

VERITAS NetBackup™ 4.5 for DB2

System Administrator's Guide

Windows NT/2000

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Preface

This guide describes how to install, configure, and use VERITAS NetBackup for DB2 agent on a Windows NT/2000 platform.

For specific information about the NetBackup server software, refer to:

- ◆ *NetBackup System Administrator's Guide for UNIX*, if you have a UNIX server.

or

- ◆ *NetBackup System Administrator's Guide for Windows* if you have a Windows NT/2000 server.

This document is the same as `NetBackup_AdminGuide_DB2_NT.pdf` distributed with the NetBackup for DB2 on Windows software.



Audience

This guide is intended for the:

- ◆ DB2 database system administrator responsible for configuring and using the databases.
- ◆ NetBackup system administrator responsible for configuring NetBackup.

A system administrator is defined as a person with system administrator privileges and responsibilities.

This guide assumes:

- ◆ A basic understanding of system administration.
- ◆ A working understanding of the NetBackup client and server software.
- ◆ A familiarity with the information covered in the following NetBackup manuals:
 - *NetBackup User's Guide for Microsoft Windows*
 - *NetBackup System Administrator's Guide for UNIX or NetBackup System Administrator's Guide for Windows*
 - *NetBackup Troubleshooting Guide for UNIX or NetBackup Troubleshooting Guide for Windows*.
- ◆ A thorough understanding of the following DB2 database topics:
 - DB2 Administration
 - DB2 Commands
 - User Exit Program

Accessibility

NetBackup contains features that make the user interface easier to use by people who are visually impaired and by people who have limited dexterity. Accessibility features include:

- ◆ Support for assistive technologies such as screen readers and voice input (Windows servers only)
- ◆ Support for keyboard (mouseless) navigation using accelerator keys and mnemonic keys

For more information, see the NetBackup system administrator's guide.



Organization

This guide is organized as follows:

- ◆ The Introduction provides an overview of terminology for NetBackup for DB2 on Windows.
- ◆ The Installation chapter explains how to install NetBackup for DB2 on Windows on your system.
- ◆ The Configuration chapter explains how to configure your system to use NetBackup for DB2 on Windows. This information supplements the NetBackup System Administrator Guides.
- ◆ Using NetBackup for DB2 on Windows explains how to use this product to backup and restore your databases. This information supplements the NetBackup manuals.
- ◆ Using NetBackup for DB2 with SAP provides guidelines for using SAP, DB2, and NetBackup together.
- ◆ Troubleshooting provides troubleshooting information.
- ◆ The Configuration for an DB2 EEE Environment appendix contains special instructions for DB2 databases in a DB2 Enterprise - Extended Edition (EEE) environment.



Related Documents

The following documents provide related information. For a more detailed listing of NetBackup documents, refer to *NetBackup Release Notes*.

If you have a UNIX server, refer to these documents:

- ◆ *NetBackup System Administrator's Guide for UNIX*
Explains how to configure and manage NetBackup on a UNIX system.
- ◆ *NetBackup Media Manager System Administrator's Guide for UNIX*
Explains how to configure and manage the storage devices and media on UNIX NetBackup servers. Media Manager is part of NetBackup.
- ◆ *NetBackup Troubleshooting Guide for UNIX*
Provides troubleshooting information for UNIX-based NetBackup products. You can also refer to www.support.veritas.com, access the Knowledge Base Search option, and search for TechNotes.

If you have a Windows server, refer to these documents:

- ◆ *NetBackup System Administrator's Guide for Windows*
Explains how to configure and manage NetBackup on a Windows server system.
- ◆ *NetBackup Media Manager System Administrator's Guide for Windows*
Explains how to configure and manage the storage devices and media on Windows NetBackup servers. Media Manager is part of NetBackup.
- ◆ *NetBackup Troubleshooting Guide for Windows*
Provides troubleshooting information for Windows-based NetBackup products. You can also refer to www.support.veritas.com, access the Knowledge Base Search option, and search for TechNotes.

For IBM DB2, you may also need the following manuals from IBM:

- ◆ *IBM DB2 Universal Database for NT Quick Beginnings*
- ◆ *IBM DB2 Universal Database for NT Command Reference*
- ◆ *IBM DB2 Universal Database Data Recovery and High Availability Guide and Reference*

Conventions

The following explains typographical and other conventions used in this guide.



Type Style

Typographic Conventions

Typeface	Usage
Bold fixed width	Input. For example, type <code>cd</code> to change directories.
Fixed width	Paths, commands, filenames, or output. For example: The default installation directory is <code>/opt/VRTSxxx</code> .
<i>Italics</i>	Book titles, new terms, or used for emphasis. For example: <i>Do not</i> ignore cautions.
<i>Sans serif (italics)</i>	Placeholder text or variables. For example: Replace <i>filename</i> with the name of your file.
Serif (no italics)	Graphical user interface (GUI) objects, such as fields, menu choices, etc. For example: Enter your password in the Password field.

Notes and Cautions

Note This is a Note. Notes are used to call attention to information that makes using the product easier or helps in avoiding problems.

Caution This is a Caution. Cautions are used to warn about situations that could cause data loss.

Key Combinations

Some keyboard command sequences use two or more keys at the same time. For example, holding down the **Ctrl** key while pressing another key. Keyboard command sequences are indicated by connecting the keys with a plus sign. For example:

Press `Ctrl+t`

Command Usage

The following conventions are frequently used in the synopsis of command usage. brackets []



The enclosed command line component is optional.

Vertical bar or pipe (|)

Separates optional arguments from which the user can choose. For example, when a command has the following format:

```
command arg1|arg2
```

the user can use either the *arg1* or *arg2* variable.

Terms

The terms listed in the table below are used in the VERITAS NetBackup documentation to increase readability while maintaining technical accuracy.

Term	Definition
Microsoft Windows, Windows	<p>Terms used as nouns to describe a line of operating systems developed by Microsoft, Inc.</p> <p>A term used as an adjective to describe a specific product or noun. Some examples are: Windows 95, Windows 98, Windows NT, Windows 2000, Windows servers, Windows clients, Windows platforms, Windows hosts, and Windows GUI.</p> <p>Where a specific Windows product is identified, then only that particular product is valid with regards to the instance in which it is being used.</p> <p>For more information on the Windows operating systems that NetBackup supports, refer to the VERITAS support web site at http://www.support.veritas.com.</p>
Windows servers	<p>A term that defines the Windows server platforms that NetBackup supports; those platforms are: Windows NT and Windows 2000.</p>
Windows clients	<p>A term that defines the Windows client platforms that NetBackup supports; those platforms are: Windows 95, 98, ME, NT, 2000, XP (for 32- and 64-bit versions), and LE.</p>



Getting Help

For updated information about this product, including system requirements, supported platforms, supported peripherals, and a list of current patches available from Technical Support, visit our web site:

`http://www.support.veritas.com/`

VERITAS Customer Support has an extensive technical support structure that enables you to contact technical support teams that are trained to answer questions to specific products. You can contact Customer Support by sending an e-mail to `support@veritas.com`, or by finding a product-specific phone number from the VERITAS support web site. The following steps describe how to locate the proper phone number.

1. Open `http://www.support.veritas.com/` in your web browser.
2. Click **Contact Support**. The *Contacting Support Product List* page appears.
3. Select a product line and then a product from the lists that appear. The page will refresh with a list of technical support phone numbers that are specific to the product you just selected.





NetBackup for DB2 on Windows integrates the database backup and recovery capabilities of DB2 commands with the backup and recovery management capabilities of NetBackup.

This chapter introduces NetBackup for DB2 on Windows and how it relates to both DB2 commands and NetBackup. Read this chapter for a description of:

- ◆ Terminology for NetBackup for DB2 on Windows
- ◆ Features of NetBackup for DB2 on Windows
- ◆ Technical Overview of NetBackup for DB2 on Windows



Terminology for NetBackup for DB2 on Windows

NetBackup Terms

This section describes NetBackup terms as they apply to NetBackup for DB2 on Windows.

<i>NetBackup</i>	NetBackup backs up and restores files, directories, raw partitions, and databases on client systems that have DB2 databases.
NetBackup policy	NetBackup policies define criteria for backups and restores. These criteria include storage unit and media to use, backup schedules, clients, files to back up, or backup templates or scripts to execute.
<i>NetBackup schedule</i>	NetBackup schedules control NetBackup operations such as: when backups can occur, the type of backup (full, incremental) to perform, and how long NetBackup retains the image (retention level).
<i>Administrator directed backups</i>	NetBackup administrators are able to perform remote backups of all files, directories, databases, and raw partitions contained on client systems within a client/server network via NetBackup interfaces.
<i>User-directed backups and restores</i>	NetBackup users are able to perform backups of all files, directories, databases, and raw partitions contained on client systems within a client system. In the case of DB2, user-directed operations are performed on the DB2 client via DB2 interfaces.
<i>Graphical interfaces</i>	Graphical user interfaces are available for both users and administrators.
<i>Media Manager</i>	The Media Manager provides complete management and tracking of all devices and media used during backups and restores.



DB2 Database Terms

This section describes DB2 database terms as they apply to NetBackup for DB2 on Windows.

BACKUP DATABASE Command	BACKUP DATABASE is a DB2 UDB command which initiates the backup of a database. For details, refer to <i>IBM DB2 Universal Database Command Reference</i> .
RESTORE DATABASE Command	RESTORE DATABASE is a DB2 UDB command which initiates the restore of a DB2 database. For details, refer to <i>IBM DB2 Universal Database Command Reference</i> .
ROLLFORWARD DATABASE Command	ROLLFORWARD DATABASE is a DB2 UDB command which initiates the rollforward recovery of transactions recorded in database logs. For details, refer to <i>IBM DB2 Universal Database Command Reference</i> .
DB2 script	A DB2 script contains BACKUP DATABASE or RESTORE DATABASE commands.
User Exit Program	A program that manages the backup and recovery of the DB2 archived logs, used during rollforward recovery. The program is called <code>db2uext2.exe</code> .
Vendor I/O Library	The Vendor I/O Library contains I/O functions provided by NetBackup for DB2 on Windows in a DLL. The Vendor I/O Library is used by the BACKUP DATABASE and RESTORE DATABASE commands to send data buffers between a DB2 database and NetBackup.
UDB EEE	Universal Database. The IBM DB2 Enterprise - Extended Edition environment. This refers to a database that is distributed across multiple hosts, or nodes. In a non-EEE environment, the database is typically centralized on a single host.



Features of NetBackup for DB2 on Windows

This section describes the NetBackup for DB2 on Windows main features.

Feature	Description
Media and device management	All devices supported by Media Manager are available to NetBackup for DB2 on Windows.
Scheduling facilities	<p>NetBackup scheduling facilities on the master server can be used to schedule automatic and unattended DB2 backups.</p> <p>This also lets you choose the times when these operations can occur. For example, to prevent interference with normal daytime operations, you can schedule your database backups to occur only at night.</p>
Multiplexed backups and restores	NetBackup for DB2 on Windows lets you take advantage of NetBackup's multiplexing capabilities. Multiplexing directs multiple data streams to one backup device, thereby reducing the time necessary to complete the operation.
Transparent execution of both DB2 and regular file system backup and restore operations	<p>All backups and restores are executed simultaneously and transparently without any action from the NetBackup administrator.</p> <p>A database administrator can execute database backup and restore operations through NetBackup or use DB2 commands as if NetBackup were not present.</p> <p>An administrator or any other authorized user can use NetBackup to execute database backups and restores.</p>
Sharing the same devices and tapes used during other file backups	It is possible to share the same devices and media used for other backups or to give DB2 exclusive use of certain devices and media.
Centralized and networked backup operations	From the NetBackup master server, you can schedule database backups or start them manually for any client. The DB2 databases can also reside on hosts that are different from the devices on which NetBackup stores the backups.

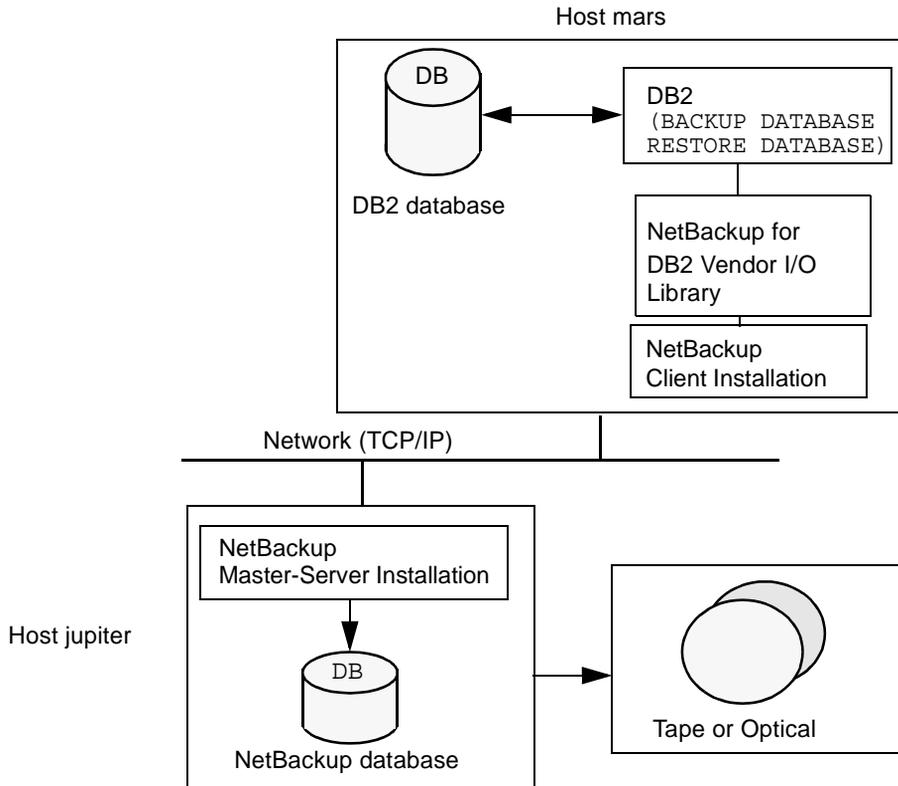


Feature	Description
Graphical user interfaces	<p>NetBackup provides the following graphical user interfaces for client users and administrators:</p> <ul style="list-style-type: none"><li>◆ Backup, Archive, and Restore user interface<li>◆ NetBackup Administration Console for Java<li>◆ NetBackup Administration Console for Windows <p>A database administrator or NetBackup administrator can start backup operations for DB2 from the NetBackup graphical user interface on the master server.</p> <p>A database administrator can also use the IBM DB2 Control Center or Command Line Processor to start user-directed backup and restore operations.</p>
Parallel backup and restore operations	<p>NetBackup for DB2 on Windows supports the parallel backup and restore capabilities of the DB2 commands. This permits the user to run more than one tape device at a time for a single DB2 backup or restore, thereby reducing the time necessary to complete the operation.</p>



Technical Overview of NetBackup for DB2 on Windows

The example network in the following illustration shows the major components in a NetBackup for DB2 on Windows configuration.



The storage devices are connected to the NetBackup master server or a remote media server. Both the master server and the remote media server must have NetBackup server software installed.

The host with the DB2 database must be a NetBackup client and have NetBackup for DB2 on Windows installed.

NetBackup for DB2 Components

Following are the main components in the NetBackup for DB2 system.

NBDB2 Vendor I/O Library

The NetBackup vendor library is used by DB2 commands when executing backups and restores. The location of the vendor library is

install_path\NetBackup\bin\nbdb2.dll

(for example, C:\Program Files\Veritas\NetBackup\bin\NBDB2.dll).

The library is called by the DB2 `BACKUP` and `RESTORE` commands, with the `LOAD` parameter. For example,

```
BACKUP DB SAMPLE ... LOAD install_path\NetBackup\bin\nbdb2.dll
```

DB2 User-Exit Program

A user-exit program is used by DB2 to backup and restore database log files. The location of the DB2 user-exit program is `<DB2_INSTANCE>\bin\db2uext2.exe`. The user-exit program is invoked by the DB2 `BACKUP` and `ROLLFORWARD` commands. For example,

```
ROLLFORWARD DB SAMPLE ... TO END OF LOGS ...
```

Sample Configuration File

A NetBackup for DB2 configuration file is used to store backup and restore preferences.

The vendor library and user-exit program use these settings. The location of the file is

install_path\NetBackup\dbext\db2\db2.conf

(for example, C:\Program Files\Veritas\NetBackup\dbext\db2\db2.conf).

