for the new policy.
   - For the **Policy type**, select **MS-Windows** (Windows) or **Standard** (UNIX).
   - Select other attributes you want.
4. Select the **Schedules** tab and configure the schedules for this policy.

5 Select the **Clients** tab and add the clients that you want to back up with this policy.

6 On the **Backup selections** tab, select **Add**.

7 From the **Pathname or directive** list select **ALL_LOCAL_DRIVES**. The select **Add to list**.

8 Select **Add**.

9 Continue with the instructions for excluding database files from the backup of a Windows client or a UNIX client.

See "About excluding Notes databases from backups" on page 29.

Perform a manual backup

After you configure the servers and assets in your environment, you can test the configuration settings with a manual backup. Perform a manual backup (or backups) from a policy with the automatic backup schedules that you created.

To perform a manual backup from a policy

1 On the left, select **Protection > Policies**.

2 Select the policy you want to test.

3 Select **Manual backup**.

4 Select the schedule that you want to use for the manual backup.

5 Select the clients that you want to include for the manual backup.

Chapter 4

Performing backups and restore of Notes databases

This chapter includes the following topics:

- Performing a user-directed backup of a Notes database
- Restoring a Notes database
- Redirecting a Notes restore to a different client
- Recovering the Notes environment

Performing a user-directed backup of a Notes database

A user backup is initiated by the user on the client computer and is not automatically scheduled. Transaction log extents are not marked as ready to re-use after a backup, making the backup similar to a snapshot. User backups do not affect the scheduled full and incremental backups.

Note: Because a user-directed backup does not mark transaction logs as ready to reuse, it should not replace regularly scheduled full backups or incremental backups.

To perform a user-directed backup of a Notes database

1. Open the Backup, Archive, and Restore interface.
2. (Windows) Select **File > Select Files and Folders to Back Up**.

3 (UNIX or Linux) Click the **Backup Files** tab.

4 Specify what you want to back up, as follows:

- Expand the **Lotus Notes** object and select the databases or mailboxes you want to back up.
- To back up all transaction log extents, select the **Transaction Logs** object.

5 Select **Actions > Backup**.

6 To back up a Domino partition server or one of multiple Domino installations, specify the `notes.ini` file that is associated with the partition server or the installation.

The partition you specify affects how a database is backed up (if logged). It also affects which set of transaction logs are backed up.

On the Windows interface, this option is available on the **Lotus Notes** tab on BAR GUI.

7 Click **Start Backup**.

Options for Notes database backups

The following options are available for backup operations of Notes databases.

Table 4-1 General Options tab

Option	Description
Specify the absolute path for the notes.ini file that is associated with the server instance to use.	This option is available on **Lotus Notes** tab of BAR GUI. To back up a partitioned Domino server or one of several Domino installations (UNIX/Linux), specify the absolute path for the `notes.ini` file. This `notes.ini` file is associated with the particular server partition or installation that you want to use to perform the backup. The partition you specify affects how a database is backed up (if logged). It also affects which set of transaction logs are backed up.
Keyword phrase to associate with this backup or archive (optional)	Specifies a keyword phrase, up to 128 characters in length, that NetBackup can associate with the image created by this backup operation. You then can restore the image by specifying the keyword phrase in the **Search Backups** dialog box. All printable characters are permitted including space (“ ”) and period (“.”). The default keyword phrase is the null (empty) string

Restoring a Notes database

Note the following when you restore Notes databases.

- Restore Notes databases from different partitions in separate restore operations.
- (UNIX or Linux) Restore different installations of Domino server in separate restore jobs.
- **Warning:** Select only the source databases or directory for restore and not the database links or directory links. If you attempt to restore the links, the actual database is deleted. This situation can lead to data loss if the database has not been backed up.
  See "Restoring linked databases or directories and manually recreating the link file" on page 38.
  See "Restoring linked databases or directories and the link file" on page 38.

About restoring individual Notes documents or mail messages

To restore individual documents or mail messages, restore the entire database under a temporary name on the production server or an alternate server. Once the restore completes, you can copy individual documents or mail messages from the temporary database into the actual database with the Notes client.

