

Symantec NetBackup™ for DB2 Administrator's Guide

UNIX, Windows, and Linux

Release 7.5



Symantec NetBackup™ for DB2 Administrator's Guide

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Documentation version: 7.5

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Introduction to NetBackup for DB2

This chapter includes the following topics:

- [Features of NetBackup for DB2](#)
- [NetBackup for DB2 overview](#)

Features of NetBackup for DB2

[Table 1-1](#) shows NetBackup for DB2's main features and introduces some terms used in this documentation.

Table 1-1 NetBackup for DB2 features and descriptions

Feature	Description
Media and device management	All devices supported by Media Manager are available to NetBackup for DB2.
Scheduling facilities	NetBackup scheduling facilities on the master server can be used to schedule automatic and unattended DB2 backups. This feature 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.
Multiplexed backups and restores	NetBackup for DB2 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.

Table 1-1 NetBackup for DB2 features and descriptions (*continued*)

Feature	Description
Transparent DB2 and regular file system backup and restore operations	<p>All backups and restores run simultaneously and transparently without any action from the NetBackup administrator.</p> <p>The database administrator can run database backup and restore operations through NetBackup. An administrator or any other authorized user can use NetBackup to run database backups and restores.</p>
Sharing the same storage units used for other file backups	<p>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. NetBackup for DB2 can use Media Manager, disk, and PureDisk storage units.</p>
Centralized and networked backup operations	<p>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.</p>
Graphical user interfaces	<p>NetBackup provides the following graphical user interfaces for client users and administrators:</p> <ul style="list-style-type: none"> ■ Backup, Archive, and Restore user interface ■ NetBackup Administration Console for Java ■ NetBackup Administration Console for Windows <p>A database administrator or NetBackup administrator can start backup or restore 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>
Templates	<p>The NetBackup for DB2 database wizards can create backup and recovery templates. You can launch the backup wizard and the recovery wizard from the Backup, Archive, and Restore interface. The wizards generate platform-independent templates that contain configuration information that the software uses when performing backups and restores. Because the wizard-generated templates do not support all the features native to DB2, you may want to write a customized backup or restore script in an operating-system defined scripting language. You can use a template as the base for a script.</p>

Table 1-1 NetBackup for DB2 features and descriptions (*continued*)

Feature	Description
Parallel backup and restore operations	NetBackup for DB2 supports the parallel backup and restore capabilities of DB2 commands. For example, 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.
Compression	Compression increases backup performance over the network and reduces the size of the backup image that NetBackup writes to the storage unit.

For more information on general NetBackup terminology, see the *NetBackup Administrator's Guide, Volume I*.

NetBackup for DB2 overview

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

The server that hosts the DB2 database must be a NetBackup client.

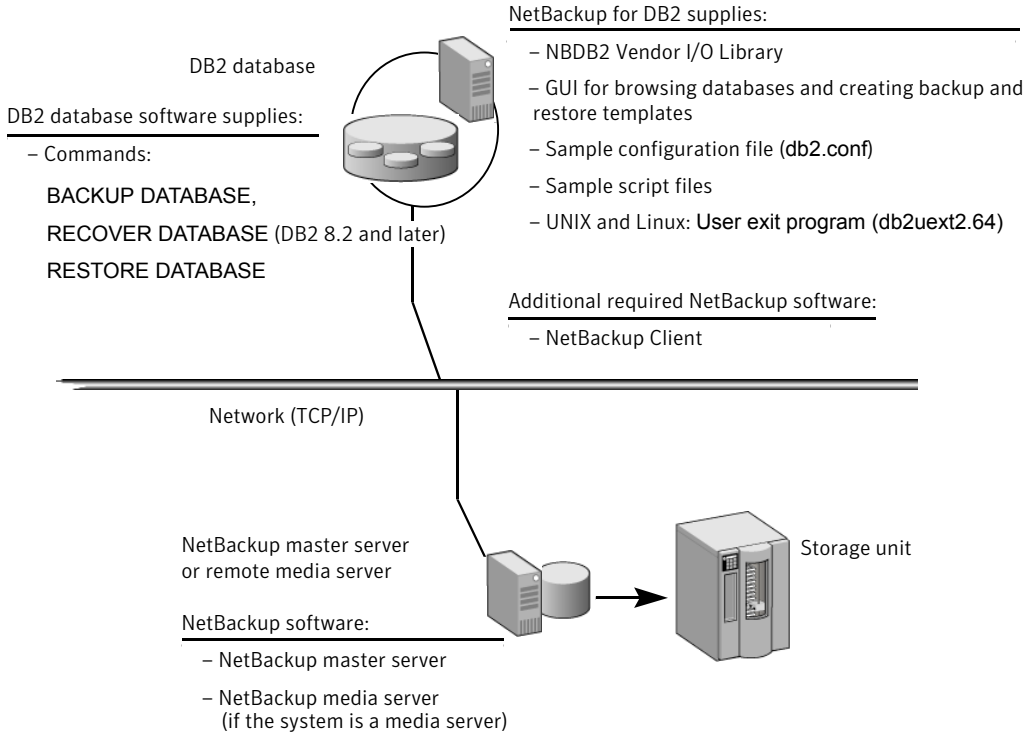
On Windows, NetBackup for DB2 must be licensed on the server.