This file contains various NetBackup settings, like the policy and schedule.

Sample Script Files

NetBackup invokes a script to perform a scheduled backup or restore of a DB2 database.

The user must customize the provided sample script file(s) for their environment. The

sample scripts contain DB2 `BACKUP` or `RESTORE` commands for use with NetBackup.

NetBackup for DB2 Backup Overview

Database Backup

The DB2 user invokes a database backup by using the DB2 Control Center or Command Line Processor. When initiating the backup command, you must specify the location of the NBDB2 library.



A scheduled task within NetBackup can also be used to backup a database. At the scheduled time, the NetBackup task will execute a script containing the necessary DB2 commands to perform a backup. The script is written by the user to perform the desired operations.

Regardless of the interface used to initiate the backup, DB2 conducts the backup by issuing `start`, `write`, and `end` instructions to the NBDB2 library.

<code>start</code>	The <code>start</code> instruction causes NBDB2 to verify the backup settings with the master server, such as policy, schedule, and client permissions. Next, <code>start</code> causes NBDB2 to reserve resources like drives and media on the media server.
<code>write</code>	The <code>write</code> instruction is then repeatedly issued by DB2, each time passing a portion of the backup image. NBDB2 takes the data and directs it to the media server for storage.
<code>end</code>	Finally, the <code>end</code> instruction is issued when DB2 has successfully written the entire backup image. NBDB2 informs the media server to commit any buffered data, and informs the master server to catalog the operation.

Log File Archiving

DB2 uses log files to preserve database transactions that have not been persistently recorded in the database. Once all transactions in a log file are persistently recorded, that log file can be archived. The DB2 `USEREXIT` setting enables the use of log files.

DB2 invokes the user-exit program to archive a log file at these times:

- ◆ The "user exits" the database using the DB2 `TERMINATE` command.
- ◆ The log file is full and transactions are being recorded into another log file.

In DB2 version 7 and later, these events also invoke the user-exit program:

- ◆ The DB2 `BACKUP` command is issued.
- ◆ The DB2 `ARCHIVE LOG` command is issued.

NetBackup provides a user-exit program for use with DB2. It supports two modes of operation:

- ◆ Saving archived log files directly to NetBackup.
- ◆ Copying archived log files to another directory, for later backup by NetBackup.

Saving the log files directly to NetBackup is simply the automatic backup of the log file. DB2 invokes the NetBackup user-exit program, which initiates a file backup operation.

Copying the log files to a directory is used in conjunction with a scheduled backup. In this case, the NetBackup user-exit program copies the file to an archive directory. Later (for example, nightly), a scheduled NetBackup task runs to backup all files in the archive directory. After backup, the task can optionally delete these files to free disk space.

The save and copy methods require different restore procedures, as explained below.

NetBackup for DB2 Restore Overview

Database Restore

The DB2 user invokes a database restore by using the DB2 Control Center or Command Line Processor. When initiating the restore command, the vendor library option must specify the location of the NBDB2 library.

A scheduled task within NetBackup can also be used to restore a database. At the scheduled time, the NetBackup task will execute a script containing the necessary DB2 commands to perform a restore. The script is written by the user to perform the desired operations.

Regardless of the interface used to initiate the restore, DB2 conducts the restore by issuing `start`, `read`, and `end` instructions to the NBDB2 library.

<code>start</code>	The <code>start</code> instruction causes NBDB2 to verify the restore settings and permissions with the master server, and locates the requested image within the media server.
<code>read</code>	The <code>read</code> instruction is then repeatedly issued by DB2, each time requesting a portion of the backup image. NBDB2 reads data from the media server and returns it to DB2.
<code>end</code>	Finally, the <code>end</code> instruction is issued when DB2 has successfully restored the entire image, and NBDB2 informs the media server to release the resources.

Log File Rollforward

Once the database is successfully restored, transactions recorded in the log files need to be re-applied. The DB2 `ROLLFORWARD` command restores transactions made since the last backup. For example, if the backup image was created 10 days ago and restored today, the log files are used to restore transactions that occurred after the backup.



DB2 assumes the *active* log files are safely preserved on disk. By definition, the active log files have never been archived. However, the *archived* log files need to be restored for the rollforward operation. DB2 invokes the user-exit program to restore archived log files.

If the log files were saved directly to NetBackup, the user-exit program simply initiates a file restore operation. DB2 invokes the user-exit program, providing the filename to restore. The user-exit program searches the NetBackup catalog for that file. When found, it is then restored directly to the DB2 log directory.

If the log files were first copied to an archive directory and later backed up by a scheduled task, the recovery process is a bit different. First, the user must use NetBackup to restore all log files created since the database backup image, e.g. 10 days ago. The files must be restored to the archive directory, not the DB2 log directory. When the rollforward operation is performed, DB2 will instruct the user-exit program to restore a log file. The user-exit program simply searches the archive directory for the file. When found, it is then copied from the archive directory into the DB2 log directory.

Log files saved directly to tape require no user intervention during the recovery. However, their sequential recovery can be slow when dealing with numerous, large log files. Log files that are first copied and later backed up require some user intervention during the recovery. Specifically, you must restore these files prior to the rollforward. Advanced users prefer this approach because of performance and flexibility benefits.

DB2 Commands

This section describes DB2 commands that interact with NetBackup, and options important to proper operation. See the DB2 UDB Command Reference for a complete description of these commands.

Backup

The DB2 `BACKUP DATABASE` command is used to backup a database to NetBackup.

<code>LOAD <NBDB2 Library Path></code>	Instructs DB2 to use the NBDB2 vendor library when performing the backup.
<code>OPEN (number) SESSIONS</code>	Specifies the number of concurrent data streams used for writing data. Use this option if you have multiple backup devices available, or have multiplexing enabled in NetBackup.
<code>WITH (number) BUFFERS</code>	Use this option when opening multiple sessions (see above).

Note The number of buffers must be twice the number of sessions.



BUFFER size	Use this option to increase or decrease the buffer size if necessary. Increased size can benefit performance, while decreased size may be necessary if using numerous buffers. DB2 recommends the size be a multiple of the extent size. The DB2 DFT_EXTENT_SZ setting defines the default extent size.
WITHOUT PROMPTING	This option is required for unattended backups, and must be specified in backup scripts executed by NetBackup.

Restore

The DB2 RESTORE DATABASE command is used to restore a database from NetBackup.

LOAD <NBDB2 Library Path>	Instructs DB2 to use the NBDB2 vendor library when performing the restore.
OPEN (number) SESSIONS	Typically, you should specify the same number of sessions used during the backup. Using fewer sessions is allowed, but may degrade overall restore performance. Specifying more sessions has no benefit.
WITH (number) BUFFERS	Use this option when opening multiple sessions (see above). Note The number of buffers must be twice the number of sessions. Using fewer buffers can degrade performance, or cause the restore to fail when reading multiplexed images.
BUFFER size	Use this option to increase or decrease the buffer size if necessary. Increased size can benefit performance, while decreased size may be necessary if using numerous buffers. DB2 will alter the actual size to be a multiple of the size used during the backup.
WITHOUT PROMPTING	This option is required for unattended restores, and must be specified in backup scripts executed by NetBackup.
INCREMENTAL	When using this option, DB2 may not read the entire image from NetBackup media. Consequently, NetBackup will log an error in the Activity Monitor, which can safely be ignored.
HISTORY FILE	When using this option, DB2 may not read the entire image from NetBackup media. Consequently, NetBackup will log an error in the Activity Monitor, which can safely be ignored.





This chapter explains how to install NetBackup for DB2 on Windows. It includes a section on installation prerequisites.

To determine which DB2 version levels and platforms are supported, refer to the Database Agent Matrix in the *NetBackup Release Notes*.

At the time of the this release, NetBackup for DB2 supports the following DB2 Universal Database Versions:

- ◆ 6.1.x FixPak 9
- ◆ 7.1.x FixPak 4
- ◆ 7.2.x FixPak 4

The Extended Edition (EE) and the Enterprise Extended Edition (EEE) are also supported at these versions.



Requirements

The requirements for using NetBackup for DB2 on Windows are as follows:

- ◆ The NetBackup *client* where you will be running NetBackup for DB2 on Windows must have:
 - A supported level of DB2 UDB installed and configured. To determine which DB2 UDB version levels are supported, refer to the Database Agent Matrix in the “Supported Platforms and Peripherals” chapter of the NetBackup release notes that came with your NetBackup server software.
 - Version 4.5 or later of NetBackup for Windows client software installed and configured.
 - NetBackup for DB2 on Windows 4.5 or later installed and configured.
 - Windows NT 4.0 with Service Pack 6/Windows 2000 with Service Pack 2.
- ◆ The NetBackup *master server* for the client must be running NetBackup version 4.5 or later for UNIX or Windows.

The NetBackup server platform can be any of those listed in the “Supported Platforms and Peripherals” chapter of the NetBackup release notes that came with your NetBackup server software.



Installation Procedure

Before installing NetBackup for DB2 on Windows, be sure to complete the following procedures:

- ◆ Install NetBackup server software on the server.

The NetBackup server platform can be any of those that NetBackup supports.

For a BusinessServer installation, refer to the *NetBackup BusinessServer Getting Started Guide - UNIX* or the *NetBackup BusinessServer Getting Started Guide for Windows* for details.

For a DataCenter installation, refer to the *NetBackup DataCenter Installation Guide - UNIX* or the *NetBackup DataCenter Installation Guide for Windows*.

- ◆ Install the NetBackup client software on the client where you will be backing up the databases.
- ◆ Install the DB2 vendor software on the client where you will be backing up the databases.

See the *IBM DB2 Universal Database Quick Beginnings*.

Now you are ready to install NetBackup for DB2 on Windows on the client where you will be backing up the databases. Refer to the next section for detailed instructions on installing NetBackup for DB2 on Windows.



Installing NetBackup for DB2 on Windows

The following is the procedure for installing NetBackup for DB2 on Windows.

Installation Requirements

- ◆ A valid license key for NetBackup for DB2 on Windows must be registered on the master or media server. License keys can be added from the NetBackup Administration Console. From the **Help** menu, choose **License Keys**.
- ◆ The version of the NetBackup Client and the version of NetBackup for DB2 on Windows must be the same (e.g., 4.5).

▼ To install NetBackup for DB2 on Windows:

1. Insert the NetBackup CD-ROM into the drive.
 - On systems with AutoPlay enabled for CD-ROM drives, the NetBackup install program starts automatically.
 - On Windows NT 4.0 or Windows 2000 systems that have AutoPlay disabled, run the `Launch.exe` program in the root directory on the CD-ROM.
2. Below the “Main Menu” on the left, click **Database Agents**.
3. Click **Database Agent Installation**.
4. Click **DB2**.
5. Click **Next** and follow the prompts in the setup program.



Upgrading from NetBackup for DB2 Version 3.4

After upgrading to this release, your existing configuration file and script files need manual updating. Perform the following steps:

1. Update the db2.conf file.

All occurrences of the CLASS keyword should be changed to POLICY. CLASS is still recognized in this release, but will be obsoleted in a future release.

The NORETRY setting, formerly used in some instances to support the DB2 ROLLFORWARD TO END OF LOGS operation, is no longer needed for ROLLFORWARD and should be removed.

2. Update your backup and restore scripts.

The backup and restore scripts specify a pathname to the NetBackup for DB2 library. The pathname will require modification.

On Windows systems, the location of the library has changed. It was previously located in the Windows system folder, e.g., C:\WinNT\System32\NBDB2.DLL. The new library is located in the NetBackup BIN folder, e.g. C:\Program Files\Veritas\NetBackup\bin\NBDB2.DLL.

Adding New DB2 Instances

If your original DB2 instance is replaced by a new instance, re-install NetBackup for DB2 on Windows.

Note Re-installing performs the necessary step of installing the user-exit program in each DB2 instance.





Before attempting to configure NetBackup for DB2 on Windows, complete the installation procedure as described in the Installation chapter.

The following is the configuration procedure.

1. Configuring the Media Manager
2. Setting the Maximum Jobs per Client Global Attribute
3. Configuring a NetBackup Policy
4. Creating Scripts for DB2 Environment
5. Creating a db2.conf File
6. Configuring the User Environment
7. Enabling Database User Authentication
8. Testing NetBackup for DB2 on Windows Configuration Settings.

The following sections in this chapter describe each of these steps in detail.

To configure NetBackup for DB2 on Windows from a Windows NetBackup server, see “Configuration Using the NetBackup Administration Console for Windows” on page 20.

To configure NetBackup for DB2 on Windows from a UNIX NetBackup server, see “Configuration Using the NetBackup Administration Console for UNIX” on page 35.



Configuration Using the NetBackup Administration Console for Windows

Although the database agent is installed on the NetBackup client, some configuration procedures are performed using the NetBackup Administration Console on the server.

These procedures include:

- ◆ Configuring the Media Manager
- ◆ Setting the Maximum Jobs per Client global attribute
- ◆ Configuring a NetBackup policy
- ◆ Testing NetBackup for DB2 on Windows configuration settings

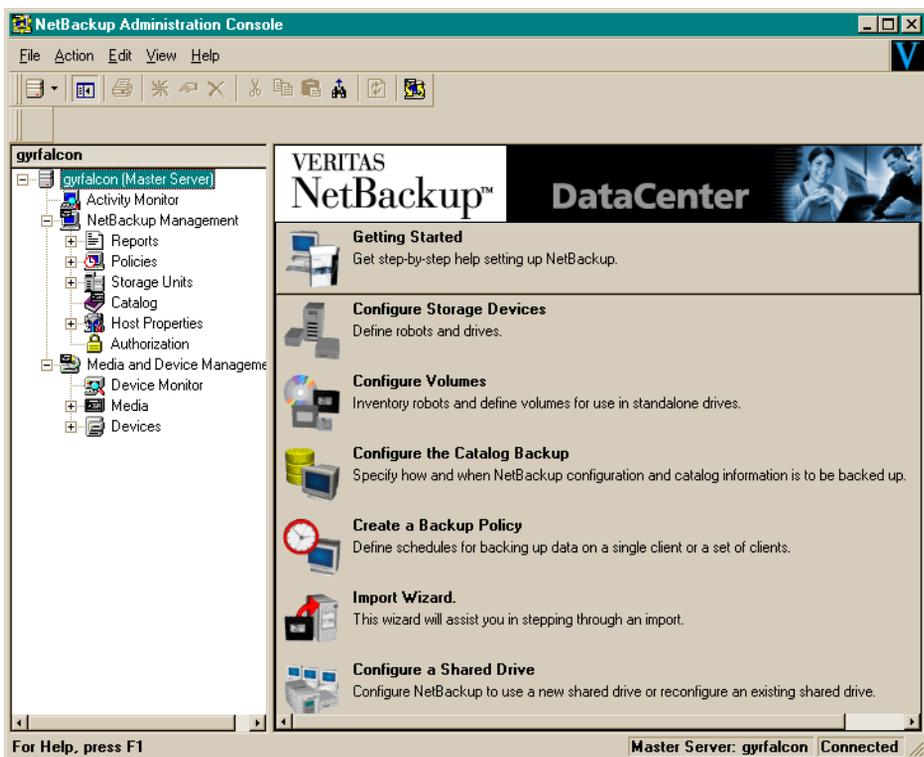
See the next section for instructions on starting the NetBackup Administration Console.

▼ To launch the NetBackup Administration Console for Windows

1. Log on to the server as administrator.
2. From the Windows **Start** menu, point to **Programs**, point to **VERITAS NetBackup** and click **NetBackup Administration Console**.

The NetBackup Administration Console appears.





Configuring the Media Manager

Use the Media Manager to configure tapes or other storage units for a NetBackup for DB2 on Windows configuration.

- ◆ Refer to the *Media Manager for NetBackup System Administrator's Guide for UNIX* if the NetBackup server is UNIX.
- ◆ Refer to the *Media Manager for NetBackup System Administrator's Guide for Windows* if the NetBackup server is Windows.

The number of volumes required will depend on the devices used, the size of the DB2 databases that you are backing up, and the frequency of backups.