Restore a Notes database (Windows)

To restore a Notes database (Windows)

1. On the NetBackup client, open the Backup, Archive, and Restore interface.
2. Select **File > Select Files and Folders to Restore > from Normal Backup**.
3. Select **File > Specify NetBackup Machines and Policy Type**.
4. Provide the following information:

Server to use for backups and restores	The server you want to perform the operation.
Source client for restores	The client on which the backup was performed.
Policy type for restores	**Lotus-Notes**.

5. Click **OK**.

6 Select the database or mailbox you want to restore.

Generally, you should not select transaction log extents for a restore. If a transaction log extent is required to recover a database, it is restored automatically as part of the database recovery. It is recycled automatically by the Domino server when the transaction log extent is no longer required.

7 Select **Actions > Restore**.

8 Choose the destination and other restore options and click **Start Restore**.

See "General tab" on page 36.

See "Lotus Notes tab on BAR GUI" on page 36.

Restore a Notes database (UNIX/Linux)

To restore a Notes database (UNIX/Linux

1 On the NetBackup client, open the Backup, Archive, and Restore interface.

2 Log on as Domino server administrative user.

3 Click the **Restore Files** tab.

4 Select **Actions > Specify NetBackup Machines and Policy Type**.

5 Provide the following information:

Server to use for backups and restores	The server you want to perform the operation.
Source client for restores	The client on which the backup was performed.
Policy type for restores	**Lotus-Notes**.

6 Click **OK**.

7 Select the following.

View > Show Most Recent Backup.

View > Refresh.

8 Select the database or mailbox you want to restore.

Generally, you should not select transaction log extents for a restore. If a transaction log extent is required to recover a database, it is restored automatically as part of the database recovery. It is recycled automatically by the Domino server when the transaction log extent is no longer required.

9 Select **Actions > Restore**.

10 Choose the destination and other restore options and click **Start Restore**.

See "General tab" on page 36.

See "Lotus Notes tab on BAR GUI" on page 36.

General tab

On this tab you can specify a different location to direct the restore to. By default, everything is restored to its original directory.

Table 4-2 Restore options on the **General** tab

Option	Description
Restore everything to its original location	Restores the selected items to the location from which they were backed up. This option is the default.
Restore everything to a different location	Select to restore to a different location, then enter the location to which you want to redirect the files and directories.
Destination	Enter the path to restore to. This field is enabled when **Restore everything to a different location** is selected.
Browse	The **Browse** option is enabled when **Restore everything to a different location** is selected. Click it to browse for the destination directory. NetBackup browses the local machine where the Backup, Archive, and Restore interface is running. You cannot browse another machine, even if you have chose to redirect a restore to a different client.
Restore individual directories and files to different locations	Specify a different location for each item. To restore files to different locations, you must mark files (not directories). To specify a different location, select an item and click **Change Selected Destinations**.
Overwrite existing files	Overwrites existing the files and directories.

Lotus Notes tab on BAR GUI

The following additional options are available for Notes (client side) restore operations on BAR GUI.

Table 4-3 Restore options on the **Lotus Notes** tab

Option	Description
Time to wait for the database to go offline	The number of seconds to wait for a busy database.
Recover databases to current time	Restores the database to the current date and time.
No Recovery	Restores a logged database. Also select either **Assign new database instance ID** or **Assign new database instance ID and replica ID.** For example, select **No Recovery** when you want to restore to a temporary location quickly. No transaction log recovery is performed on the restored database, which lets you get the version of the database at the backup time.
Recover database(s) to date and time	Restores a database to a specific date and time. Select either **Assign new database instance ID** or **Assign new database instance ID and replica ID**. **Assign new database instance ID** is the default option.
Assign new database instance ID.	Creates a new database instance ID, but retains the replica ID. This option is not applicable when you restore unlogged databases. Select this option for the following types of restores: ■ Restore of a logged database to an alternate location on same server ■ Point in time restore
Assign new database instance ID and replica ID.	Prevents the other databases under replication from writing over the restored database files. For logged databases, a new database instance ID and a new replica ID are assigned. For unlogged databases, a new replica ID is assigned. Select this option to disable replication on restore.
Retain original IDs	Retains the original IDs for the database. This option is available when you restore a database to the current time.
Wait until resources are available	Wait for Domino server resources to become available before NetBackup starts the restore process.
Specify the absolute path for the NOTES.INI file for the server instance	The absolute path for the `notes.ini` file. The server partition you specify during restore affects how a database is restored (if logged). It also affects which set of transaction logs are used for recovery. To restore a Domino partition server, indicate the file that is associated with the particular server partition you want to perform the restore. (UNIX or Linux) To restore a one of multiple Domino server installations, indicate the file that is associated with the server installation you want to perform the restore.