On UNIX and Linux, NetBackup for DB2 must be installed on the server.

[Figure 1-1](#) shows the hardware components and software components for a NetBackup for DB2 environment.

Figure 1-1 NetBackup for DB2 components

System hosting the DB2 database



About the NetBackup for DB2 components

[Table 1-2](#) describes the main NetBackup components in a NetBackup for DB2 environment.

Table 1-2 NetBackup for DB2 component descriptions

Component	Description
NBDB2 vendor I/O library	<p>The DB2 <code>BACKUP</code> and <code>RESTORE</code> commands use the NBDB2 vendor I/O library to send data buffers between a DB2 database and NetBackup.</p> <p>You specify the library as the argument to the <code>LOAD</code> parameter of the DB2 <code>BACKUP</code> and <code>RESTORE</code> commands.</p> <p>The installation program installs the vendor library in the following location:</p> <p>On Windows: <code>install_path\NetBackup\bin\nbdb2.dll</code></p> <p>On UNIX and Linux: <code>/usr/openv/netbackup/bin</code></p> <p>On UNIX and Linux, the name of the vendor library differs, depending on your platform as follows:</p> <ul style="list-style-type: none"> ■ 64-bit Solaris SPARC and 64-bit Linux x86: <code>nbdb2.so64</code> ■ 64-bit AIX and HP-UX PARISC: <code>nbdb2.s164</code> ■ 64-bit Linux Itanium, HP Itanium, and IBM pSeries: <code>nbdb2.so</code>
User exit program	<p>The NetBackup for DB2 user exit program, <code>db2uext2</code>, provides one method for backing up and restoring the DB2 archive log files.</p> <p>Use this method at the following times:</p> <ul style="list-style-type: none"> ■ When you use the DB2 <code>BACKUP</code> command or <code>ROLLFORWARD</code> command to back up or restore databases. ■ When the user exits the database with the DB2 <code>TERMINATE</code> or <code>DISCONNECT</code> command. ■ When the log file fills and DB2 starts writing transactions to another log file. ■ The DB2 <code>ARCHIVE LOG</code> command is issued. <p>The user exit program backs up and restores the archive logs as files. The file is called <code>db2uext2.64</code>. NetBackup for DB2 supports this method for protecting the archive logs on all supported DB2 releases.</p> <p>The user exit program resides in the following location:</p> <p>On Windows: <code>%DB2_INSTANCE%\bin\db2uext2.exe</code></p> <p>On UNIX and Linux: <code>\$DB2_INSTANCE/sql1lib/adm/db2uext2.</code></p> <p>Other methods are available for backing up archive log files. See “About log archiving” on page 25.</p>

Table 1-2 NetBackup for DB2 component descriptions (*continued*)