Setting the Maximum Jobs per Client Global Attribute

The **Maximum jobs per client** attribute value is figured with the following formula.

$$\text{Max Jobs per Client} = \text{Number of Sessions} \times \text{Number of Policies}$$

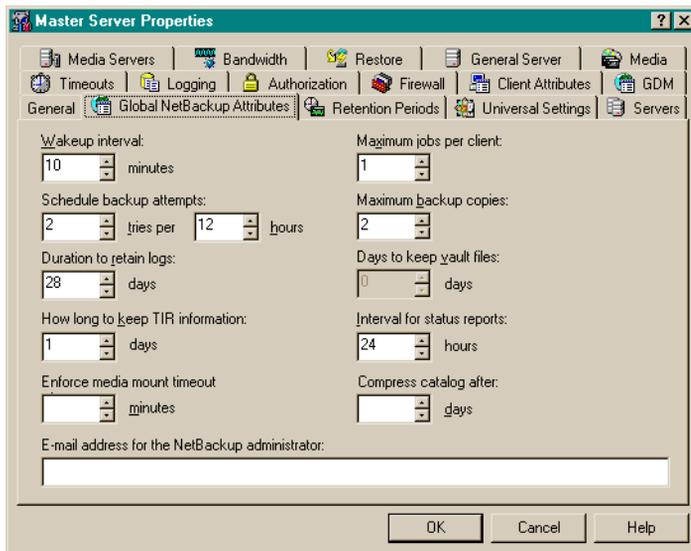


Where:

- ◆ *Number of Session* is the number of backup sessions between the backup server and NetBackup on the client. Each separate session starts a new backup job on the client.
- ◆ *Number of Policies* is the number of policies that may back up this client at the same time. This number can be greater than one. For example, a client may be in two policies in order to back up two different databases. These backup windows may overlap.

▼ **To set the Maximum jobs per client attribute on a Windows server**

1. In the left pane of the NetBackup Administration Console, expand **Host Properties**. Select **Master Server**.
2. In the right pane, double-click on the server icon.
The Master Server Properties dialog box appears.
3. In the Master Server Properties dialog box, click the **Global NetBackup Attributes** tab.



The default value is 1 for **Maximum jobs per client**.

4. Change the **Maximum jobs per client** value to a value equal to the maximum number of backups allowed per client.

Tip To avoid any problems, we recommend that you enter a value of 99 for the **Maximum jobs per client** global attribute.

Configuring a NetBackup Policy

A NetBackup policy defines the backup criteria for a specific group of one or more clients. These criteria include:

- ◆ storage unit and media to use
- ◆ backup schedules
- ◆ script files to be executed on the clients
- ◆ clients to be backed up

To use NetBackup for DB2 on Windows, at least one DB2 policy with the appropriate schedules needs to be defined. A configuration can have a single policy that includes all clients or there can be many policies, some of which include only one client.

Most requirements for DB2 policies are the same as for file system backups. In addition to the attributes described here, there are other attributes for a policy to consider. Refer to the *NetBackup System Administrator's Guide* for detailed configuration instructions and information on all the attributes available.

DB2 Environments

In general, the following NetBackup configuration is required to use NetBackup for DB2 on Windows:

- ◆ To backup the DB2 Database:
Create a DB2 database policy with an Application Backup schedule.
- ◆ To schedule a DB2 Backup using NetBackup:
Create a DB2 database policy with an Automatic Backup schedule.
- ◆ To backup the DB2 Archive Log files:
Create an MS-Windows-NT file policy with a User Backup schedule.

In most DB2 environments, a single DB2 policy can be used. However, in a DB2 EEE environment, a minimum of two (2) DB2 policies are needed: one for the DB2 catalog node(s), and another for the non-catalog nodes. In any DB2 environment where USEREXIT is enabled, an MS-Windows-NT file policy is required.

The following sections describe how to create the NetBackup policies and schedules for these environments. For DB2 EEE users, see “Configuration for an DB2 EEE Environment” on page 91.



Configuring a DB2 Policy

Note The Media Manager must be configured and a Storage Unit defined before a policy can be added.

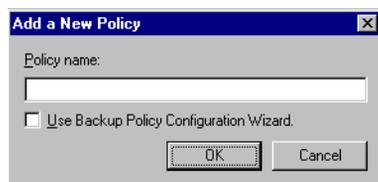
Adding New Policies

Use this procedure when configuring a policy from a Windows server or from a NetBackup Remote Administration Console host.

▼ To add a new policy

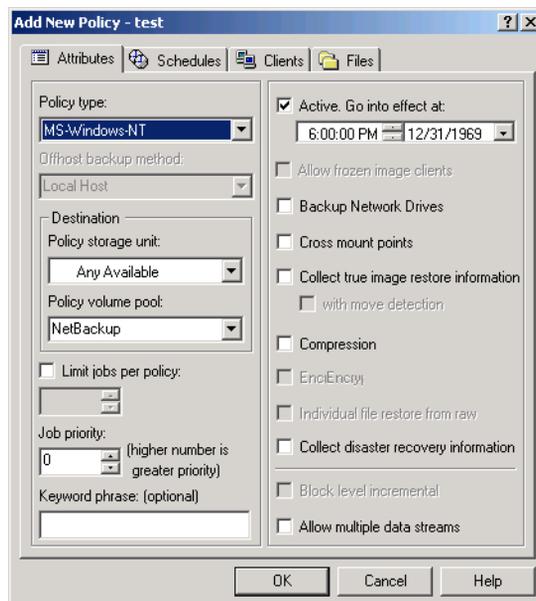
1. Log on to the server as administrator.
2. Start the NetBackup Administration Console.
3. If your site has more than one master server, choose the one where you want to add the policy.
4. In the left pane, right-click **Policies**. From the menu, select **New Policy**.

The Add a New Policy dialog box appears.



- a. In the **Policy name** box, type a unique name for the new policy.
 - b. Choose whether to use the wizard for configuring the policy. The wizard guides you through the setup process and simplifies it by automatically choosing default values that are good for most configurations. If necessary, you can change the defaults later by editing the policy.
 - ◆ To use the wizard, select the **Use Backup Policy Configuration Wizard** box and click **OK**. The wizard starts and you create the policy by following the prompts. When prompted, select the DB2 policy type.
 - ◆ If you require more control over the settings than the wizard provides, then do not select the **Use Backup Policy Configuration Wizard** box and proceed to step 5.
5. Click **OK**.

A dialog box appears in which you can specify the general attributes for the policy.



6. From the **Policy Type** box, select the DB2 policy type.
7. Complete the entries on the **Attributes** tab as explained in “Description of Attributes.”
8. Add other policy information:
 - ◆ To add schedules, see “Adding New Schedules.”
 - ◆ To add scripts, see “Specifying the List of Scripts.”
 - ◆ To add clients, see “Adding Clients to a Policy.”
9. Click **OK**. The new policy will be created.

Description of Attributes

With a few exceptions, NetBackup manages a database backup like a file system backup. Policy attributes that are different for DB2 backups are explained below.



Your other policy attributes will vary according to your specific backup strategy and system configuration. Consult the *NetBackup System Administrator's Guide* for detailed explanations of the policy attributes.

Table 1. Description of Policy Attributes

Attribute	Description
Policy type	Determines the type of clients that can be in the policy and in some cases the types of backups that can be performed on those clients. To use NetBackup for DB2 on Windows, you must have defined at least one DB2 policy.
Keyword phrase	For NetBackup for DB2 on Windows, the keyword phrase entry is ignored.

Adding New Schedules

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

A DB2 backup requires at least two specific schedule types: an Application Backup schedule and an Automatic Backup schedule. You can also create additional schedules.

The following procedures explain how to configure the required schedule types, and how to add other new schedules.

▼ To configure an Application Backup schedule

1. Double-click on the schedule named **Default-Application-Backup**.

All DB2 database operations are performed through NetBackup for DB2 on Windows using an Application Backup schedule. This includes those backups started automatically.

You must configure an Application Backup schedule for each DB2 policy you create. If you do not do this, you will not be able to perform a backup. To help satisfy this requirement, an Application Backup schedule named **Default-Application-Backup** is automatically created when you configure a new DB2 policy.

2. Specify the other properties for the schedule as explained in "Schedule Properties."

The backup window for an Application Backup schedule must encompass the time period during which all NetBackup jobs, scheduled and unscheduled, will occur. This is necessary because the Application Backup schedule starts processes that are required for all NetBackup for DB2 on Windows backups, including those started automatically.

For example, assume that you:



- ◆ expect users to perform NetBackup operations during business hours, 0800 to 1300.
- ◆ configured automatic backups to start between 1800 and 2200.

The Application Backup schedule must have a start time of 0800 and a duration of 14 hours.

Table 2. Example Settings for an Application Backup schedule.

Type of Backup	Schedule settings	Description	Settings
Application Backup	Retention	The length of time backup images are stored.	2 weeks
	Backup Window	The time during which a NetBackup operation can be performed.	Sunday through Saturday 00:00:01 - 23:59:59

Note The Application Backup schedule name must be specified in the *install_path\NetBackup\dbext\db2\db2.conf* file on the client.

Tip Set the time period for the Application Backup schedule for 24 hours per day, seven days per week. This will ensure that your NetBackup for DB2 on Windows operations are never locked out due to the Application Backup schedule.

▼ To configure an automatic backup schedule

1. In the left pane, right-click on the name of the policy and select **New Schedule** from the menu.

The Add New Schedule dialog box appears. The title bar shows the name of the policy to which you are adding the schedules.

2. Specify a unique name for the schedule.
3. Select the **Type of Backup**.



For information on the types of backups available for this policy, see “Types of Backups.”

Refer to the following table for recommended settings for an Automatic Backup schedule.

Table 3. Example Settings for an Automatic Backup Schedule.

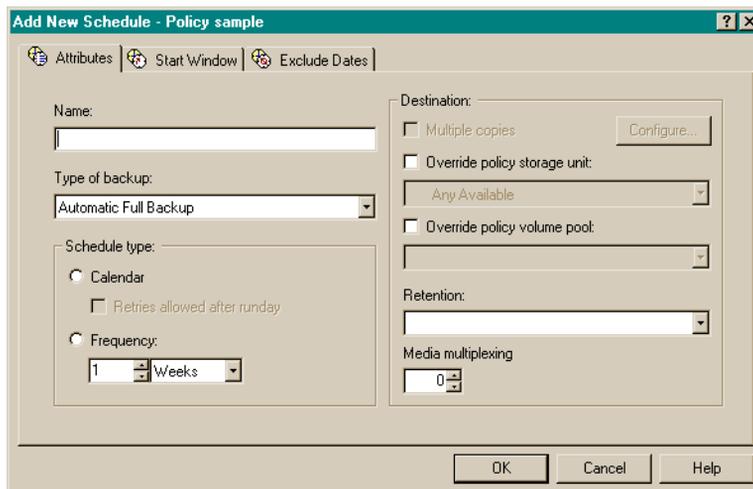
Type of Backup	Schedule settings	Description	Settings
Automatic Backup	Retention	The length of time to store the record of a backup.	2 weeks
	Frequency	Frequency determines how often a backup should be performed	every week
	Backup Window	The time during which a NetBackup operation can be performed.	Sunday, 18:00:00 - 22:00:00

- Specify the other properties for the schedule as explained in “Schedule Properties.”

▼ To add other schedules

- In the left pane, right-click on the name of the policy and click **New Schedule**.

The Add New Schedule dialog appears. The title bar shows the name of the policy to which you are adding the schedule.



- Specify a unique name for the schedule.

3. Select the Type of Backup.

For information on the types of backups available for this policy, see “Types of Backups.”

4. Specify the other properties for the schedule as explained in “Schedule Properties.”**5. Click OK.**

To add more schedules, repeat this procedure. Click **Cancel** to cancel changes that you have not yet added and close the dialog box.

Types of Backups

Table 4. Description of Backup Types for DB2

Application Backup	The Application Backup schedule enables user-controlled NetBackup operations performed on the client. At least one Application Backup schedule type must be configured for each DB2 policy. The Default-Application-Backup schedule is automatically configured as an Application Backup schedule.
Automatic Backup	An Automatic Backup schedule specifies the dates and times when NetBackup will automatically start backups by running the DB2 scripts in the order that they appear in the file list. If there is more than one client in the DB2 policy, the DB2 scripts are executed on each client.

Schedule Properties

Some of the schedule properties have a different meaning for database backups than for a regular file system backup. These properties are explained below.

Other schedule properties will vary according to your specific backup strategy and system configuration. Consult the *NetBackup System Administrator’s Guide* for detailed explanations of the schedule properties.

Table 5. Description of Schedule Properties

Property	Description
Type of backup	Specifies the type of backup that this schedule will control. The selection list shows only the backup types that apply to the policy you are configuring. For more information see “Types of Backups.”



Table 5. Description of Schedule Properties

Property	Description
Frequency	This setting is used only for scheduled backups, and not for user-directed backups. Frequency specifies the period of time that will elapse until the next backup operation can begin on this schedule. For example, if the frequency is seven days and a successful backup occurs on Wednesday, the next full backup will not occur until the following Wednesday. Normally, incremental backups will have a shorter frequency than full backups.
Calendar	This setting is used only for scheduled backups, and not for user-directed backups. The Calendar option allows you to schedule backup operations based on specific dates, recurring week days, or recurring days of the month.
Retention	<p>Frequency based scheduling</p> <p>The retention period for an Application Backup schedule refers to the length of time that NetBackup keeps backup images.</p> <p>The retention period for an Automatic Backup schedule controls how long NetBackup keeps records of when scheduled backups have occurred.</p> <p>The NetBackup scheduler compares the latest record to the frequency to determine whether a backup is due. This means that if you set the retention period to expire the record too early, the scheduled backup frequency will be unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog will accumulate unnecessary records. <i>Therefore, set a retention period that is <u>longer</u> than the frequency setting for the schedule.</i></p> <p>For example, if the frequency setting is set to one week, set the retention period to be more than one week.</p> <p>Calendar based scheduling</p> <p>The retention period for an Application Backup schedule refers to the length of time that NetBackup keeps backup images.</p> <p>The retention period for an Automatic Backup schedule controls how long NetBackup keeps records of when scheduled backups have occurred. However, this setting is not significant for calendar based scheduling.</p>
Multiple copies	If you are licensed for the Inline Tape Copy feature and wish to specify multiple copies for your DB2 policy, configure Multiple copies on the Application Backup schedule.

Specifying the List of Scripts

The Scripts list in a database policy has a different meaning than the File list has for other policies. Normally, in a MS-Windows-NT policy, you would list files and folders to be backed up. But since you are now configuring a database policy, you will list scripts.



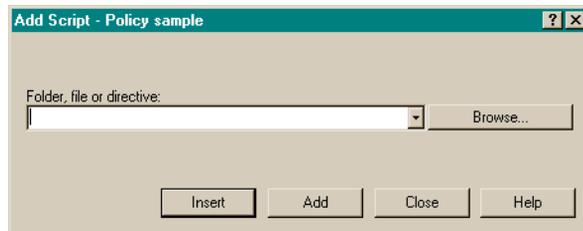
Add scripts only if you are setting up a policy for automatic scheduling. All scripts listed in the Scripts list will be executed for the Automatic Backup schedules as specified under the **Schedules** tab.

All scripts specified in the Scripts list are executed during manual or automatic backups. NetBackup will start backups by running the scripts in the order that they appear in the Scripts list.

▼ To add scripts to the Scripts List

1. In the left pane of the NetBackup Administration Console, right-click on the policy name and click **New Script**.

A dialog box appears. The title bar shows the name of the policy to which you are adding the scripts.



2. Type the name of the NetBackup for DB2 script.

Be sure to specify the full pathname when listing DB2 scripts. For example:

```
\MyScripts\db2_backup_db_offline.cmd
```

Refer to “Creating Scripts for DB2 Environment” on page 51 for details on creating scripts.

Be sure that the DB2 scripts listed here are installed on each client in the Client list.

3. Click **Add**.

Adding Clients to a Policy

The client list is the list of clients on which your DB2 scripts will be executed during an automatic backup. A NetBackup client must be in at least one policy but can be in more than one.



▼ **To add clients to a policy**

1. In the left pane of the NetBackup Administration Console, right-click on the policy name and click **New Client**.

The Add New Client dialog box appears. The title bar shows the name of the policy to which you are adding the clients.



2. In the **Client name** text box, type the name of the client that you are adding.
On the client the following should be installed:
 - ◆ DB2
 - ◆ NetBackup client or server
 - ◆ NetBackup for DB2 on Windows
 - ◆ the backup or restore script(s)
3. Choose the hardware and operating system type.
4. Click **Add**.
5. To add another client, repeat step 2 through step 4. If this is the last client, click **Close** to close the dialog box.