Table 4-3 Restore options on the **Lotus Notes** tab *(continued)*

Option	Description
Specify the directory where Notes is installed	To restore one of multiple Domino server installations on a server, specify the directory where the Notes program files are installed.

Restoring linked databases or directories and the link file

The following procedure describes how to restore linked databases or directories and the link file.

Warning: Failure to move the actual database before you restore the link file can lead to data loss. If you only restore the link, Domino deletes the database that the link references.

To restore a linked database or directory and the link file

1. Restore the database file to the directory that is referenced in the database or the directory link.
2. Move the databases that the link file references to a temporary location.
3. Restore the database link file.
4. Move the actual databases back to their original location.
5. On the NetBackup client, open the Backup, Archive, and Restore interface.

See "Restoring linked databases or directories and manually recreating the link file" on page 38.

Restoring linked databases or directories and manually recreating the link file

The following procedure describes how to restore linked databases or directories and manually recreating the link file.

Warning: Do not restore the link file.

To restore a linked database or directory

1. Restore the database file to the directory that is referenced in the database or the directory link.
2. Once the restore is complete, manually recreate the link file in the Domino data directory.

See “Restoring linked databases or directories and the link file” on page 38.

Redirecting a Notes restore to a different client

A restore redirected to a different client is performed like a regular restore except that a different destination client is selected. Optionally, a different source client can also be selected.

To redirect a Notes restore to a different client

1. On the NetBackup client, open the Backup, Archive, and Restore interface.
2. (Windows) Open a Restore window.

   (UNIX or Linux) Click the **Restore Files** tab.
3. (Windows) Select **Actions > Specify NetBackup Machines and Policy Type**.

   (UNIX or Linux) Select **File > Specify NetBackup Machines and Policy Type**.
4. From the **Source client for restores** list, select the client.

   The source client is the computer name whose backup images you want to browse.
5. From the **Policy type for restores** list, select **Lotus-Notes**.
6. From the **Destination client for restores** list, select the client to which to redirect the restore.

   The NetBackup for Domino agent must be installed on the destination client.
7. Click **OK**.

   NetBackup browses for Notes backup images.

Recovering the Notes environment

If you need to recreate the Notes environment, restore both Notes databases and regular files from backup.

To recover the Notes environment

1. Reinstall the Domino server software.
2. Restore the Domino configuration files (`*.id`) from the file system backup image.

   Restore these files to the path of the current Domino server installation.

3. Configure the Domino server.

   The `*.id` files that were restored in the previous step can be used to configure the Domino server for the first time.

4. If the previous Notes environment had transaction logging enabled:
   - Enable transaction logging on the new Domino server, by using the Domino Administrator application.
   - Restart the Domino server to create new transaction logs.

5. Shut down the Domino server.

6. Make the following change in the `notes.ini` file.

   ```
   TRANSLOG_Status=0
   ```

7. Add the following line to the `notes.ini` file:

   ```
   TRANSLOG_mediaonly=1
   ```

8. Move or delete any files that may exist in the `translog_path` directory.

   For example, `nlogctrl.lfh` or any transaction log extents.

9. Copy the transaction log extents from the previous Domino server installation into the current transaction log directory.

   Or, you can restore the transaction log extents by using the Backup, Archive, and Restore interface. The transaction log extents should have a timestamp later than the timestamp of the backup image from which the databases are restored.

10. Make the following changes to the `notes.ini` file:

    ```
    TRANSLOG_Status=1
    TRANSLOG_MediaOnly=1
    TRANSLOG_Style=1
    ```

11. Start the Domino server to create the new control file of the restored transaction log extents.

12. Shut down domino server.

13. Use the Backup, Archive, and Restore interface to restore the Notes databases or mailboxes from the Notes backup image, as follows:
    - If transaction logging is enabled, select the point-in-time to which you want to recover the databases.

- If point-in-time is not selected, the database rolls forward to the most recent available version.

14 After the recovery of the Notes databases is complete, make the following change to the `notes.ini` file.

```
TRANSLOG_MediaOnly=0
```

(Or, remove the setting from `notes.ini`.)