Component	Description
<p>Sample configuration file (db2.conf) and script files</p>	<p>The installation software installs the following sample files:</p> <ul style="list-style-type: none"> ■ A sample configuration file (db2.conf file). The db2.conf file includes specifications for backups and restores, and it provides information on policies and schedules. The NetBackup for DB2 library and user exit program use the information in this file. ■ Sample backup and restore scripts. NetBackup can invoke a script to perform a scheduled backup or restore of a DB2 database. The scripts contain DB2 BACKUP or RESTORE commands for use with NetBackup. <p>Alternatively, users can use the NetBackup for DB2 wizards to create backup and restore templates. You can use the templates in place of scripts, and you can convert templates into scripts.</p> <p>The installation software writes these sample files to the following location:</p> <p>On Windows: <i>install_path</i>\NetBackup\dbext\db2\samples</p> <p>On UNIX and Linux: <i>/usr/opensv/netbackup/ext/db_ext/db2/scripts.</i></p> <p>To use the sample files, copy the sample files to working directories and modify them for your own use.</p>
<p>NetBackup for DB2 backup wizard and recovery wizard</p>	<p>NetBackup for DB2 provides wizards that enable you to create backup and recovery templates. You invoke the wizards by browsing for and selecting a DB2 database object in the Backup, Archive, and Restore interface. After you supply information about the operation, the wizard creates a template that you can run immediately or store on the server (for backup templates). You can use the stored backup templates in scheduled backups through a NetBackup policy. You can also use them to perform manual backups on the NetBackup for DB2 client.</p>

About NetBackup for DB2 terminology

DB2 supports archiving its log file through a user exit program or through a vendor library. DB2 supports backing up the archive log files by using a vendor library in its 8.2 and later releases. NetBackup for DB2 supplies a user exit program and a library to support both of these methods.

The DB2 syntax for specifying these archive log methods differs from release to release. NetBackup for DB2 topics use the terms "user exit" and "VENDOR" to differentiate the methods.

Table 1-3 shows the DB2 syntax you can use to specify these methods within DB2. It indicates the term that the DB2 for NetBackup uses to describe each method.

Table 1-3 Use of user exit and VENDOR terminology

Settings used with "user exit"	Setting used with "VENDOR"
LOGARCHMETH1=LOGRETAIN LOGARCHMETH1=USEREXIT USEREXIT=ON USEREXIT=YES LOGRETAIN=ON LOGRETAIN=RECOVERY	LOGARCHMETH1=VENDOR <i>library</i>

When `VENDOR` is used, archive logs are backed up by means of the NetBackup for DB2 vendor library. The full specification for this archive log method is as follows:

On Windows: LOGARCHMETH1=VENDOR:*install_path*\NetBackup\bin\nbdb2.dll

On UNIX and Linux: LOGARCHMETH1=VENDOR:/usr/opensv/netbackup/bin/*library*

For *library*, specify an operating system specific library.

When a user exit program is used, archive logs are backed up by means of the NetBackup for DB2 user exit program. The DB2 syntax that defines the user exit program includes the `USEREXIT` and `LOGRETAIN` keywords that are specified in a configuration parameter.

Installing NetBackup for DB2

This chapter includes the following topics:

- [Planning the installation of NetBackup for DB2](#)
- [Verifying the operating system and platform compatibility for NetBackup for DB2](#)
- [Adding license keys for NetBackup for DB2 backups](#)
- [About log archiving](#)
- [Specifying the DB2 home path \(UNIX and Linux\)](#)
- [About adding new DB2 instances](#)

Planning the installation of NetBackup for DB2

[Table 2-1](#) shows the major installation steps needed to run NetBackup for DB2. Each step contains one or more links to pertinent procedures and concepts.

Table 2-1 Installation steps for NetBackup for DB2

Step	Action	Description
Step 1	Verify the installation prerequisites.	See “ Verifying the operating system and platform compatibility for NetBackup for DB2 ” on page 22. See “ NetBackup server and client requirements for NetBackup for DB2 ” on page 23. See “ DB2 server software requirements for NetBackup for DB2 ” on page 23. See “ Requirements for installing NetBackup for DB2 in a NetBackup cluster ” on page 24.
Step 2	Add the license key for NetBackup for DB2.	See “ Adding license keys for NetBackup for DB2 backups ” on page 24.
Step 3	Specify a log archive method.	See “ About log archiving ” on page 25.
Step 4	(UNIX and Linux) specify the DB2 home path.	See “ Specifying the DB2 home path (UNIX and Linux) ” on page 27.
Step 5	Add a new database instance.	See “ About adding new DB2 instances ” on page 28.