Configuring an MS-Windows-NT Policy

In addition to the DB2 policy, you must also configure an MS-Windows-NT type policy. An MS-Windows-NT policy will enable the backup of database log files.

An MS-Windows-NT type policy must be added when:

- ◆ `userexit` for logging is turned on in DB2 UDB.
- ◆ Client is a WindowsNT/2000 machine.

Note The name of the policy must be specified in the `install_path\NetBackup\dbext\db2\db2.conf` file on the client.

▼ **To Create an MS-Windows-NT Policy**

1. Add a new policy, as specified in “Configuring a NetBackup Policy” on page 29.
2. Specify the general attributes for the policy:
 - a. Select MS-Windows-NT for the policy type.
 - b. Specify other attributes as desired.
3. Add a schedule:
 - a. Type the name of your schedule.

Note This schedule name must be specified in the `install_path\NetBackup\dbext\db2\db2.conf` file on the client.

- b. In the **Type of Backup** box, select User Backup.

This is a user backup that is started by the NetBackup for DB2 on Windows user-exit program on the client. This schedule specifies the criteria for DB2 archive logs file backups. A User Backup schedule enables user controlled NetBackup operations performed on the client.

- c. In the **Retention** box, set the time period needed to retain two full backups of your database.

For example, if your database is backed up once every Sunday morning, select a retention period of at least two weeks.

- d. In the **Start Window** section of the **Schedules** dialog, set the time of day when you want backups to occur.

This schedule must encompass *all of the time periods* during which DB2 UDB can call the user-exit programs.

Note You do not configure a script list for this policy because it will be a User Backup type schedule.

4. Specify the clients that you will be backing up. The client must have:
 - ◆ DB2 UDB installed



◆ NetBackup for DB2 on Windows installed

5. Click **OK**.

The Add New Policy dialog box closes. The policy you just configured appears in the policy list.



Configuration Using the NetBackup Administration Console for UNIX

Although the database agent is installed on the NetBackup client, some configuration procedures are performed using the NetBackup Administration Console on the server.

These procedures include:

- ◆ Configuring the Media Manager
- ◆ Setting the Maximum Jobs per Client global attribute
- ◆ Configuring a NetBackup policy
- ◆ Testing NetBackup for DB2 on Windows configuration settings

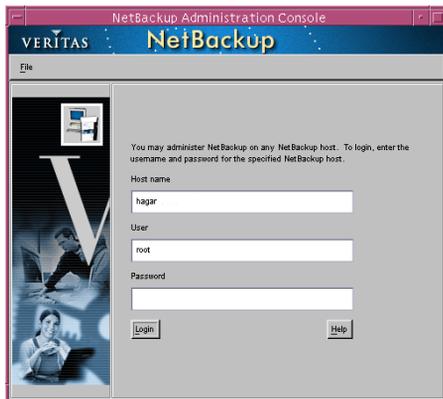
See the next section for instructions on starting the NetBackup Administration Console.

▼ To launch the NetBackup Administration Console for UNIX

1. Log onto the UNIX server as root.
2. Start the NetBackup Administration Console by executing:

```
install_path/netbackup/bin/jnbSA &
```

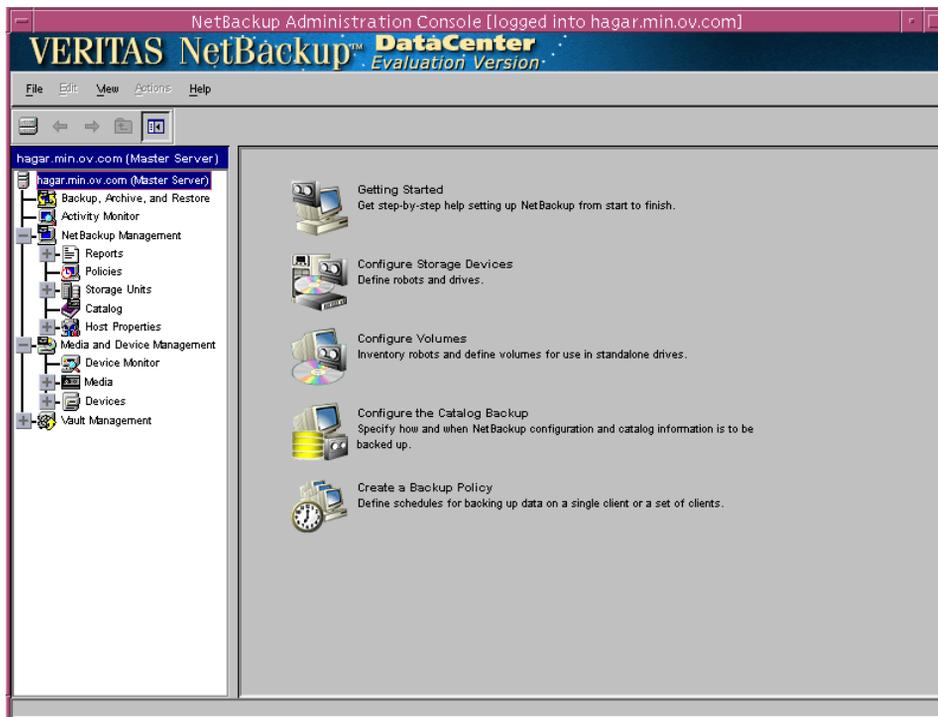
The Login dialog box appears.



3. Type the name of the master server where you initially want to manage NetBackup. You can specify any NetBackup master server. Indicate the User and Password.



4. Click **Login**. The NetBackup Administration Console appears.



Configuring the Media Manager

Use the Media Manager to configure tapes or other storage units for a NetBackup for DB2 on Windows configuration.

- ◆ Refer to the *Media Manager for NetBackup System Administrator's Guide for UNIX* if the NetBackup server is UNIX.
- ◆ Refer to the *Media Manager for NetBackup System Administrator's Guide for Windows* if the NetBackup server is Windows.

The number of volumes required will depend on the devices used, the size of the DB2 databases that you are backing up, and the frequency of backups.

Setting the Maximum Jobs per Client Global Attribute

The **Maximum jobs per client** attribute value is figured with the following formula.

$$\text{Max Jobs per Client} = \text{Number of Sessions} \times \text{Number of Policies}$$



Where:

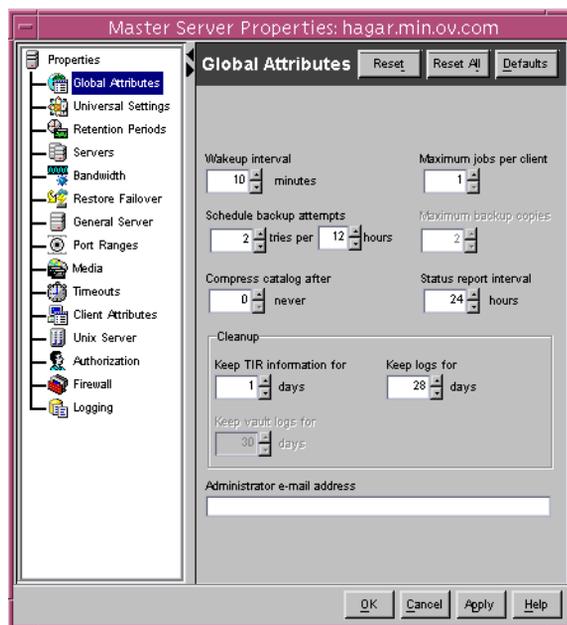
- ◆ *Number of Session* is the number of backup sessions between the backup server and NetBackup on the client. Each separate session starts a new backup job on the client.
- ◆ *Number of Policies* is the number of policies that may back up this client at the same time. This number can be greater than one. For example, a client may be in two policies in order to back up two different databases. These backup windows may overlap.

▼ To set the Maximum jobs per client attribute on a UNIX server

Use this procedure to set the **Maximum jobs per client** global attribute using the NetBackup Administration Console - Java interface on a Java-capable platform.

1. In the left pane of the NetBackup Administration Console, expand **Host Properties**. Select **Master Servers**.
2. In the right pane, double-click on the server icon. Click **Global Attributes**.

The Master Server Properties dialog box appears.



The default value is 1 for **Maximum jobs per client**.

3. Change the **Maximum jobs per client** value to a value equal to the maximum number of backups allowed per client.



Tip To avoid any problems, we recommend that you enter a value of 99 for the **Maximum jobs per client** global attribute.

Configuring a NetBackup Policy

A NetBackup policy defines the backup criteria for a specific group of one or more clients. These criteria include:

- ◆ storage unit and media to use
- ◆ backup schedules
- ◆ script files to be executed on the clients
- ◆ clients to be backed up

To use NetBackup for DB2 on Windows, at least one DB2 policy with the appropriate schedules needs to be defined. A configuration can have a single policy that includes all clients or there can be many policies, some of which include only one client.

Most requirements for DB2 policies are the same as for file system backups. In addition to the attributes described here, there are other attributes for a policy to consider. Refer to the *NetBackup System Administrator's Guide* for detailed configuration instructions and information on all the attributes available.

DB2 Environments

In general, the following NetBackup configuration is required to use NetBackup for DB2 on Windows:

- ◆ To backup the DB2 Database:
 - Create a DB2 database policy with an Application Backup schedule.
- ◆ To schedule a DB2 Backup using NetBackup:
 - Create a DB2 database policy with an Automatic Backup schedule.
- ◆ To backup the DB2 Archive Log files:
 - Create an MS-Windows-NT file policy with a User Backup schedule.

In most DB2 environments, a single DB2 policy can be used. However, in a DB2 EEE environment, a minimum of two (2) DB2 policies are needed: one for the DB2 catalog node(s), and another for the non-catalog nodes. In any DB2 environment where USEREXIT is enabled, an MS-Windows-NT file policy is required.

The following sections describe how to create the NetBackup policies and schedules for these environments. For DB2 EEE users, see “Configuration for an DB2 EEE Environment” on page 91.



Configuring a DB2 Policy

Note The Media Manager must be configured and a Storage Unit defined before a policy can be added.

Use this procedure when configuring a policy from a UNIX server.

▼ To add a new policy

1. Log onto the server as root.
2. Start the NetBackup Administration Console.
3. If your site has more than one master server, choose the one to which you want to add the policy.
4. In the left pane, click on **Policies**. The right pane splits into a All Policies pane and a details pane.
5. In the All Policies pane, right-click on the Master Server, and click **New**.

The Add a New Policy dialog box appears.

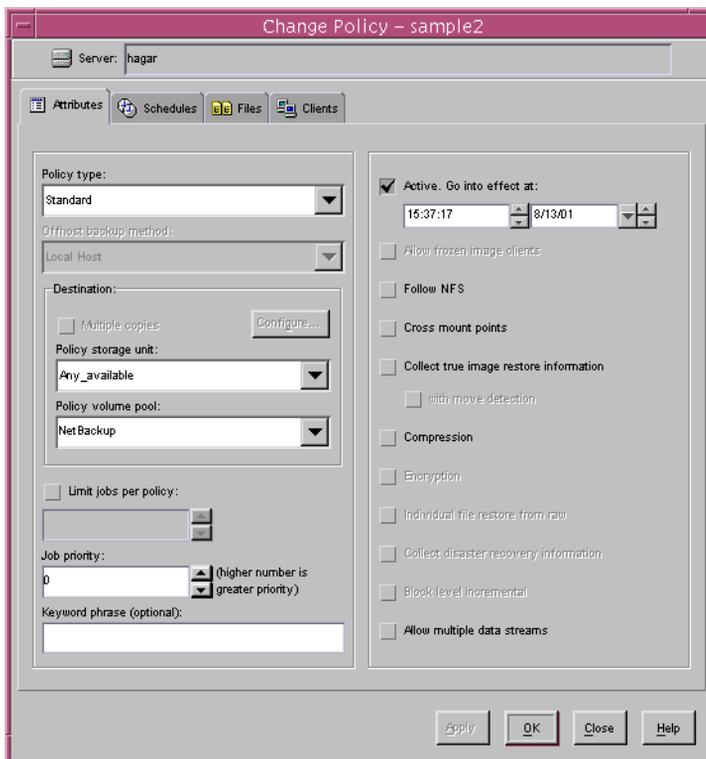


- a. In the **Policy name** box, type a unique name for the new policy.
- b. Choose whether to use the wizard for configuring the policy. The wizard guides you through the setup process and simplifies it by automatically choosing default values that are good for most configurations. If necessary, you can change the defaults later by editing the policy.
 - ◆ To use the wizard, select the **Use add policy wizard** box and click **OK**. The wizard starts and you create the policy by following the prompts. When prompted, select the DB2 policy type.
 - ◆ If you require more control over the settings than the wizard provides, do not select the **Use add policy wizard** box and proceed to step 6.

6. Click **OK**.



A dialog box appears in which you can specify the general attributes for the policy.



7. From the **Policy type** box, select the DB2 policy type.
8. Complete the entries on the **Attributes** tab as explained in “Description of Attributes” and click **Apply** to save the attribute entries.
9. Add other policy information:
 - ◆ To add schedules, see “Adding New Schedules.”
 - ◆ To add scripts, see “Specifying the List of Scripts.”
 - ◆ To add clients, see “Adding Clients to a Policy.”

Description of Attributes

With a few exceptions, NetBackup manages a database backup like a file system backup. Policy attributes that are different for DB2 backups are explained below.



Your other policy attributes will vary according to your specific backup strategy and system configuration. Consult the *NetBackup System Administrator's Guide* for detailed explanations of the policy attributes.

Table 6. Description of Policy Attributes

Attribute	Description
Policy type	Determines the type of clients that can be in the policy and in some cases the types of backups that can be performed on those clients. To use NetBackup for DB2 on Windows, you must have defined at least one DB2 policy.
Keyword phrase	For NetBackup for DB2 on Windows, the keyword phrase entry is ignored.

Adding New Schedules

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

A DB2 backup requires at least two specific schedule types: an Application Backup schedule and an Automatic Backup schedule. You can also create additional schedules.

The following procedures explain how to configure the required schedule types, and how to add other new schedules.

▼ To configure an Application Backup schedule

1. Under the policy name, select **Schedules**.
2. In the right pane, double-click on the schedule named **Default-Application-Backup**.
A dialog box appears. The title bar shows the name of the policy to which you are adding the schedule.

All DB2 database operations are performed through NetBackup for DB2 on Windows using an Application Backup schedule. This includes those backups started automatically.

You must configure an Application Backup schedule for each DB2 policy you create. If you do not do this, you will not be able to perform a backup. To help satisfy this requirement, an Application Backup schedule named Default-Application-Backup is automatically created when you configure a new DB2 policy.
3. Specify the other properties for the schedule as explained in “Schedule Properties.”



The backup window for an Application Backup schedule must encompass the time period during which all NetBackup jobs, scheduled and unscheduled, will occur. This is necessary because the Application Backup schedule starts processes that are required for all NetBackup for DB2 on Windows backups, including those started automatically.

For example, assume that you:

- ◆ expect users to perform NetBackup operations during business hours, 0800 to 1300.
- ◆ configured automatic backups to start between 1800 and 2200.

The Application Backup schedule must have a start time of 0800 and a duration of 14 hours.

Tip Set the time period for the Application Backup schedule for 24 hours per day, seven days per week. This will ensure that your NetBackup for DB2 on Windows operations are never locked out due to the Application Backup schedule.

Table 7. Example Settings for an Application Backup schedule.

Type of Backup	Schedule settings	Description	Settings
Application Backup	Retention	The length of time backup images are stored.	2 weeks
	Backup Window	The time during which a NetBackup operation can be performed.	Sunday through Saturday 00:00:01 - 23:59:59

Note The Application Backup schedule name must be specified in the *install_path\NetBackup\dbext\db2\db2.conf* file on the client.

▼ **To configure an automatic backup schedule**

1. In the All Policies pane, expand the policy you wish to configure. Right-click **Schedules** and choose **New**.

A dialog box appears. The title bar shows the name of the policy to which you are adding the schedules.

2. Specify a unique name for the schedule.
3. Select the **Type of Backup**.



For information on the types of backups available for this policy, see “Types of Backups.”

Refer to the following tables for recommended settings for an Automatic Backup schedule.

Table 8. Example Settings for a Automatic Backup Schedule.