15 Start the Domino server.

If backup images of non-Notes databases are not available, you can configure the newly installed Domino server by creating new `*.id` files.

Chapter 5

Domino clustering

This chapter includes the following topics:

- About Domino clustering components
- Backing up a Domino replicated or clustered environment
- About the restore and recovery in a Domino replicated or clustered environment

About Domino clustering components

Several components work together to control a Domino cluster. These components include the Cluster Manager, the Cluster Database Directory, the Cluster Database Directory Manager, and the Cluster Replicator.

The Cluster Manager runs on each server in a Domino cluster and monitors the state of the other servers in the Domino cluster.

The Cluster Manager performs the following tasks:

- Determines which servers belong to the Domino cluster
- Monitors for server availability and workload
- Fails over database requests due to unavailability of a clustered Domino server
- Performs workload balancing

The Cluster Database Directory (`CLDBDIR.NSF`) is replicated on every server in a Domino cluster. The Cluster Database Directory contains information for each database on each server in the Domino cluster. This information includes file name, server, replica ID, cluster replication status, and out-of-service information. The different cluster components use this information to perform their tasks.

The Cluster Database Directory Manager (`CLDBDIR`) task on each server manages the Cluster Database Directory and keeps it up to date. The Cluster Database

Directory Manager also monitors the status of each database to determine if they are out of service or not yet deleted.

The Cluster Replicator (`CLREPL`) task constantly synchronizes the database replicas in a Domino cluster. Changes to the database are pushed immediately to the other replicas in the cluster. This event-drive replication ensures that each time a database is accessed that it contains the most up-to-date data. The Cluster Replicator task pushes changes only to those servers in a Domino cluster. The traditional scheduled replication is used to replicate changes to and from servers outside a Domino cluster.

Because Domino stores replication events in memory only, both the source server and destination server must be available for the replication to complete successfully. If a destination server is not available, the replication events are stored on the source server until the destination server becomes available. If the source server shuts down before the replication completes, the replication events in memory are lost. To prevent this loss, configure immediate replication with all members of the Domino cluster whenever a Domino cluster server is restarted. Perform scheduled replications between Domino clustered servers on a regular basis to help maintain database consistency for all members of the Domino cluster.

Backing up a Domino replicated or clustered environment

If you use transaction logging, configure your Domino cluster environment as follows:

- Enable archive-style logging on the server that functions as your backup server.
- Enable circular-style or linear-style logging on all other servers in the Domino cluster.
  By running circular-style or linear-style logging on the non-backup servers, you have all the advantages of transaction logging. These advantages include data reliability and integrity. Also, improved performance can be attained without having to manage (re-use) the archival-style transaction logs.
- Back up the Domino files that are not part of the database as part of a standard backup.
  These files include the notes.ini, user certificates IDs, server certificates IDs, and the `cluster.ncf`.

About the restore and recovery in a Domino replicated or clustered environment

Domino clustering is a “software” clustering solution that relies on software replication to provide consistency of the databases across all members of the cluster. To achieve the result you want, knowledge of how replication functions is vital.

See “Example of clustered environment with three Domino servers” on page 45.

See “Example of clustered environment with four Domino servers” on page 44.

See “Backing up a Domino replicated or clustered environment” on page 43.

See “About Domino clustering components” on page 42.

See “About Domino partitioned servers” on page 47.

Example of clustered environment with four Domino servers

The environment is a Domino clustered environment with four Domino servers as members of the Domino cluster. Server A is identified as your backup server and runs archive-style transaction logging. Servers B, C, and D run circular or linear-style logging. To provide load balancing across all the servers, replicas of all databases exist on all four servers in your Domino cluster. A successful full backup of all databases was completed earlier in the week. Successful incremental backups of the archival-style transaction logs are completed every four hours, with the last one completing two hours ago. At 2:30 P.M., a user complains that the database `acme.nsf` is corrupted, while they modified the database on server C over the last 30 minutes. Unfortunately, because the environment is a Domino cluster environment, the corruption is replicated to all four member servers. The users state that the database was in a consistent state when they began to modify the database.

To restore a database to a consistent state do the following:

- On server A, perform a point-in-time recovery of the database `acme.nsf`. Select the database `acme.nsf` from the last successful backup of the database (for example, a full backup that was completed successfully earlier in the week). Begin the restore.
- On the **Lotus Notes** tab of the **Restore Marked Files** dialog box, select the **Assign new database instance ID and replica ID** option. Select the **Recover database(s) to specified point in time** option. Specify today’s date at 2:00 P.M. (the time that the user started to modify the database) as the point-in-time for recovery.