Verifying the operating system and platform compatibility for NetBackup for DB2

Verify that the NetBackup for DB2 agent is supported on your operating system or platform.

To verify operating system and compatibility

- 1 Go to the Symantec Support Web page:
<http://www.symantec.com/business/support/index.jsp>
- 2 Click on the link for **NetBackup Enterprise Server**.
- 3 In the list of documents, click on the following document:
NetBackup Database Agent Compatibility List
- 4 For information on supported cluster environments for NetBackup for DB2, see the following document:
NetBackup Cluster Compatibility List
- 5 For information on support for Snapshot Client, see the following document:
NetBackup Snapshot Client Compatibility List

NetBackup server and client requirements for NetBackup for DB2

Note: To use NetBackup for DB2 with Snapshot Client, you must have a license for NetBackup Snapshot Client.

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

- The NetBackup server software is installed and operational on the NetBackup server. The NetBackup server platform can be any that NetBackup supports. See the *NetBackup Installation Guide*.
- Make sure that you configure any backup media that the storage unit uses. The number of media volumes that are required depends on several things:
 - The devices used
 - The sizes of the databases that you want to back up
 - The amount of data that you want to archive
 - The size of your backups
 - The frequency of backups or archivesSee the *NetBackup Administrator's Guide, Volume I*.

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

- The NetBackup client software is installed on the computer that has the databases you want to back up.

DB2 server software requirements for NetBackup for DB2

Verify the following regarding the DB2 server software on the NetBackup server or client:

- DB2 server software must be installed and operational.
- One or more DB2 instances must exist.

Note: In a DB2 EEE environment, install the NetBackup client software on every node and client that DB2 uses.

Requirements for installing NetBackup for DB2 in a NetBackup cluster

If you plan to use the database agent software on a NetBackup server configured in a NetBackup cluster, verify the following requirements:

- Your cluster environment is supported by NetBackup:
See “[Verifying the operating system and platform compatibility for NetBackup for DB2](#)” on page 22.
- The NetBackup server software is installed and configured to work in a NetBackup cluster.
See the *NetBackup Installation Guide*.
See the *NetBackup Clustered Master Server Administrator's Guide*.
- The DB2 server software is installed and operational on each node to which NetBackup can failover.
- On each node where NetBackup server resides, add the license key for the database agent.

Adding license keys for NetBackup for DB2 backups

Note: To use NetBackup for DB2 with Snapshot Client, you must have a license for NetBackup Snapshot Client.

To use NetBackup for DB2, add a valid license key for it on the master server. More information is available on how to add license keys.

See the *NetBackup Administrator's Guide, Volume I*.

In a NetBackup cluster, add the key on each node where the NetBackup server is installed.

To add a NetBackup for DB2 license key in the NetBackup Administration Console

- 1 On the master server, open the NetBackup Administration Console.
- 2 Choose **Help > License Keys**.
- 3 Click the **New** icon.
- 4 Type the license key and click **Add**.

On UNIX and Linux, you can also add a license key by using the `get_license_key` command.

To add a NetBackup for DB2 license key with the `get_license_key` command

- 1 From the master server server, run the following command:

```
/usr/opensv/netbackup/bin/admincmd/get_license_key
```
- 2 When the system prompts you, type the host name of the NetBackup master server.

About log archiving

DB2 can write database archive logs by using several different methods. For a roll-forward recovery, you need both the database itself and the archive logs from the backup media. The DB2 parameters that specify an archive log method include the `LOGRETAIN`, `USEREXIT`, and `LOGARCHMETH1` keywords.

The following topics describe the archive methods and how to specify an archive method in DB2.

See [“Using the VENDOR archive method”](#) on page 25.

See [“Using the user exit archive method”](#) on page 26.

The terms “VENDOR” and “user exit” describe the methods that DB2 supports for log archiving. Ensure that you understand how the terms are used in this manual.

See [“About NetBackup for DB2 terminology”](#) on page 18.

Using the VENDOR archive method

Only the DB2 8.2 release lets you use the `VENDOR` log archive method.