Type of Backup	Schedule settings	Description	Settings
Automatic Backup	Retention	The length of time to store the record of a backup.	2 weeks
	Frequency	Frequency determines how often a backup should be performed	every week
	Backup Window	The time during which a NetBackup operation can be performed.	Sunday, 18:00:00 - 22:00:00

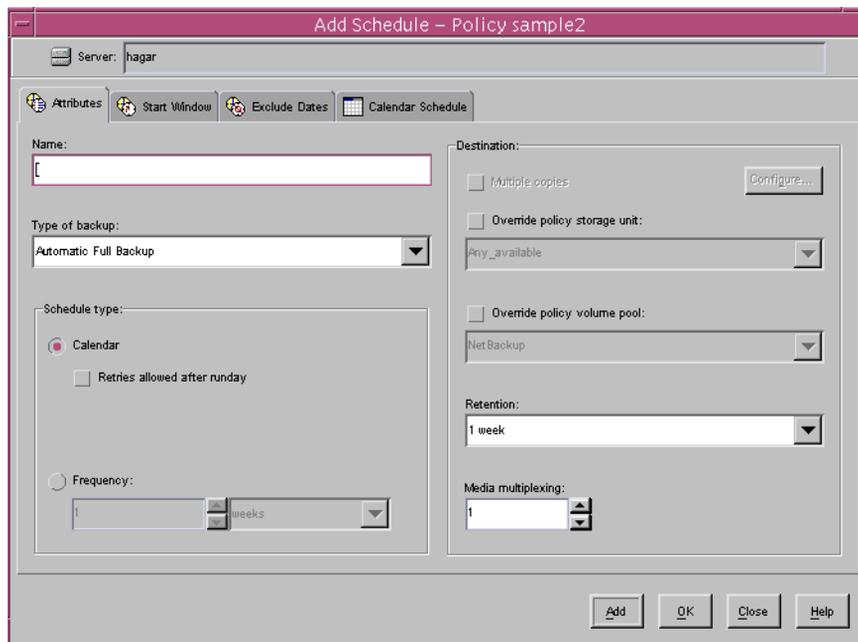
4. Specify the other properties for the schedule as explained in “Schedule Properties.”



▼ **To add other schedules**

1. In the left pane, right-click on the name of the policy and select **New Schedule** from the menu.

The Add Schedule dialog box appears. The title bar shows the name of the policy to which you are adding the schedules.



2. Specify a unique name for the schedule.
3. Select the **Type of Backup**.
For information on the types of backups available for this policy, see “Types of Backups.”
4. Specify the other properties for the schedule as explained in “Schedule Properties.”
5. If this is the last schedule, click **OK**. To add more schedules, click **Add** and repeat step 2 through step 4. Click **Close** to cancel changes that you have not yet added and close the dialog box.

Types of Backups

Table 9. Description of Backup Types for DB2

Application Backup	The Application Backup schedule enables user-controlled NetBackup operations performed on the client. At least one Application Backup schedule type must be configured for each DB2 policy. The Default-Application-Backup schedule is automatically configured as an Application Backup schedule.
Automatic Backup	An Automatic Backup schedule specifies the dates and times when NetBackup will automatically start backups by running the DB2 scripts in the order that they appear in the file list. If there is more than one client in the DB2 policy, the DB2 scripts are executed on each client.

Schedule Properties

Some of the schedule properties have a different meaning for database backups than for a regular file system backup. These properties are explained below.

Other schedule properties will vary according to your specific backup strategy and system configuration. Consult the *NetBackup System Administrator's Guide* for detailed explanations of the schedule properties.

Table 10. Description of Schedule Properties

Property	Description
Type of backup	Specifies the type of backup that this schedule will control. The selection list shows only the backup types that apply to the policy you are configuring. For more information see "Types of Backups."
Frequency	This setting is used only for scheduled backups, and not for user-directed backups. Frequency specifies the period of time that will elapse until the next backup operation can begin on this schedule. For example, if the frequency is seven days and a successful backup occurs on Wednesday, the next full backup will not occur until the following Wednesday. Normally, incremental backups will have a shorter frequency than full backups.
Calendar	This setting is used only for scheduled backups, and not for user-directed backups. The Calendar option allows you to schedule backup operations based on specific dates, recurring week days, or recurring days of the month.



Table 10. Description of Schedule Properties

Property	Description
Retention	<p>Frequency based scheduling</p> <p>The retention period for an Application Backup schedule refers to the length of time that NetBackup keeps backup images.</p> <p>The retention period for an Automatic Backup schedule controls how long NetBackup keeps records of when scheduled backups have occurred.</p> <p>The NetBackup scheduler compares the latest record to the frequency to determine whether a backup is due. This means that if you set the retention period to expire the record too early, the scheduled backup frequency will be unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog will accumulate unnecessary records. <i>Therefore, set a retention period that is <u>longer</u> than the frequency setting for the schedule.</i></p> <p>For example, if the frequency setting is set to one week, set the retention period to be more than one week.</p> <p>Calendar based scheduling</p> <p>The retention period for an Application Backup schedule refers to the length of time that NetBackup keeps backup images.</p> <p>The retention period for an Automatic Backup schedule controls how long NetBackup keeps records of when scheduled backups have occurred. However, this setting is not significant for calendar based scheduling.</p>
Multiple copies	<p>If you are licensed for the Inline Tape Copy feature and wish to specify multiple copies for your DB2 policy, configure Multiple copies on the Application Backup schedule.</p>

Specifying the List of Scripts

The File list in a database policy has a different meaning than the File list has for other policies. Normally, in a MS-Windows-NT policy, you would list files and folders to be backed up. But since you are now configuring a database policy, you will list scripts.

Add scripts only if you are setting up a policy for automatic scheduling. All scripts listed in the Files list will be executed for the Automatic Backup schedules as specified under the **Schedules** tab.

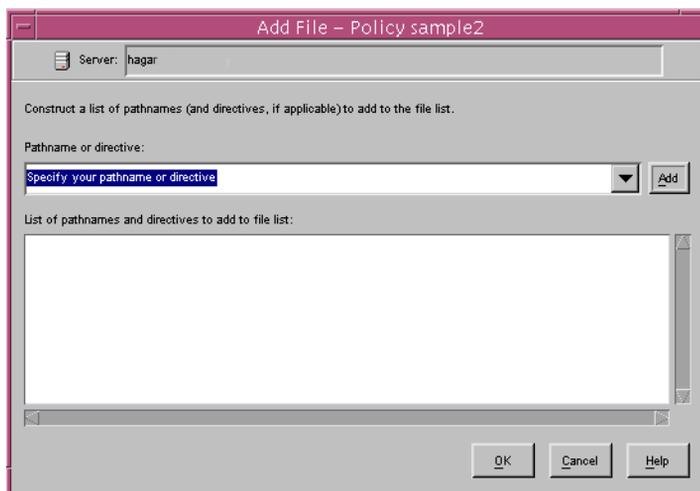
All scripts specified in the Files list are executed during manual or automatic backups. NetBackup will start backups by running the scripts in the order that they appear in the Files list.



▼ **To add scripts to the Scripts List**

1. In the left pane, click **Policies**.
2. In the All Policies pane, expand the policy you want to add the scripts.
3. Right-click on **Files** and choose **New**.

The Add File dialog box appears. The title bar shows the name of the policy to which you are adding the scripts.



4. Type the name of the DB2 script.
Be sure to specify the full pathname when listing DB2 scripts. For example:
`\MyScripts\db2_backup_db_offline.cmd`
Be sure that the DB2 scripts listed here are installed on each client in the Client list.
5. Click **Add**.
6. To add more scripts, repeat step 4 and step 5.

Adding Clients to a Policy

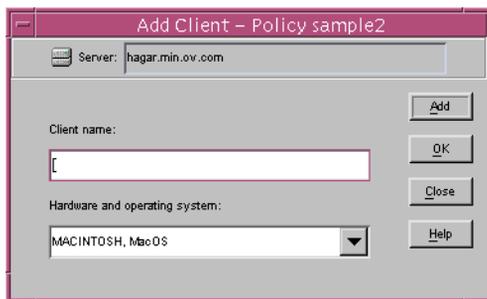
The client list is the list of clients on which your NetBackup for DB2 on Windows backups will be performed. A NetBackup client must be in at least one policy but can be in more than one.



▼ **To add clients to a policy**

1. In the left pane, expand **Policies**.
2. In the All Policies pane, expand the policy you wish to configure.
3. Right-click on **Clients** and choose **New**.

The Add Client dialog box appears. The title bar shows the name of the policy where you are adding clients.



4. In the **Client name** text box, type the name of the client that you are adding.
On the client the following should be installed:
 - ◆ DB2
 - ◆ NetBackup client or server
 - ◆ NetBackup for DB2 on Windows
 - ◆ the backup or restore script(s)
5. Choose the hardware and operating system type and click **Add**.
6. If this is the last client, click **OK**. If you are going to add more clients, repeat step 4 and step 5.

Configuring an MS-Windows-NT Policy

In addition to the DB2 policy, you must also configure an MS-Windows-NT type policy. An MS-Windows-NT policy will enable the backup of database log files.

An MS-Windows-NT type policy must be added when:

- ◆ `userexit` for logging is turned on in DB2 UDB.

- ◆ Client is a WindowsNT/2000 machine.

Note The name of the policy must be specified in the `install_path\NetBackup\dbext\db2\db2.conf` file on the client.

▼ **To Create an MS-Windows-NT Policy**

1. Add a new policy, as specified in “Configuring a NetBackup Policy” on page 29.
2. Specify the general attributes for the policy:
 - a. Select MS-Windows-NT for the policy type.
 - b. Specify other attributes as desired.
3. Add a schedule:
 - a. Type the name of your schedule.

Note This schedule name must be specified in the `install_path\NetBackup\dbext\db2\db2.conf` file on the client.

- b. In the **Type of Backup** box, select User Backup.

This is a user backup that is started by the NetBackup for DB2 on Windows user-exit program on the client. This schedule specifies the criteria for DB2 archive logs file backups. A User Backup schedule enables user controlled NetBackup operations performed on the client.

- c. In the **Retention** box, set the time period needed to retain two full backups of your database.

For example, if your database is backed up once every Sunday morning, select a retention period of at least two weeks.

- d. In the **Start Window** section of the **Schedules** dialog, set the time of day when you want backups to occur.

This schedule must encompass *all of the time periods* during which DB2 UDB can call the user-exit programs.

Note You do not configure a script list for this policy because it will be a User Backup type schedule.

4. Specify the clients that you will be backing up. The client must have:



- ◆ DB2 UDB installed
- ◆ NetBackup for DB2 on Windows installed

5. Click OK.

The Add New Policy dialog box closes. The policy you just configured appears in the policy list.



Creating Scripts for DB2 Environment

Note For more information on scripts, see the *DB2 Commands User's Guide*.

The following example scripts were included with the NetBackup for DB2 on Windows installation:

```
db2_backup_db_offline.cmd
db2_backup_db_online.cmd
db2_restore_db.cmd
db2_mpp_backup_offline.cmd
db2_mpp_restore_db.cmd
```

These scripts were provided as examples. They are installed in the following folder:

```
install_path\NetBackup\dbext\db2\samples\
```

where *install_path* is C:\Program Files\VERITAS by default.

Note Be sure to modify these scripts for your environment. Do not store your scripts in the sample directory, as they will be lost when upgrading or re-installing. Always relocate your scripts to a safe location.

Although each script can have multiple DB2 commands operations, a separate script is required for each type of operation. For example, you need separate scripts for backups and restores.

Caution Always specify the correct script when configuring automatic backups or when starting operations through NetBackup. NetBackup for DB2 on Windows will not generate an error if a restore script is used for a backup operation or a backup script is used for a restore operation.

Instructions for Modifying Scripts

Note If you are using DB2 EEE, see “Creating DB2 Scripts for DB2 EEE Environment” on page 104 “Creating DB2 Scripts for an DB2 EEE Environment” on page 96.



1. Copy the example scripts to a different folder on your client. DB2 scripts can be located anywhere on the client.
2. Modify the script
 - a. Use a text editor such as Notepad to open the script.
 - b. Follow the instructions in the script.

Note Test the scripts you just created by starting a manual backup of this policy as explained in “Testing NetBackup for DB2 on UNIX Configuration Settings” on page 67 “Testing NetBackup for DB2 on Windows Configuration Settings” on page 62.

The following example shows the sample script:

```
install_path\NetBackup\dbext\db2\samples\db2_backup_db_offline.
cmd

@REM $Revision: 1.5 $

@REM -----
@REM This script is provided as an example. Changes must be made to make this
@REM work with your environment.
@REM
@REM This script takes an offline backup of the database. An offline backup
@REM requires exclusive access to the database. All users must be disconnected
@REM from the database or database partition before the backup operation can
@REM occur. In a partitioned database environment, if you are performing an
@REM offline backup of the catalog node, there can be no activity on the entire
@REM database.
@REM To back up a database or a database partition, the user must have SYSADM,
@REM SYSCTRL, or SYSMANT authority.
@REM -----

@echo off
@setlocal

@REM -----
@REM These environmental variables are created by Netbackup (bphdb)
@REM -----

@echo DB2_POLICY = %DB2_POLICY%
@echo DB2_SCHEDULED = %DB2_SCHEDULED%
@echo DB2_SCHED = %DB2_SCHED%
@echo DB2_SERVER = %DB2_SERVER%
```



```

@echo DB2_FULL = %DB2_FULL%
@echo DB2_INCR = %DB2_INCR%
@echo DB2_USER_INITIATED = %DB2_USER_INITIATED%

@REM -----
@REM DB2 home directory (the system catalog node)
@REM Modify to your DB2 home directory
@REM -----

@set DB2_HOME=d:\sqllib
@echo DB2_HOME = %DB2_HOME%

@REM -----
@REM The command file that will be use to feed to db2cmd.exe
@REM -----

@set CMD_FILE=%temp%\cmd_file
@echo CMD_FILE = %CMD_FILE%

@REM -----
@REM Actual command that will be used to execute a backup
@REM Note: the parameters /c /w /i and db2 should be used with db2cmd.exe
@REM Without them, NetBackup job monitor may not function properly.
@REM -----

@set CMD_LINE=%DB2_HOME%\bin\db2cmd.exe /c /w /i db2 -f %CMD_FILE%
@echo CMD_LINE = %CMD_LINE%

@REM -----
@REM NetBackup DB2 Library Extension
@REM -----

@set LIB=C:\progra~1\veritas\netbackup\bin\nbdb2.dll
@echo LIB = %LIB%

@REM -----
@REM Database to backup
@REM Modify to the name of the database that you want to backup
@REM -----

@set DATABASE=sample
@echo DATABASE = %DATABASE%

@echo backup database %DATABASE% load %LIB%
@echo backup database %DATABASE% load %LIB% > %CMD_FILE%

@REM -----

```



```
@REM Execute the command
@REM -----

@echo CMD=%CMD_LINE%
@REM %CMD_LINE%

if errorlevel 1 goto errormsg
echo BACKUP successful
if "%STATUS_FILE%" == "" goto end
if exist %STATUS_FILE% echo 0 > %STATUS_FILE%
goto end

:errormsg
echo Execution of BACKUP command failed - exiting
if "%STATUS_FILE%" == "" goto end
if exist %STATUS_FILE% echo 1 > %STATUS_FILE%

:end

@endlocal
```

Script Parameters

Parameters are necessary in DB2 scripts to enable the DB2 commands to perform backup and restore operations. The parameters can come from one of these sources:

- ◆ Environmental Variables
- ◆ Windows NT registry information
- ◆ NetBackup db2.conf

Parameters from these sources can be evaluated within the scripts. For example, the DB2_POLICY value is the name of the policy used to perform the backup.

Environmental Variables

It is important to note that these environmental variables are created locally when a DB2 script is executed through:

- ◆ the NetBackup automatic scheduler
- ◆ a user-directed backup process

When the NetBackup automatic scheduler calls a DB2 script, the following environmental variables are created.