- After the restore or recovery is successful, a version of `acme.nsf` from 2:00 P.M. today should exist on server. Verify the consistency of `acme.nsf` on server A. If all is as expected, from server A create new replicas of `acme.nsf` on servers B, C, and D. Cluster replication should now be functional on servers A, B, C, and D, with a consistent version of `acme.nsf`.

Example of clustered environment with three Domino servers

The environment is a Domino clustered environment with three Domino servers as members of the Domino cluster. Server C is identified as your backup server and is running archive-style transaction logging. Servers A and B are running circular-style or linear-style logging. To provide high availability and load balancing of mail, replicas exist on several servers. Databases A-L exist on servers A and C. Databases M-Z exist on servers B and C. A successful full backup of all databases was completed earlier in the week. Successful incremental backups of the archive-style transaction logs are completed every four hours, with the last one completing two hours ago. Today a user discovers that 30 mail messages were accidentally deleted. They were deleted yesterday at about 3:30 P.M. and were stored in the database `mander.nsf`.

To recover accidentally deleted mail messages do the following:

- On server C, perform a point-in-time recovery of the following database:
  UNIX or Linux: `/mail/mander.nsf`
  Windows: `mail\mander.nsf`
  Select the database from the last successful backup of the database (for example, the full backup that was completed successfully earlier in the week). Begin the restore.
- On the **Lotus Notes** tab of the **Restore Marked Files** dialog box, select the **Assign new database instance ID and replica ID** option. Select the **Recover database(s) to specified point in time** option. Specify yesterday's date at 3:25 P.M. (the time right before the user deleted the mail messages) as the point-in-time for recovery.
- A version of the database is recovered to yesterday at 3:25 P.M. and a database that contains the deleted messages should exist on server C. Verify the existence of messages in the `mander.nsf` database on server C. If all is as expected, copy the accidentally deleted messages from the database on server C to the database on server B.
- After the copy, verify the existence of the messages in the database on server B. If all is as expected, from server B create a new replica of the following database on server C.
  Windows: `mail\mander.nsf`

UNIX and Linux: `/mail/mander.nsf`

Cluster replication should now be functional for the database on servers B and C.

In this example the **Assign new database instance ID and replica ID** option is chosen. If the **Assign new database instance ID** option was chosen instead, the final results of the recovery would be different. The restored database would function the same, except that the replica ID would not be changed. The database would be recovered to the specified point-in-time. However, because the replica ID was not changed during the restore, it would match the replica ID on server B. Therefore, all the changes to the database between the point-in-time to which the database was recovered and the current time (including the deletion of the 30 mail messages) eventually is replicated to the database on server C. Two identical copies of the database exist, one on server B and the other on server C. Both copies are the same as when the restore was started on server C.

Chapter 6

Domino partitioned servers

This chapter includes the following topics:

- About Domino partitioned servers
- About performing backups in a Domino partitioned server environment
- About restoring a Domino partitioned server environment

About Domino partitioned servers

Domino partitioned servers allow multiple Domino servers to run on a single computer. The advantages of using Domino partitioned servers are to reduce hardware expenses and minimize the number of computers to administer. Each Domino partitioned server has its own Domino data directory and notes.ini file. All partitioned servers on a single computer share the same Domino program directory.

Use different user accounts for each partitioned server. With different users accounts, you can easily use commands such as `nsd` to clean up orphaned processes after a server crash. The database agent easily supports backups and restores of multiple server partitions with each using a different user account. It is possible to backup multiple Lotus partitions from a single NetBackup policy; however, back up each partition by using a separate data stream.

About performing backups in a Domino partitioned server environment

The following examples illustrate two possible configurations of the backup selections list that can be used to back up a Domino partitioned server environment.

Table 6-1 Backup selections list examples

Environment	Backup policy

The environment is a Domino partitioned server environment with two partitions.
 	