If you use this method, note the following:

- The archive logs are backed up as part of the database, so you do not need a separate NetBackup policy for them.
- NetBackup for DB2 backs up and restores the archive log files as a byte stream. This method uses the DB2 backup API and the DB2 restore API.

To use the VENDOR archive method

- 1 Quiesce the DB2 database.
Perform this procedure and the configuration procedures at a time when minimal changes are made to the DB2 database.
- 2 Specify the archive method. The syntax is as follows:
On Windows:
`LOGARCHMETH1=VENDOR:install_path\NetBackup\bin\nbdb2.dll`
On UNIX and Linux:
`LOGARCHMETH1=VENDOR:/usr/opensv/netbackup/bin/library`
For the library name, refer to the following topic.
See [“About the NetBackup for DB2 components”](#) on page 16.
- 3 Verify your DB2 configuration to ensure that the appropriate log archiving method for your site is enabled.
If necessary, edit your DB2 configuration specifications to specify the log archiving method.

Using the user exit archive method

NetBackup for DB2 includes a user exit program that you can use to back up the archive logs. Any DB2 release lets you use this log archive method. The syntax for specifying the user exit method depends on the DB2 release.

If your DB2 configuration uses the `USEREXIT` or `LOGRETAIN` keywords in its configuration parameters, note the following:

- NetBackup for DB2 backs up and restores the archive log files as individual files.
- DB2 supports this archive method only for backward compatibility.

To use the user exit archive method

- 1 Quiesce the DB2 database.
Perform this procedure and the configuration procedures at a time when minimal changes are made to the DB2 database.
- 2 Specify the archive method.
The method you use to specify these parameters and the syntax for these parameters depends on the DB2 version level. For more information on the effects of these parameters within DB2, or on the specific syntax for these parameters, see your DB2 documentation.

- 3 If your DB2 configuration uses the `USEREXIT` or `LOGRETAIN` keywords in its configuration parameters, configure one of the following:
 - On Windows, a separate NetBackup MS-Windows policy that includes the archive logs.
 - On UNIX and Linux, a separate NetBackup Standard policy that includes the archive logs.
 - On UNIX and Linux, directories for the user exit program to use when it copies the archive logs. You may also want to create a separate NetBackup Standard policy for backing up these directories.
 - On Windows, directories for the user exit program to use when it copies the archive logs. You may also want to create a separate NetBackup MS-Windows policy for backing up these directories.
 - On UNIX and Linux, modify an existing NetBackup Standard policy with a user backup schedule. Include the archive log directories..
 - On Windows, modify an existing NetBackup MS-Windows policy with a user backup schedule. Include the archive log directories.
- 4 Verify your DB2 configuration to ensure that the appropriate log archiving method for your site is enabled.

If necessary, edit your DB2 configuration specifications to specify the log archiving method.

Specifying the DB2 home path (UNIX and Linux)

After you add the license key for NetBackup for DB2, run this script on the computer where the DB2 vendor software is installed. With this script, NetBackup can gather additional information about your DB2 environment.

Complete this procedure at the following times:

- After you specify a log archiving method in DB2.
- If you licensed NetBackup for DB2 for the first time.
- When you create a new DB2 instance.

To specify the DB2 home path

- 1 Change to the following directory:

```
/usr/opensv/netbackup/bin
```

- 2 Run the following script:

```
./db2_config
```

- 3 Supply the home path for the database instance.

For example:

```
/home/db2inst1
```

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

About adding new DB2 instances

Adding new DB2 instances on a Windows system is different than adding new instances on a UNIX or Linux system.

- On Windows, the NetBackup for DB2 installation software writes the user exit program to the following location:

```
install_path\NetBackup\dbext\DB2\db2uext2.exe
```

DB2 expects the `db2uext2` executable to reside in the DB2 installation location. If you reinstall or move the DB2 installation, manually copy `db2uext2.exe` from the NetBackup location into the DB2 location.

- On UNIX or Linux, if you install a new DB2 instance after you install NetBackup, you need to add this new instance to the NetBackup configuration. This action ensures that all new DB2 instances are included in backup operations. See [“Specifying the DB2 home path \(UNIX and Linux\)”](#) on page 27.