DB2_POLICY	Name of the DB2 policy from which the Automatic Backup backup type was started. This policy name is not necessarily the same policy name that is in the <code>bp.conf</code> file or the <code>db2.conf</code> file. This variable is set only if the backup is initiated from the server (either automatically by the NetBackup scheduler or manually through the administrator interface).
	Note When a DB2 script is started from the Graphical User Interface client all of the same variables are created except for <code>DB2_POLICY</code> variable.
DB2_SERVER	Name of the NetBackup server.
DB2_SCHED	Name of the Automatic Backup backup type. This variable is set up only if the backup is initiated from the server (either automatically by the NetBackup scheduler or manually through the administrator interface).
DB2_SCHEDULED	Set to 1 if this is a scheduled backup type (Automatic Backup).
DB2_USER_INITIATED	Set to 1 if this is a user-initiated backup type (Application Backup backup).
DB2_FULL	Set to 1 for a full backup.
DB2_INCR	Set to 1 for an incremental backup

Note The above environmental variables are only used in the executing script. They are unknown to the DB2 UDB backup/restore. For example, the `DB2_POLICY` variable will not be processed by the DB2 UDB backup or DB2 UDB restore. Instead it uses the `POLICY` name defined in the registry or the `install_path\Netbackup\dbext\db2\db2.conf` file.



Creating a db2.conf File

A `db2.conf` file is a control file that indicates what policy, schedule, and database to use. You must place this file in the `install_path\NetBackup\dbext\db2\` folder on all the NetBackup for DB2 on Windows clients. A sample copy is provided in the sample folder.

Example

Assume we are backing up a database named *SAMPLE* and its archive logs. We have already configured two policies that have the required schedules for our backups.

One of the policies is for backing up the database. This policy is named *DB2_DB_Policy* and has both an Application Backup schedule and an Automatic Backup schedule. The first entry in the example file below specifies this policy and its Application Backup schedule, which is named *Default-Application-Backup*. The Automatic Backup schedule is not specified in `db2.conf`.

The other policy is for backing up the archive logs. This policy is named *DB2_Log_Policy* and has a User Backup type schedule named *User*. The second entry in the example file below specifies this policy and its User Backup schedule.

```
#
# The following settings are used by NetBackup to backup/restore a DB2 database.
#
# Reminders:
# 1) The specified policy must have a type of "DB2".
# 2) The specified schedule must be defined for this policy.
# 3) The DB2 database host must be entered as a client for this policy.
#

OBJECTTYPE DATABASE
DATABASE SAMPLE
POLICY DB2_DB_Policy
SCHEDULE Default-Application-Backup
ENDOPER

#
# The following settings are used by NetBackup to backup/restore DB2 log files.
#
# Reminders:
# 1) The specified policy must have a type of "Standard" (for UNIX DB2 host) or
#    "MS-Windows-NT" (for Windows DB2 host).
# 2) The specified schedule must be defined for this policy.
# 3) The DB2 database host must be entered as a client for this policy.
#
# If DB2 log file archiving is enabled (DB2 USEREXIT ON), DB2 will invoke
```



```
# the NetBackup user-exit program to backup & restore DB2 archive log files.
# Using ARCFUNC SAVE causes log files to be archived to NetBackup storage,
# as specified by the policy.
# Using ARCFUNC COPY causes log files to be archived to a disk directory.
# Use ARCDIR to specify the destination directory for log file backup.
# Use RETDIR to specify the source directory for log file restore.
#
```

```
OBJECTTYPE ARCHIVE
DATABASE SAMPLE
POLICY DB2_Log_Policy
SCHEDULE User
ARCFUNC SAVE
#ARCFUNC COPY
#ARCDIR /home/db2inst1/arcdir
#RETDIR /home/db2inst1/arcdir
ENDOPER
```

Using ARCFUNC to Backup Archive Logs

ARCFUNC can be used with two options: SAVE and COPY. The default option is SAVE.

When using ARCFUNC SAVE, the name of the MS-Windows-NT policy configured earlier (see “Configuring an MS-Windows-NT Policy” on page 32) must be recorded in the db2.conf file.

The following is an example of a db2.conf file for backing up archive log files for the database SAMPLE using ARCFUNC SAVE. The policy name is db2_archive and the schedule name is db2_archive_sched

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE
POLICY db2_archive
SCHEDULE db2_archive_sched
ARCFUNC SAVE
ENDOPER
```

The ARCFUNC COPY function is different. It is a straight copy of the archive log(s) to the ARCDIR. There is no NetBackup policy or schedule involved or needed. The user exit program (db2uext2.exe) does the copy operation when called by DB2. However, you must setup ARCDIR and the RETDIR in the db2.conf file for the operation to function properly. The following example shows contents of a db2.conf file for the database SAMPLE.

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE
```



```
ARCFUNC copy
ARCDIR C:\MyLogs\arcdire\
RETDIR C:\MyLogs\arcdire\
ENDOPER
```

At some point, the disk will become full with archived log files. To manage this, you need to configure a separate MS-Windows-NT policy to archive the entire ARCDIR directory to NetBackup storage. To reclaim the disk space, the policy must use a "User Archive" schedule type. This instructs NetBackup to delete the files after they have been successfully backed up. Refer to the NetBackup System Administrator's Guide for more information about User Archive schedules.

Note This policy is managed by NetBackup only and has nothing to do with the db2.conf file.

Using ARCFUNC During Restore of Archive Log Files

If your database is restored to a rollforward pending state, execute a `ROLLFORWARD DATABASE` command. DB2 will request the archive log files it needs to do the rollforward. DB2 will perform the rollforward through the user exit program.

When a restore request comes in from DB2 and the ARCFUNC option is SAVE, the user exit program will look for the file from tape or other device you setup for backup. When using this option, you will not need to worry about the ARCDIR or RETDIR options.

When the option for ARCFUNC is COPY, the user exit program will look for the file to restore from the RETDIR you specified in the db2.conf file. If some or all of the files have been archived to NetBackup storage, you must restore them to the RETDIR directory before performing a `ROLLFORWARD DATABASE` command. See the "Performing Restores" section in the NetBackup User's Guide for detailed instructions regarding how to restore a file to disk. The `ROLLFORWARD DATABASE` command will request the log files that DB2 needs from the user exit program. The user exit program will look in the RETDIR to find the file since the option for ARCFUNC is COPY. The user exit program will then copy the files to the DB2 primary log folder.

Important Points

Remember the following about the db2.conf file.

- ◆ A different `POLICY` name needs to be specified for `DATABASE` and `ARCHIVE` objects.
- ◆ A db2.conf consists of a series of entries that define the policy and schedule based upon the `OBJECTTYPE`.
- ◆ `OBJECTTYPE` and `POLICY` are required fields and all other fields are optional.



- ◆ Each operation consists of a series of *keyword, value* pairs, which completely define the total action.
- ◆ The keyword is not case sensitive, but the value is.
- ◆ Entries are not nested.
- ◆ Within an entry, the *keyword, value* pairs can appear in any order. Each entry must be terminated by `ENDOPER`.
- ◆ Any line with a `#` in the first column is treated as a comment line.

Keywords

The following table describes the keywords and values used in `db2.conf` file.

Keyword	Value	Required	Default	Description
ARCDIR	<i>directory path</i>	yes, if the value for ARCFUNC is COPY no, if the value for ARCFUNC is SAVE	none	folder path name where archive logs are moved to.
ARCFUNC	SAVE COPY	no	SAVE	Only for OBJECTTYPE is ARCHIVE. SAVE saves a backup/restore archive log to/from NetBackup. COPY copies an archive to/from ARCDIR/RETDIR directories.
POLICY	<i>NB policyname</i>	yes	If not specified, it will not use the first DB2 policy found in the configuration on the NetBackup master server.	NetBackup policy name.
DATABASE	<i>database_name</i>	no	none	DB2 database name. If OBJECTTYPE is ARCHIVE, then an MS-Windows-NT policy must be specified. If OBJECTTYPE is DATABASE or TABLESPACE, then a DB2 policy must be specified.
ENDOPER	none	yes	none	Terminates each entry.



Keyword	Value	Required	Default	Description
OBJECTTYPE	DATABASE TABLESPACE ARCHIVE	yes	none	Type of backup/restore being performed. DATABASE and TABLESPACE are for DB2 policy types. ARCHIVE is for the MS-Windows-NT policy type.
RETDIR	<i>directory path</i>	yes if the value for ARCFUNC is COPY no if the value for ARCFUNC is SAVE	none	The folder path name where archive logs are retrieved from.
SCHEDULE	<i>nb schedname</i>	no	first Application Backup in policy	NetBackup schedule name in policy.
NORETRY	<i>(none)</i>	no	none	Obsolete: only use under the supervision of NetBackup support personnel



Configuring the User Environment

The NetBackup for DB2 on Windows variables can be set for use in the user environment. These variables are:

DB2_POLICY

DB2_SERVER

DB2_SCHED

For a description of these variables, see “Environmental Variables” on page 54.

Enabling Database User Authentication

Because the NetBackup Client service is, by default, started under the `SYSTEM` account, special attention must also be given to database user authentication. The `SYSTEM` account will not have permission to connect to the target database. You must run the NetBackup Client service under an account that has `SYSADM`, `SYSCTRL`, or `SYSMAINT` privileges for DB2 and the account name must comply with the DB2 naming rules. To do this:

1. From the Start menu, open Control Panel.
2. From the Control Panel, open Services.
3. Highlight **NetBackup Client Service** and click on **Stop**.
4. Click **Startup**.
5. From the **Log ON As:** pane, select **This Account**.
6. Type in the account name with `SYSADM`, `SYSCTRL`, or `SYSMAINT` privileges.
7. Type in the password.
8. Click **OK**.
9. Click **START** to restart the service.

For more information on naming rules and authentication, see your DB2 documentation.



Testing NetBackup for DB2 on Windows Configuration Settings

After you have configured the master server for NetBackup for DB2 on Windows, you should test the configuration settings. For a description of status codes, refer to the *NetBackup Troubleshooting Guide - Windows NT/2000* if you are using a Windows server or the *NetBackup Troubleshooting Guide - UNIX* if you are using a UNIX server.

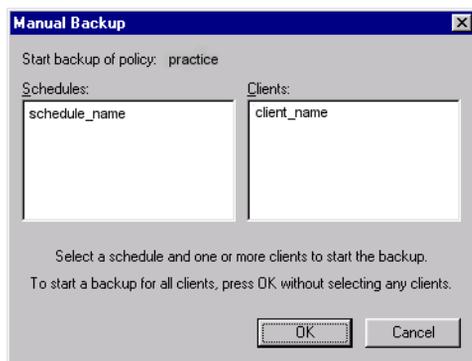
NetBackup Administration Console for Windows

Use this procedure to test a policy configuration from a Windows server or from the Remote Administration Console.

▼ To test the configuration settings on a Windows server

1. Log onto the server as administrator.
2. Start the NetBackup Administration Console.
3. In the left pane, click **Policies**. The policy list appears in the right pane.
4. Click on the policy you wish to test.
5. From the **Actions** menu, click **Manual Backup**.

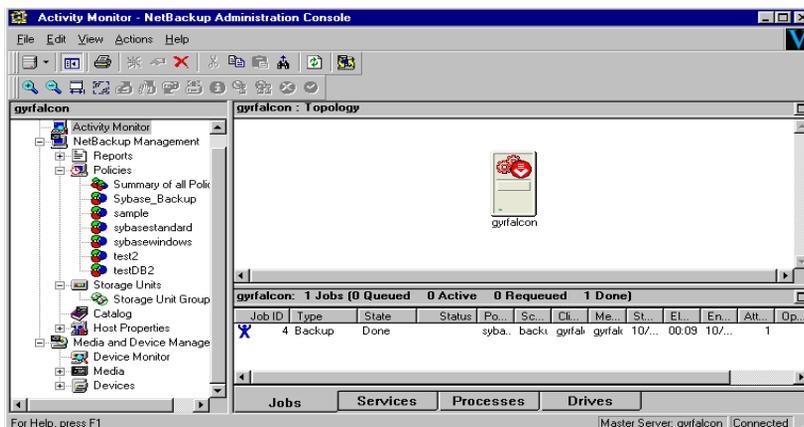
The Manual Backup dialog box appears.



The Schedules pane contains the name of a schedule (or schedules) configured for the policy you are going to test. The Clients pane contains the name of the client(s) listed in the policy you are going to test.

6. Follow the instructions on the dialog box.

7. Click **Activity Monitor** on the NetBackup Administration Console.



If the manual backup does not exit with a successful status, refer to the Troubleshooting chapter.

NetBackup Administration Console for UNIX

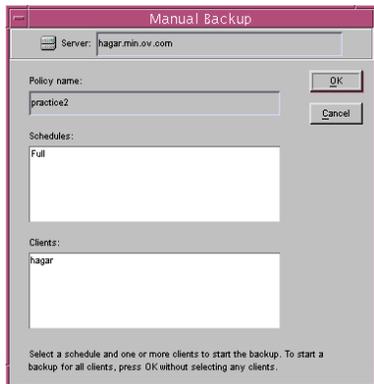
Use this procedure to test a policy configuration on the NetBackup Administration Console for UNIX.

▼ To test the configuration settings on a UNIX server

1. Log onto the server as root.
2. Start the NetBackup Administration Console.
3. In the left pane, click **Policies**.
The right pane splits into an All Policies pane and a details pane.
4. In the All Policies pane, click the policy you wish to test.
5. From the **Actions** menu, click **Manual Backup**.

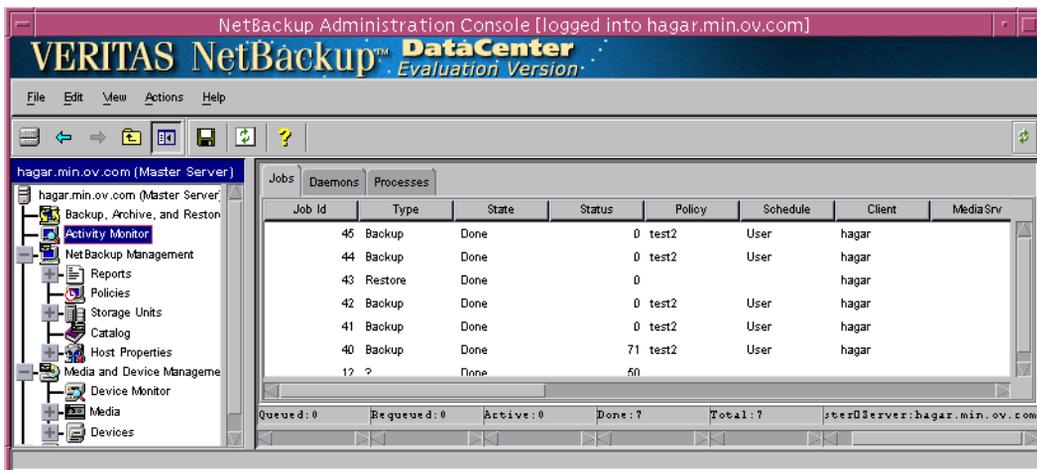


The Manual Backup dialog box appears.



The Schedules pane contains the name of a schedule (or schedules) configured for the policy you are going to test. The Clients pane contains the name of the client(s) listed in the policy you are going to test.

6. Follow the instructions on the dialog box.
7. Click **Activity Monitor** on the NetBackup Administration Console.



If the manual backup does not exit with a successful status, refer to the Troubleshooting chapter.

When all installation and configuration is complete, you can start DB2 backups and restores through NetBackup or execute DB2 UDB commands directly.

This chapter contains the following sections:

- ◆ Performing a Backup
- ◆ Browsing Back Ups
- ◆ Performing a Restore

Caution Always specify the correct DB2 script when configuring automatic backups or when starting operations through NetBackup (see the Configuration chapter). NetBackup for DB2 on Windows will not generate an error if a restore DB2 script file is used for a backup operation or a backup DB2 script is used for a restore operation.



Performing a Backup

There are two types of DB2 backups: database and archive logs.

- ◆ A database backup is a copy of the entire database or tablespaces. This backup is accomplished by executing a DB2 `BACKUP DATABASE` command. A database backup can be initiated through NetBackup by an automatic backup of a DB2 class, a manual backup of a DB2 policy, or a user-directed backup through the DB2 command window.
- ◆ An archive log backup is a backup of an archive log file for DB2. These backups are initiated by DB2 through a user exit program.

Automatic Backup of a DB2 Policy

The most convenient way to back up your database is to set up schedules for automatic backups. When the NetBackup scheduler invokes a schedule for an automatic backup, the DB2 scripts run:

- ◆ In the same order as they appear in the file list
- ◆ On all clients listed in the client list

The DB2 scripts will start the database backup.

To add a new schedule or change an existing schedule for automatic backups, follow the guidelines given in the Configuration chapter.