The Domino data directory for partition 1 is located at `D:\Lotus\Domino\data1`. The Domino data directory for partition 2 is located at `D:\Lotus\Domino\data2`.
	To back up this environment with two separate NetBackup policies, add the following to the backup selections list:
	
	Policy 1
	
	`NOTES_INI_PATH=D:\Lotus\Domino\data1\notes.ini`
	`D:\Lotus\Domino\data1\`
	
	Policy 2
	
	`NOTES_INI_PATH=D:\Lotus\Domino\data2\notes.ini`
	`D:\Lotus\Domino\data2\`

The environment is a Domino partitioned server environment with two partitions.
 	
The Domino data directory for partition 1 is located at `/db/notesdata1`. The Domino data directory for partition 2 is located at `/db/notesdata2`.
	To back up this environment with two separate NetBackup policies, add the following to the backup selections list:
	
	Policy 1
	
	`NOTES_INI_PATH=/db/notesdata1/notes.ini`
	`/db/notesdata1`
	
	Policy 2
	
	`NOTES_INI_PATH=/db/notesdata2/notes.ini`
	`/db/notesdata2`

The environment is a Domino partitioned server environment with three partitions.
 	
The Domino data directory for each partition is located as follows:
 	
■ Partition 1, `D:\Lotus\Domino\data1`
■ Partition 2, `D:\Lotus\Domino\data2`
■ Partition 3, `D:\Lotus\Domino\data3`
	Each partition is configured to use archive-style transaction logging. To back up this environment with a single NetBackup policy, add the following to the backup selections list:
	
	`NEW_STREAM`
	`NOTES_INI_PATH=D:\Lotus\Domino\data1\notes.ini`
	`D:\Lotus\Domino\data1`
	`BACKUP_TRANSACTION_LOGS`
	`NEW_STREAM`
	`NOTES_INI_PATH=D:\Lotus\Domino\data2\notes.ini`
	`D:\Lotus\Domino\data2`
	`BACKUP_TRANSACTION_LOGS`
	`NEW_STREAM`
	`NOTES_INI_PATH=D:\Lotus\Domino\data3\notes.ini`
	`D:\Lotus\Domino\data3`
	`BACKUP_TRANSACTION_LOGS`

Table 6-1 Backup selections list examples *(continued)*

Environment	Backup policy

The environment is a Domino partitioned server environment with three partitions.
The Domino data directory for each partition is located as follows:
■ Partition 1, `/db/notesdata1`
■ Partition 2, `/db/notesdata2`
■ Partition 3, `/db/notesdata3`
	Each partition is configured to use archive-style transaction logging. To back up this environment with a single NetBackup policy, add the following to the backup selections list:
	`NEW_STREAM`
	`NOTES_INI_PATH=/db/notesdata1/notes.ini`
	`db/notesdata1`
	`BACKUP_TRANSACTION_LOGS`
	`NEW_STREAM`
	`NOTES_INI_PATH=/db/notesdata2/notes.ini`
	`BACKUP_TRANSACTION_LOGS`
	`NEW_STREAM`
	`NOTES_INI_PATH=/db/notesdata3/notes.ini`
	`db/notesdata3`
	`BACKUP_TRANSACTION_LOGS`

About restoring a Domino partitioned server environment

The user who owns the partition's Domino data directory must restore the partitioned server. For Domino server, the notes.ini file determines how a database to be restored is accessed and which Lotus transaction log extents to use for recovery. Because each partition in a partitioned server environment has its own `notes.ini`, restore databases from different partitions in separate restore operations.

See "Recovering the Notes environment" on page 39.

Chapter 7

Domino server multiple installations (UNIX or Linux)

This chapter includes the following topics:

- About Domino server multiple installations
- About configuring NetBackup for a multiple Domino server environment
- About backups in a multiple Domino server environment
- About restores a multiple Domino server environment

About Domino server multiple installations

Multiple Domino server installations of same or different versions allow multiple Domino servers to run on a single computer. These versions can be standalone or partitioned or a combination of both. The advantages of using Domino partitioned servers are to reduce hardware expenses and minimize the number of computers to administer. Each Domino server installation has its own Domino data directory and notes.ini file.

The NetBackup for Domino agent uses different UNIX user account for each installation. When you use different accounts it is easier to use commands such as `nsd` to clean up orphaned processes after a Domino server crash. To accommodate this recommendation, It is possible to back up multiple Domino installations from a single NetBackup policy. However, each installation must be backed up by using a separate data stream.