Configuring NetBackup for DB2

This chapter includes the following topics:

- [Overview of NetBackup for DB2 configuration](#)
- [About permissions for NetBackup for DB2 log files \(UNIX and Linux\)](#)
- [About configuring a backup policy for a DB2 database](#)
- [About adding backup selections to a DB2 policy](#)
- [About adding schedules to a NetBackup for DB2 policy](#)
- [Testing configuration settings for NetBackup for DB2](#)
- [About backing up archive log files with the user exit program](#)
- [Configuring the runtime environment](#)
- [About NetBackup for DB2 templates and shell scripts](#)

Overview of NetBackup for DB2 configuration

Before you configure NetBackup for DB2, complete the installation procedure.

You perform many configuration steps from the NetBackup Administration Console on the master server. The type of console available depends on your master server platform. NetBackup supports a Java interface for both Windows and UNIX master servers. In addition, NetBackup supports a Windows interface for Windows master servers.

The Java and Windows interfaces are nearly identical. If interface differences exist in the configuration procedures, the term “Windows” or “Java” appears in the procedure to differentiate between the two interfaces.

[Table 3-1](#) shows the three major parts of NetBackup for DB2 configuration.

Table 3-1 Major configuration tasks

Task	Description
Configure a backup policy for a DB2 database	A backup policy for a database defines the backup criteria for a specific group of one or more clients. To back up the database environment, you must define at least one DB2 policy with the appropriate schedules. See “About configuring a backup policy for a DB2 database” on page 31.
Configure the runtime environment	To configure your runtime environment, you must create a <code>db2.conf</code> file. This task includes a description of the environment variables that NetBackup creates. See “Configuring the runtime environment” on page 48.
Create a template or shell script	To perform a scheduled NetBackup for DB2 backup, you must create a template or a shell script. The template or the shell script controls the backup job on the NetBackup for DB2 client. See “About NetBackup for DB2 templates and shell scripts” on page 61.

About permissions for NetBackup for DB2 log files (UNIX and Linux)

NetBackup uses the `/usr/opensv/netbackup/logs` directory tree not only for the recording of troubleshooting information, but for progress and communication updates to users and other NetBackup applications. Restrictive permissions on these directories can not only disable the collection of troubleshooting data, but also prevent the application itself from functioning correctly.

Backup and restore operations fail when permissions are too restrictive. We recommend that you make all of the `usr/opensv/netbackup/logs` directories and subdirectories readable and writeable by all users (777 permissions). However,

security requirements may prohibit global read-write access. If so, you can restrict permissions of specific directories to a single group or user if the following is true: Processes that run as members of that group or as that user initiate all backup and restore operations that are related to that directory.

Check that the `/usr/opensv/netbackup/logs/user_ops` directory tree has 777 permissions. The items in this directory need to be accessible for the applications to operate correctly.

If you restrict permissions on the other directories that are located in `/usr/opensv/netbackup/logs`, backup and restore operations are not affected. However, troubleshooting efforts may be hindered when processes do not have the appropriate permissions to update the debug logs therein.

About configuring a backup policy for a DB2 database

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

These criteria include the following:

- Storage unit and media to use
- Policy attributes
- Backup schedules
- Clients to be backed up
- Backup templates or script files to be run on the clients

To back up the database environment, define at least one DB2 policy with the appropriate schedules. A configuration can have a single policy that includes all clients, or there can be many policies, some of which include only one client.

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

See the *NetBackup Administrator's Guide, Volume I*.

To add and configure a policy, see the following topics:

- See [“Adding a new NetBackup for DB2 policy”](#) on page 32.
- See [“About policy attributes for NetBackup for DB2”](#) on page 32.
- See [“About adding schedules to a NetBackup for DB2 policy”](#) on page 39.
- See [“Adding clients to a NetBackup for DB2 policy”](#) on page 33.
- See [“About adding backup selections to a DB2 policy”](#) on page 35.

Adding a new NetBackup for DB2 policy

This topic describes how to add a new backup policy for a database.