Manual Backup of a DB2 Policy

The administrator on the master server can use the NetBackup administrator's interface to manually execute an Automatic Backup schedule for a DB2 policy. The instructions for doing this are the same as given in "Testing NetBackup for DB2 on Windows Configuration Settings" on page 62.

Refer to for instructions on initiating a backup of a DB2 class.

Using DB2 to Perform a Backup

You can start a backup by executing the DB2 `BACKUP DATABASE` command from the DB2 command window on the client. For example:

```
db2 backup database sample load C:\Veritas\NetBackup\bin\NBDB2.dll
```

Refer to the *IBM DB2 Universal Database Command Reference* for details on using the DB2 `BACKUP DATABASE` command.

Browsing Backups

This section describes how to browse backup images. You can also use the DB2 `LIST BACKUP/HISTORY` command. For instructions on using this command, see the *IBM DB2 Universal Database Command Reference* manual.

Using `bplist` to Browse

The following example uses `bplist` to search all DB2 backups (images) for the client named `camel`, which is also the master server. The information comes from the NetBackup catalog on the master server. The `-t 18` on this command specifies DB2 backup types. The `bplist` output shows the list of DB2 database backup images that are stored in the NetBackup database. See the NetBackup online help for more information on the `bplist` command.

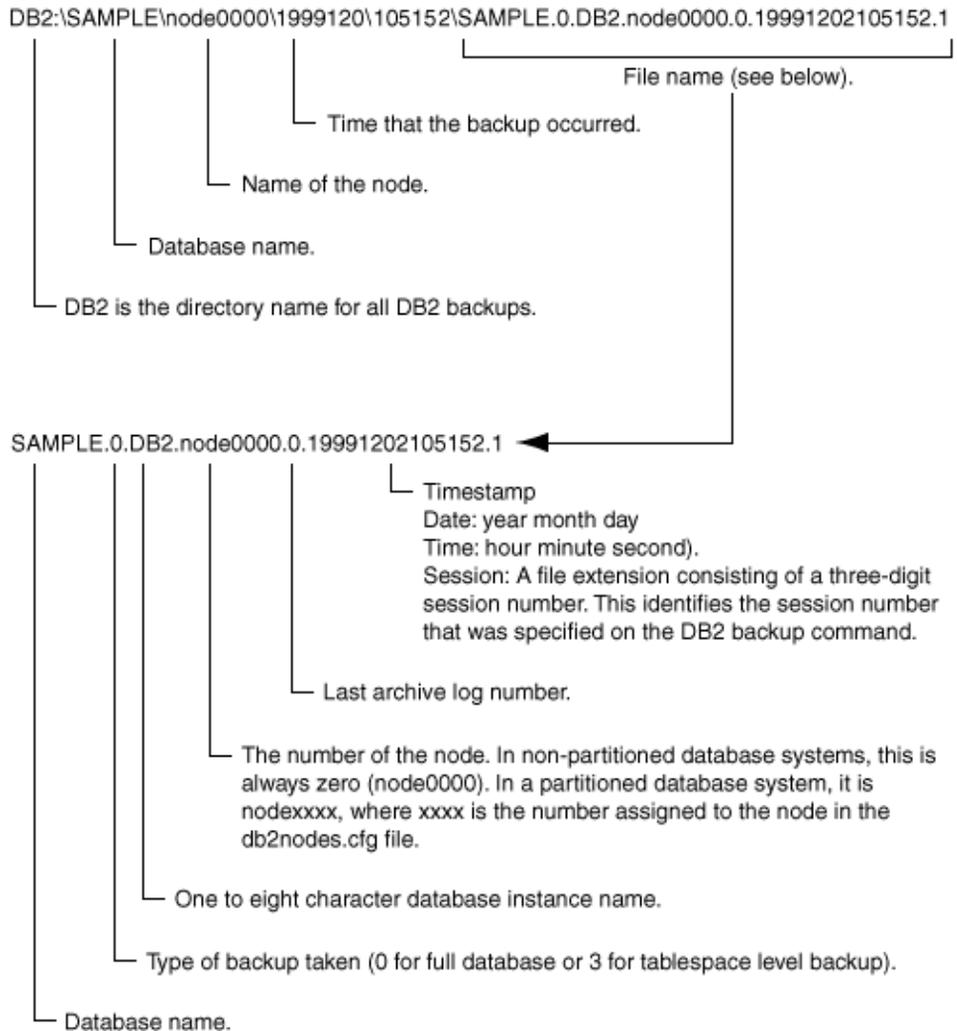
```
install_path\bplist -C camel -S camel -t 18 -R /  
DB2:\SAMPLE\node0000\19991202105152\SAMPLE.0.DB2.node0000.0.19991202105152.1  
DB2:\SAMPLE\node0000\19991202104734\SAMPLE.0.DB2.node0000.0.19991202104734.1  
DB2:\SAMPLE\node0000\19991201171209\SAMPLE.0.DB2.node0000.0.19991201171209.1  
DB2:\SAMPLE\node0000\19991129154117\SAMPLE.3.DB2.node0000.4.19991129154117.1  
DB2:\SAMPLE\node0000\19991129142046\SAMPLE.0.DB2.node0000.0.19991129142046.1
```

The next example uses `bplist` to search for all DB2 archive log file backups. The `-k DB2_Log_Policy` specifies files backed up using this policy. The policy name originates from the settings in the `db2.conf` file for archive log files. The `bplist` output shows the list of DB2 archive log files stored in NetBackup.

```
install_path\NetBackup\bin\bplist -k DB2_Log_Policy -C camel -S camel -R /  
C:\DB2\NODE0000\SQL00001\SQLLOGDIR\S0000026.LOG  
C:\DB2\NODE0000\SQL00001\SQLLOGDIR\S0000025.LOG  
C:\DB2\NODE0000\SQL00001\SQLLOGDIR\S0000024.LOG
```



The following diagram explains how to interpret one of the lines from the listing.



Performing a Restore

The procedure for restoring a DB2 database depends on the database involved and the problems that you have on your system. See the *DB2 UDB Administration Guide Data Recovery and High Availability Guide* for a complete description of how to recover a DB2 database.

Automatic Restore of a DB2 Policy

The following procedure shows how to restore our example database, SAMPLE, to the level of a recent database backup plus archive logs.

1. Perform a user-directed restore using DB2. See “Using DB2 to Restore” on page 69.
2. Browse and restore archive log.
See “Using bplist to Browse” in the previous section. Also follow the instructions in “Using ARCFUNC During Restore of Archive Log Files” on page 58.
3. Run the DB2 `ROLLFORWARD DATABASE` command. This brings the database back on-line. For example:

```
db2 rollforward database sample to end of logs and stop
```

For more information on this command, refer to the *IBM DB2 Universal Database Command Reference* manual.

Using DB2 to Restore

You can also start a restore by executing the DB2 `RESTORE DATABASE` command from the DB2 command window on the client. For example:

```
db2 restore database sample load C:\Veritas\NetBackup\bin\NBDB2.dll
```

Refer to the *IBM DB2 Universal Database Command Reference* manual for details on using the DB2 `RESTORE DATABASE` command.





When a DB2 database is used by SAP software, NetBackup for DB2 can be used within that environment for backup and restore of SAP data. This chapter provides guidelines for using SAP, DB2, and NetBackup together.

This chapter contains the following sections:

- ◆ Installation of the DB2 User-Exit Program
- ◆ Backup and Restore of DB2 Databases
- ◆ Archive and Restore of DB2 Log Files
- ◆ Backup of SAP Files



Installation of the DB2 User-Exit Program

DB2 allows for the presence of a single user-exit program to manage archiving of database log files. Both SAP and NetBackup deliver user-exit programs for exclusive use by DB2. The user-exit program resides in the DB2 database directory as db2uext2.

Note The use of the NetBackup user-exit program is required, because it provides for automatic archiving of log files to tape and on-demand recovery of log files by DB2.

Take precautions when installing SAP to prevent overwriting the NetBackup user-exit program. Always preserve the NetBackup db2uext2 file before installing SAP, and restore afterwards.

Backup and Restore of DB2 Databases

Follow the standard NetBackup instructions in this document for backup and restore of the DB2 database(s) used by SAP. You may use either DB2 or NetBackup to initiate database backups and restores.

Caution *Do not* use SAP CCMS, sapdba, brbackup, or brrestore commands to initiate backups or restores. They will not invoke NetBackup.

Caution Also, SAP must not be running when attempting to restore the database.

Archive and Restore of DB2 Log Files

Follow the standard NetBackup instructions in this document for configuring the user-exit program. DB2 will automatically invoke the user-exit program to archive and recover the necessary log files.

Caution DO NOT use SAP CCMS, sapdba, brarchive commands, or the SAP Logfile Management window in the DB2 Control Center for log file archival. They are dependent upon the SAP user-exit program for proper operation.

Backup of SAP Files

Be certain to include any/all SAP files when planning for SAP recovery, not just the DB2 database. For instance, any regular files used by SAP can be backed up using standard NetBackup file backup procedures. For file backup instructions, consult the “Performing Backups” section in the NetBackup User’s Manual.





NetBackup, NetBackup for DB2 on Windows, and the DB2 commands all provide reports on database operations. These reports are useful for finding errors associated with those applications.



NetBackup Reports

The NetBackup server and client software allow you to set up detailed debug logs for troubleshooting problems that occur outside of either NetBackup for DB2 on Windows or the DB2 commands. See the *NetBackup Troubleshooting Guide - UNIX* or the *NetBackup Troubleshooting Guide - Windows NT/2000* for a complete description of debug logs. Also see the `install_path\NetBackup\logs\README.debug` file.

Note These logs do not reveal errors that occur during the execution of the DB2 commands, unless those errors also affect NetBackup for DB2. DB2 may (or may not) use the NetBackup for DB2 logs for errors in the application. Your best sources for DB2 error information are the logs provided by DB2.

Enable the NetBackup for DB2 on Windows logs by performing the following steps.

1. Create the following folders on the client:
2. `install_path\NetBackup\logs\bphdb`
`install_path\NetBackup\logs\bpdb2`
Make sure there is share access to the log folders.

The following sections describe the logs created when you create the log directories. Use a text editor to view the contents of the logs.

bphdb Folder on the Client

The `install_path\NetBackup\logs\bphdb` folder contains the following types of logs. These logs are a good starting place to determine what type of error occurred.

`db2_stdout.mmddyy.hhmmss.txt`

Unless redirected elsewhere, NetBackup places DB2 script output in this file.

`db2_st derr.mmddyy.hhmmss.txt`

Unless redirected elsewhere, NetBackup places DB2 script errors in this file.

`mmddyy.log`

`bphdb` is the NetBackup Database Backup binary. This log contains debugging information for the `bphdb` process. NetBackup for DB2 on Windows uses this client process for DB2 script execution. It is invoked when an automatic backup schedule is executed.

bpdb2 Folder on the Client

The `install_path\NetBackup\logs\bpdb2` folder contains the following execution log.

`mmddyy.log`



This log contains debugging information and execution status for the DB2 NetBackup client processes linked to the library program provided with NetBackup for DB2 on Windows.

NetBackup Server Reports

NetBackup provides other reports that are useful in isolating problems. One such report is All Logs Entries on the server. See the *NetBackup System Administrator's Guide* for a description of this and other reports.



Setting the Debug Level

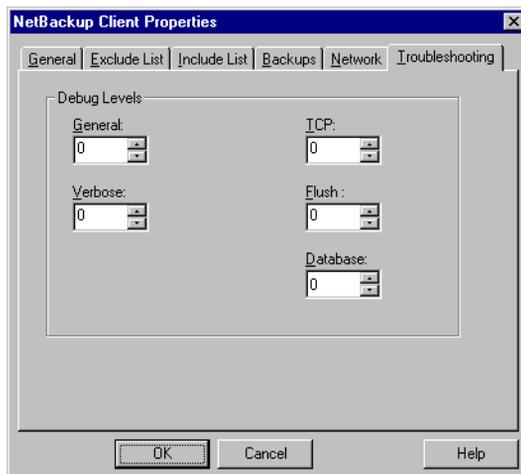
You can control the amount of information written to the debug log in the *install_path\NetBackup\logs\bpdb2* folder by changing the Database debug level. The higher the value, the more information is logged. In everyday normal operations, the default value of 0 is sufficient. However, VERITAS technical support may ask you to set the value higher when a problem is being analyzed. 5 is the highest possible setting.

▼ To change the Debug Level

1. From the Start button, click **Programs->VERITAS NetBackup->Backup, Archive, and Restore**.

The Backup, Archive, and Restore interface appears.

2. From the File menu, select **NetBackup Client Properties**.
3. In the NetBackup Client Properties dialog box, select the **Troubleshooting** tab.



By default, the settings are zero.

4. Set the Database debug level to adjust the amount of information from the NBDB2 vendor library.
5. Set the Verbose level to adjust the amount of information from the user-exit program.

Note Information from both settings will be logged to the same file, *mmddyy.log*

Preventing Timeout Failures on Large Database Restores

Large database restores sometimes fail when multiple restore sessions compete for resources. In this situation, a restore session can be delayed waiting for media or device access. If the delay is too long, the restore session will timeout.

This problem can be resolved by increasing the NetBackup Client Read Timeout setting, which will prevent session timeouts and allow the restores to complete successfully.

Use the NetBackup Administration Console on the server to change the properties of each client that contains a database you may need to restore. The default for the Client Read Timeout setting is 300 seconds (5 minutes). For database agent clients, increase the value significantly to prevent timeout errors, e.g. 30 minutes.

Using NET_BUFFER_SZ to Speed Up a Slow Restore

When the restore is slow you can speed it up by creating a file in the NetBackup install folder, *install_path\NetBackup\NET_BUFFER_SZ*, on the NetBackup master server. In the file, add the size of the socket you want to set in number of bytes. For example, 32768 bytes = 32K.

Note This only applies when the NetBackup master server is a UNIX machine.

Reason Code

The following reason code can occur while accessing the NetBackup DLL during the processing of a DB2 database utility BACKUP or RESTORE. Refer to the log files for more detail information about an error message.

300

Message:

```
ERR - No match for a database image file was found based on
the following criteria.
```

Cause:

The restore criteria of database name, instance, type, and backup time object can not be found in the NetBackup database.

Action:

Make sure the image you are trying to restore exist by using `bplist` to list it.



Make sure the correct instance is being used.

Make sure the correct values are set in `db2.conf`.

If logging is turned on, check the current log file in `install_path\NetBackup\logs\bpdb2` folder for more information.

305

Message:

```
ERR - found more than one object.
```

Cause:

More than one DB2 backup images were found in the NetBackup database that matched the restore criteria of database name, instance, type and backup time.

Action:

This should not happen under normal operation.

If logging is turned on, check the current log file in `install_path\NetBackup\logs\bpdb2` folder for more information.

310

Message:

```
ERR - bp.config failed with <%d> status.
```

Cause:

Unable to read configuration file.

Action:

Make sure this file exists and is properly configured.

If logging is turned on, check the current log file in `install_path\NetBackup\logs\bpdb2` folder for more information.

330

Message:

```
ERR - Invalid options encountered for action %s.
```

Cause:

Invalid option(s) encountered for the action. The %s is for a string that will be inserted according to the error condition.

Action:



Make sure the action parameters are used properly.

335

Message:

```
ERR - in get DB2 UDB level.
```

Cause:

NetBackup server and NetBackup DB2 DLL are not the same level.

Action:

Make sure NetBackup and DB2 DLL are the same level. Check the log file in *install_path*\NetBackup\logs\bpdb2 folder for the version number of the DLL and the version number for NetBackup. If they are not the same, you will need to install the same level.

380

Message:

```
ERR - db2.conf read status error <%d>.
```

Cause:

db2.conf read status error.

Action:

Make sure the folder is accessible with read and write permissions. Also make sure the file exists and has read permission.

385

Message:

```
ERR - Found multiple <DATABASE> entries before an <ENDOPER>
entries was encountered.
```

Cause:

Found multiple DATABASE entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra DATABASE entry.



390

Message:

ERR - Found multiple <OBJECTTYPE> entries before an <ENDOPER> entries was encountered.

Cause:

Found multiple OBJECTTYPE entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra OBJECTTYPE entry.

395

Message:

ERR - Found multiple <CLASS> entries before an <ENDOPER> entries was encountered.

Cause:

Found multiple CLASS entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra CLASS entry.

400

Message:

ERR - Found multiple <SCHEDULE> entries before an <ENDOPER> entries was encountered.