About configuring NetBackup for a multiple Domino server environment

Run the following script to configure the NetBackup to support backups and restores of a multiple Domino server environment.

Run the following script from NetBackup's bin directory:

```
$./lotusnotes_config
```

Enter the Lotus install path for each Domino installation. For example:

```
/opt/lotus655/lotus
```

About backups in a multiple Domino server environment

The following examples illustrate possible configurations of the backup selections list when used to back up a Lotus multiple server installation environment.

Table 7-1 Multiple Domino server examples

Environment	NetBackup policy

The environment is a multiple Domino server installation environment that runs with two installations.
 	
For example: installation 1 of 7.5 version and installation 2 of 7.6 version are installed at `/opt/lotus75/lotus` and `/opt/lotus76/lotus` respectively. The Domino data directory for installation 1 is located at `/db/notesdata1` and the Domino data directory for installation 2 is located at `/db/notesdata2`.
	To back up this environment with two separate NetBackup policies, add the following to the backup selections list:
	
	Policy 1
	
	`NOTES_INI_PATH=/db/notesdata1/notes.ini`
	`NOTES_INSTALL_PATH=/opt/lotus75/lotus`
	`/db/notesdata1`
	
	Policy 2
	
	`NOTES_INI_PATH=/db/notesdata2/notes.ini`
	`NOTES_INSTALL_PATH=/opt/lotus76/lotus`
	`/db/notesdata2`

Table 7-1 Multiple Domino server examples *(continued)*

Environment	NetBackup policy

The environment is a multiple Domino server installation environment that runs with three installations.
 	
For example: installation 1 of 7.1 version, installation 2 of 7.5 version, and installation 3 of 7.6 version are installed at `/opt/lotus71/lotus`, `/opt/lotus75/lotus` and `/opt/lotus76/lotus`, respectively. The Domino data directory for installation 1 is located at `/db/notesdata1`, the Domino data directory for installation 2 is located at `/db/notesdata2`, and the Domino data directory for installation 3 is located at `/db/notesdata3`. Each installation is configured to use archive style transaction logging.
	To back up this environment with a single NetBackup policy, add following to the backup selections list:
	
	Policy 1
	
	`NEW_STREAM`
	`NOTES_INI_PATH=/db/notesdata1/notes.ini`
	`NOTES_INSTALL_PATH=/opt/lotus71/lotus`
	`/db/notesdata1`
	`BACKUP_TRANSACTION_LOGS`
	`NEW_STREAM`
	`NOTES_INI_PATH=/db/notesdata2/notes.ini`
	`NOTES_INSTALL_PATH=/opt/lotus75/lotus`
	`/db/notesdata2`
	`BACKUP_TRANSACTION_LOGS`
	`NEW_STREAM`
	`NOTES_INI_PATH=/db/notesdata3/notes.ini`
	`NOTES_INSTALL_PATH=/opt/lotus76/lotus`
	`/db/notesdata3`
	`BACKUP_TRANSACTION_LOGS`

About restores a multiple Domino server environment

As with restores of a standalone Domino server environment, the user owns the Domino data directory for the installation that must restore the server installation. For Domino server, the notes.ini file determines how a database to be restored is accessed and which transaction log extents to use for recovery. Because each Domino server installation has its own `notes.ini`, databases from different installations must be restored in separate restore operations.

Chapter 8

Troubleshooting NetBackup for Domino

This chapter includes the following topics:

- About NetBackup for Domino debug logging
- View the progress report of a NetBackup for Domino operation
- About Notes restore operations
- Windows client backup fails with status 69
- Point-in-time restore from master server fails with status 12

About NetBackup for Domino debug logging

The NetBackup primary server and client software offers a comprehensive set of debug logs for troubleshooting problems that can occur during NetBackup operations. Debug logging is also available for Domino server backup and restore operations.

See the following topics for information on how to create the logs and how to control the amount of information written to the logs.

See "Enable the debug logs automatically (Notes client) (Windows)" on page 54.

See "Debug logs for NetBackup for Domino backup operations" on page 54.

See "Debug logs for NetBackup for Domino restore operations" on page 54.

See "Setting the debug level on a NetBackup for Domino Windows client" on page 55.

See "Set the debug level on a Notes client (UNIX) " on page 54.

After you determine the cause of the problem, disable debug logging by removing the previously created debug logging directories. For details see the NetBackup Logging Reference Guide.