Cause:

Found multiple SCHEDULE entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra SCHEDULE entry.

405

Message:



ERR - Found multiple <ARCFUNC>entries before an <ENDOPER> entries was encountered.

Cause:

Found multiple ARCFUNC entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra ARCFUNC entry.

410

Message:

ERR - Found multiple <ARCDIR> entries before an <ENDOPER> entries was encountered.

Cause:

Found multiple ARCDIR entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra ARCDIR entry.

415

Message:

ERR - Found multiple <RETDIR> entries before an <ENDOPER> entries was encountered.

Cause:

Found multiple RETDIR entries before an ENDOPER entries was encountered in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Remove the extra RETDIR entry.

420

Message:

ERR - need to specify a valid CLASS or SCHEDULE in db2.conf for <DATABASE %s> and <OBJECTTYPE %s>.

Cause:



Class name or schedule name is not specified in the CLASS SCHEDULE entry in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Add an appropriate class name or schedule name to the CLASS or SCHEDULE entry.

425

Message:

```
ERR - need to specified a valid ARCDIR in db2.conf: Errno =  
%d : %s.
```

Cause:

Invalid ARCDIR is specified in db2.conf.

Action:

Add an appropriate folder name to the ARCDIR entry.

430

Message:

```
ERR - ARCDIR field needs to be specified in the db2.conf  
file.
```

Cause:

No ARCDIR entry found in the
install_path\NetBackup\dbext\db2\db2.conf file.

Action:

Add ARCDIR field to the *install_path*\NetBackup\dbext\db2\db2.conf file with an appropriate folder name as a parameter.

435

Message:

```
ERR - RETDIR field needs to contain a valid file when  
OBJECTTYPE is equal to ARCHIVE: %s.
```

Cause:

RETDIR field does not contain a valid file.

Action:



RETDIR field needs to contain a valid file when OBJECTTYPE is equal to ARCHIVE in the *install_path*\NetBackup\dbext\db2\db2.conf file.

440

Message:

ERR - COPY or SAVE needs to be specified for ARCFUNC when OBJECTTYPE is equal to ARCHIVE.

Cause:

Found OBJECTTYPE equal to ARCHIVE but no ARCFUNC is found in the db2.conf file.

Action:

Need to specify a copy or save parameter for ARCFUNC when OBJECTTYPE is equal to ARCHIVE.

445

Message:

ERR - Invalid <OBJECTTYPE> entries: <%s>.

Cause:

Invalid OBJECTTYPE entry in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Add the appropriate object type to the *install_path*\NetBackup\dbext\db2\db2.conf file.

450

Message:

ERR - OBJECTTYPE entry needs to be specified.

Cause:

OBJECTTYPE entry is not specified in the *install_path*\NetBackup\dbext\db2\db2.conf file.

Action:

Add the appropriate object type to the *install_path*\NetBackup\dbext\db2\db2.conf file.



455

Message:

ERR - CLASS entry needs to be specified.

Cause:

CLASS entry is not specified in the
install_path\NetBackup\dbext\db2\db2.conf file.

Action:

Add the appropriate class name to the CLASS entry in the
install_path\NetBackup\dbext\db2\db2.conf file.

502

Message:

NetBackup DB2 Handle Invalid

Cause:

Internal communication between DB2 and NetBackup has failed.

505

Message:

The input parameters supplied by DB2 are not valid.

Cause:

This may result from using an unsupported version of DB2

507

Message:

NetBackup Initialize Failed

Cause:

NetBackup encountered errors in preparing for the requested operation. This may result from improper configuration.

510

Message:

NetBackup Read Config Failed



Cause:

NetBackup encountered errors in reading configuration settings.

Action:

Check that the NetBackup client & server settings have been configured, and that the db2.conf file exists and has been configured.

511**Message:**

NetBackup Write Config Failed

Cause:

NetBackup encountered errors in preparing for the requested operation. This may result from improper configuration.

513**Message:**

NetBackup Begin Action Failed

Cause:

NetBackup encountered errors when attempting to start the requested operation. This may indicate a problem in obtaining necessary resources.

514**Message:**

NetBackup Create Image Failed

Cause:

NetBackup encountered errors when attempting to create a backup image.

515**Message:**

NetBackup Get Image Failed

Cause:

NetBackup encountered errors when attempting to access a backup image.



516

Message:

NetBackup Find Image Failed

Cause:

NetBackup encountered errors when attempting to locate a backup image.

518

Message:

NetBackup Write Failed

Cause:

NetBackup encountered errors when writing a backup image.

520

Message:

NetBackup Read Failed

Cause:

NetBackup encountered errors when reading a backup image

523

Message:

NetBackup Commit Data Failed

Cause:

NetBackup encountered errors when attempting to close the backup image.

524

Message:

NetBackup Commit Action Failed

Cause:

NetBackup encountered errors when attempting to complete the requested operation.



526

Message:

NetBackup Abort Action Failed

Cause:

NetBackup encountered errors when attempting to abort the previously requested operation.

528

Message:

NetBackup Delete Image Failed

Cause:

NetBackup encountered errors when attempting to expire an incomplete backup image. This typically indicates the previous operation has failed, and DB2 is attempting to delete any incomplete image.





Configuration for an DB2 EEE Environment

A

Note In an DB2 EEE environment, the NetBackup client and NetBackup for DB2 on Windows software must be installed on every client used by DB2.

The following is the configuration procedure.

1. Configure the Media Manager.

The instructions for configuring the Media Manager for DB2 EEE are the same as those for DB2. Refer to “Configuring the Media Manager” on page 21.

2. Set the Maximum Jobs per Client Global attribute.

The instructions for setting the Maximum Jobs per Client global attribute for DB2 EEE are the same as those for DB2. Refer to “Setting the Maximum Jobs per Client Global Attribute” on page 21.

3. Add NetBackup policies for the DB2 EEE environment.

The instructions for adding policies to NetBackup are different for DB2 EEE. Refer to “Adding NetBackup Policies for DB2 EEE Environment” on page 92.

4. Create DB2 Scripts for the DB2 EEE environment.

The instructions for creating scripts for DB2 EEE are the same as those for DB2. Refer to “Creating Scripts for DB2 Environment” on page 51.

Also refer to “Creating DB2 Scripts for an DB2 EEE Environment” on page 96 to view a DB2 EEE script.

5. Create a `db2.conf` file.

The instructions for configuring the `db2.conf` files for DB2 are the same as those for DB2. Refer to “Creating a `db2.conf` File” on page 56.

6. Test NetBackup for DB2 configuration settings.



The instructions for testing DB2 configuration settings are the same as those for DB2. Refer to “Testing NetBackup for DB2 on Windows Configuration Settings” on page 62.

Adding NetBackup Policies for DB2 EEE Environment

A DB2 EEE environment requires two separate DB2 policies: one for an Application Backup schedule type of backup and another for an Automatic Backup schedule type of backup.

To back up archive logs it will be necessary to add a separate MS-Windows-NT-type policy.

The following policies must be configured for a DB2 EEE environment.

- ◆ A DB2 type policy that has an Automatic Backup backup type schedule.

This policy should contain only one Automatic Backup backup schedule type. It includes only the clients that:

- contain the system catalog
- run a DB2 script.

The script uses the IBM `db2_all.bat` command to archive the catalog nodes before any other node is backed up. For configuration instructions, see the next topic “To Create a DB2 policy with Automatic Backup schedule type” on page 92.

- ◆ A DB2 type policy with an Application Backup schedule type.

This policy should contain only one Application backup schedule type. This policy includes *all* clients to be backed up in the client list, including the catalog node. For configuration instructions, see the “To create a DB2 policy with Application Backup schedule type” on page 94.”

- ◆ MS-Windows-NT type policy with a User Backup type schedule.

For configuration instruction, see “To Create an MS-Windows-NT Policy” on page 94.

▼ To Create a DB2 policy with Automatic Backup schedule type

Note Do not specify this policy or schedule name in the `install_path\NetBackup\dbext\db2\db2.conf` file.

1. Add a new policy, as specified in “Configuring a NetBackup Policy” on page 23
2. Specify the general attributes for the policy:



- a. Select DB2 for the policy type.
 - b. Specify other attributes as desired.
3. Delete the schedule called Default-Application-Backup.
 4. Configure a schedule for an Automatic Backup type of backup.

When the NetBackup scheduler invokes an *Automatic Backup* type of backup, NetBackup for DB2 on Windows will execute the DB2 scripts listed in the File list, on each client listed in the Client list.

Since all the DB2 scripts execute during automatic backups, you may need a separate DB2 policy for each type of backup you want to execute automatically on the same database. For example, to perform both full and tablespace backups of the same database, two different DB2 scripts are required. If you put both DB2 scripts in the same DB2 policy, NetBackup for DB2 on Windows executes both of them during each Automatic Backup session for that DB2 policy. This means that you will be performing both full and tablespace backups during the same backup type, which is normally undesirable.

5. Configure the Scripts list.

Note Specify a Scripts list if unattended scheduled backups are going to be performed.

List the DB2 scripts that you want to execute on the client. Always specify the full path name for a DB2 script file list. For example:

```
\NetBackup\dbext\db2\samples\db2_backup_db_offline.cmd
```

Note The scripts provided are not intended for production. Modify these scripts to suit your needs.

See “Creating DB2 Scripts for an DB2 EEE Environment” on page 96 for information on creating a DB2 script.

Caution NetBackup does not interpret a DB2 script. Be sure to use the correct DB2 script name in the file list to prevent an error or possibly a wrong operation.

6. Specify all DB2 clients that will run the DB2 script. These must be the clients that contain the system catalog. Click OK.
7. Click OK.

The Add New Policy dialog box closes. The policy you just configured appear in the policy list.



▼ **To create a DB2 policy with Application Backup schedule type**

Note The name of the policy must be specified in the *install_path\NetBackup\dbext\db2\db2.conf* file on the client.

1. Add a new policy, as specified in “Configuring a NetBackup Policy” on page 23
2. Specify the general attributes for the policy:
 - a. Select DB2 for the policy type.
 - b. Specify other attributes as desired.
3. Double-click the schedule called Default-Application-Backup. Configure the schedule properties for an Application Backup schedule type.
4. Specify the clients that you want to back up. The client must:
 - Have DB2 UDB installed
 - Have NetBackup for DB2 on Windows installed
5. Click OK.

The Add New Policy dialog box closes. The policy you just configured appear in the policy list.

▼ **To Create an MS-Windows-NT Policy**

An MS-Windows-NT type policy must be added when:

- ◆ `userexit` for logging is turned on in DB2 UDB.
- ◆ Client is a WindowsNT/2000 machine.

Note The name of the policy must be specified in the *install_path\NetBackup\dbext\db2\db2.conf* file on the client.

1. Add a new policy, as specified in “Configuring a NetBackup Policy” on page 29.
2. Specify the general attributes for the policy:
 - a. Select MS-Windows-NT for the policy type.
 - b. Specify other attributes as desired.
3. Add a schedule:



- a. Type the name of your schedule.
- b. In the **Type of Backup** box, select **User Backup**.

This is a user backup that is started by the NetBackup for DB2 on Windows user-exit program on the client. This schedule specifies the criteria for DB2 archive logs file backups. A User Backup schedule enables user controlled NetBackup operations performed on the client.
- c. In the **Retention** box, set the time period needed to retain two full backups of your database.

For example, if your database is backed up once every Sunday morning, select a retention period of at least two weeks.
- d. In the **Start Window** section of the **Schedules** dialog, set the time of day when you want backups to occur.

This schedule must encompass *all of the time periods* during which DB2 UDB can call the user-exit program.

Note You do not configure a script list for this policy because it will be a User Backup type schedule.

4. Specify the clients that you will be backing up. The client must have:
 - DB2 UDB installed
 - NetBackup for DB2 on Windows installed
5. Click **OK**.

The Add New Policy dialog box closes. The policy you just configured appears in the policy list.



Creating DB2 Scripts for an DB2 EEE Environment

1. Copy the example scripts to a different directory on your client. DB2 scripts can be located anywhere on the client.
2. Modify the script
 - a. Use a text editor to open the script.
 - b. Follow the instructions in the script.

Note Test the scripts you just created by backing up the policy as explained in “Testing NetBackup for DB2 on Windows Configuration Settings” on page 62.

Example

The following shows a sample script:

```
install_path\dbext\db2\samples\db2_mpp_backup_offline.cmd:
```

```
@REM $Revision: 1.5 $
```

```
@REM -----
@REM This script is provided as an example. Changes must be made to make this
@REM work with your environment.
```

```
@REM
@REM This script takes an offline backup of the database. An offline backup
@REM requires exclusive access to the database. All users must be disconnected
@REM from the database or database partition before the backup operation can
@REM occur. In a partitioned database environment, if you are performing an
@REM offline backup of the catalog node, there can be no activity on the entire
@REM database.
```

```
@REM To back up a database or a database partition, the user must have SYSADM,
@REM SYSCTRL, or SYSMAINT authority.
```

```
@REM -----
```

```
@echo off
@setlocal
```

```
@REM -----
@REM These environmental variables are created by Netbackup (bphdb)
@REM -----
```

```
@echo DB2_POLICY = %DB2_POLICY%
@echo DB2_SCHEDULED = %DB2_SCHEDULED%
@echo DB2_SCHED = %DB2_SCHED%
@echo DB2_SERVER = %DB2_SERVER%
@echo DB2_FULL = %DB2_FULL%
```



```

@echo DB2_INCR = %DB2_INCR%
@echo DB2_USER_INITIATED = %DB2_USER_INITIATED%

@REM -----
@REM DB2 home directory of the catalog node
@REM Modify to your DB2 catalog node home
@REM -----

@set DB2_HOME=d:\sqllib
@echo DB2_HOME = %DB2_HOME%

@REM -----
@REM database to backup
@REM Modify to the database you want to backup
@REM -----

@set DATABASE=sample
@echo DATABASE = %DATABASE%

@REM -----
@REM commands
@REM -----

@set CMD_FILE=%temp%\cmd_file
@set DB2_ALL=%DB2_HOME%\bin\db2_all.bat
@set DB2CMD=%DB2_HOME%\bin\db2cmd.exe

@echo CMD_FILE = %CMD_FILE%
@echo DB2_ALL = %DB2_ALL%
@echo DB2CMD = %DB2CMD%

@REM -----
@REM sequentially backup all nodes (system node will be done first)
@REM uncomment the lines below if you want to backup sequentially all nodes
@REM Note: if you do this, do not do the parallel option below
@REM -----

@set LIB=C:\progra~1\veritas\netbackup\bin\nbdb2.dll
@echo LIB = %LIB%

@REM @set CMD_PARAM=db2 "backup database %DATABASE% load %LIB%"
@REM @echo CMD_PARAM = %CMD_PARAM%
@REM @set CMD_LINE=%DB2_ALL% %CMD_PARAM%

@REM -----
@REM Execute the command
@REM -----

@REM @echo CMD_LINE= %CMD_LINE%
@REM %CMD_LINE%

@REM -----
@REM Backup catalog node first then backup all other nodes in parallel

```



Creating DB2 Scripts for an DB2 EEE Environment

```
@REM uncomment the line below if you want to backup all nodes in parallel except
@REM the catalog node.
@REM Note: if you want sequential backup, do not do parallel backup and
@REM vice versa)
@REM -----

@REM --- backup catalog node ---
@set CMD_LINE=%DB2CMD% /c /w /i db2 -f %CMD_FILE%
@echo backup database %DATABASE% load %LIB% > %CMD_FILE%
@echo CMD_LINE = %CMD_LINE%
@REM %CMD_LINE%

@REM --- exit if the catalog backup failed ---
if errorlevel 1 goto errormsg

@REM --- backup the rest of the nodes in parallel ---
@set CMD_LINE2=%DB2_ALL% "||<<-0<db2 backup database %DATABASE% load %LIB%"
@echo CMD_LINE2= %CMD_LINE2%
@REM %CMD_LINE2%

if errorlevel 1 goto errormsg
echo BACKUP successful
if "%STATUS_FILE%" == "" goto end
if exist %STATUS_FILE% echo 0 > %STATUS_FILE%
goto end

:errormsg
echo Execution of BACKUP command failed - exiting
if "%STATUS_FILE%" == "" goto end
if exist %STATUS_FILE% echo 1 > %STATUS_FILE%

:end

@endlocal
```



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