Additional information about NetBackup client logs and NetBackup primary server logs is available. See the help for the Backup, Archive, and Restore interface and the NetBackup Web UI Administrator's Guide.

Note: When debug logging is enabled, the files can become large. The same files are used by normal file backups.

Enable the debug logs automatically (Notes client) (Windows)

You can enable debug logging by running a batch file that creates each log directory. To create all log file directories automatically, run the following:

install_path\NetBackup\logs\mklogdir.bat

Debug logs for NetBackup for Domino backup operations

To turn on debug logging for standard backup operations, create the following:

(Windows) *install_path*\NetBackup\logs\bpbkar

(UNIX or Linux) /usr/openv/netbackup/logs/bpbkar

Debug logs for NetBackup for Domino restore operations

To turn on debug logging for restore operations, create the following directory:

install_path\NetBackup\logs\tar

/usr/openv/netbackup/logs/tar

For all restores, tar logs exist on the primary client.

Set the debug level on a Notes client (UNIX)

The debug logs are located in /usr/openv/netbackup/logs.

To set the debug level

- Enter the following line in the bp.conf file.

  VERBOSE = *X*

  Where *X* is the debug level you want.

Setting the debug level on a NetBackup for Domino Windows client

To control the amount of information that is written to the debug logs, change the "General" debug level. Typically, the default value of 0 is sufficient. However, technical support may ask you to set the value higher to analyze a problem.

The debug logs are located in *install_path*\NetBackup\logs.

To set the debug level for the legacy process on a NetBackup for Domino client

1. Open the **Backup, Archive, and Restore** program
2. Select **File > NetBackup Client Properties**.
3. Click the **Troubleshooting** tab.
4. Set the **General** debug level.
5. Click **OK** to save your changes.

To set the debug level for the processes that use unified logging on a NetBackup for Domino client

1. Newer NetBackup processes such as `ncfgre` use Veritas Unified Logging (VxUL). To increase VxUL logging level, run the following:

   ```
   install dir\NetBackup\bin\vxlogcfg -a -p 51216 -o OID -s
   DebugLevel=6 -s DiagnosticLevel=6
   ```

   For a list of all OID values, see the NetBackup Logging Reference Guide.
2. To reset the VxUL logging level default value, run the following command:

   ```
   install dir\NetBackup\bin\vxlogcfg -a -p 51216 -o OID -s
   DebugLevel=1 -s DiagnosticLevel=1
   ```

View the progress report of a NetBackup for Domino operation

This topic describes how to view the progress report of a NetBackup for Domino backup or restore operation.

To view the progress report of a NetBackup for Domino operation

1. Open the Backup, Archive, and Restore interface.
2. Click the **Task Progress** tab.
3. Click **Update Task List**.
4. Choose **File** > **View Status**.

5 Click the task for which you want to check the progress.

6 Click **Refresh**.

More information is available on progress reports and the meaning of the messages.

See the NetBackup Backup, Archive, and Restore Getting Started Guide.

About Notes restore operations

The following operations are performed during a database restore:

- The database is taken offline.
- The database (file data) is restored.
- The Notes change information is applied.
  If recovery of logged databases is requested, it is done after all logged and all unlogged databases are restored.
- The database is recovered (transactions from transaction logs are applied).
- The database is brought online.

Once the restore is complete, NetBackup attempts to recover all logged databases that were restored. The logged databases that were restored are rolled forward to a specific point in time by using the appropriate transactions from the required transaction logs. Then the databases are brought back online. Any required transaction logs are restored automatically as part of the recovery operation if they were previously backed up and recycled. Do not restore transaction log extents manually.

Windows client backup fails with status 69

If the ALL_LOTUS_DATABASES directive is encountered during a backup of a Notes Windows client, the backup fails with a `status 69: The file list string is invalid`. For Windows clients, create a backup selections list that includes the directories that contain the actual Notes databases. If you have both UNIX and Windows clients, create at least two policies: one exclusively for UNIX clients and another exclusively for Windows clients.

Point-in-time restore from master server fails with status 12

The restore jobs that use point-in-time are initiated from the master server can fail with a status 12. Specifically, the automatic restore of Notes transaction log extents during recovery of the Notes database can fail. This failure occurs if the install path of the master server is different from the install path of the NetBackup client.

See the NetBackup Troubleshooting Guide for more information.