To add a new NetBackup for DB2 policy

- 1 Log on to the master server as administrator (Windows) or root (UNIX).
- 2 Start the NetBackup Administration Console.
- 3 If your site has more than one master server, choose the one on which you want to add the policy.
- 4 Do one of the following:
 - Windows: In the left pane, right-click **Policies** and choose **New Policy**.
 - Java interface: In the left pane, click **Policies**. In the **All Policies** pane, right-click the master server, and click **New Policy**.
- 5 In the **Add a New Policy** dialog box, in the **Policy name** box, type a unique name for the new policy.
- 6 Click **OK**.
- 7 In the **Add New Policy** dialog box, in the **Policy type** list, select **DB2**.

The database agent policy type does not appear in the drop-down list unless your master server has a license key for the database agent.
- 8 Complete the entries on the **Attributes** tab.

See [“About policy attributes for NetBackup for DB2”](#) on page 32.
- 9 Add other policy information as follows:
 - Add schedules.

See [“About adding schedules to a NetBackup for DB2 policy”](#) on page 39.
 - Add clients.

See [“Adding clients to a NetBackup for DB2 policy”](#) on page 33.
 - Add templates or scripts to the backup selections list.

See [“About adding backup selections to a DB2 policy”](#) on page 35.
- 10 When you have added all the schedules, clients, and backup selections you need, click **OK**.

About policy attributes for NetBackup for DB2

With a few exceptions, NetBackup manages a database backup like a file system backup. Other policy attributes vary according to your specific backup strategy and system configuration.

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

Table 3-2 Policy attribute descriptions for NetBackup for DB2 policies

Attribute	Description
Policy type	Determines the types of clients that can be in the policy. In some cases the policy type determines the types of backups that NetBackup can perform on those clients. To use the DB2 database agent, you must define at least one policy of type that is DB2.
Keyword phrase	For NetBackup for DB2, the Keyword phrase entry is ignored.
Snapshot Client	This option enables backups with Snapshot Client. See “NetBackup for DB2 with Snapshot Client features” on page 99.

Adding clients to a NetBackup for DB2 policy

The client list contains a list of the clients on which your scripts are run during an automatic backup. A NetBackup client must be in at least one policy but can be in more than one.

For a NetBackup for DB2 policy, clients you want to add must have the following software installed:

- DB2
- NetBackup client or server
- The backup or restore script(s), unless you use templates

To add clients to a NetBackup for DB2 policy

- 1 In the **Policy** dialog box, click the **Clients** tab.
To access the **Policy** dialog box, double-click the policy name in the **Policies** list in the NetBackup Administration Console.
- 2 Click **New**.
- 3 Type the name of the client and press **Enter** (Windows) or click **Add** (Java).
If DB2 is installed in a NetBackup cluster, specify the virtual DB2 name as the client name.
- 4 (Windows) To add another client, repeat step 2 and step 3.
- 5 (Java) To add another client, repeat step 3.
- 6 If this client is the last client you want to add, click **OK**.
- 7 (Java) In the **Policy** dialog box, click **Close**.

Specifying the master server for a NetBackup for DB2 client

After you add your NetBackup for DB2 client to a policy, specify the master server for the client in the NetBackup Administration Console.

Note: Add the server names to the master server before you configure the server list on the client. To add server names on the client, see the following topic:

See [“Specifying the NetBackup master server from the client”](#) on page 61.

To specify the master server in the NetBackup Administration Console

- 1 In the left pane, expand **NetBackup Management > Host Properties > Clients**.
- 2 Double-click the NetBackup for DB2 client name in the **Clients** list.
- 3 Click **Servers**.
- 4 Verify that the correct server displays in the **Master Server** box.

If the correct server does not display, click the server name in the **Additional Servers** list, and click **Make Master**. Alternatively, click **Add** to add a new server name to the list.

- 5 Click **OK**.

Configuring a policy to back up the configuration files

This topic shows how to create an automatic backup policy to back up the NetBackup configuration files. If you want users to be able to back up configuration files manually, you also must create a User Backup schedule.

To back up configuration files

- 1 Create an MS-Windows (Windows) or Standard (UNIX) policy.
- 2 Specify the attributes for the policy.
- 3 On the **Schedules** tab, create a full backup schedule.
- 4 In the **Backup Selections** list, add an entry that includes the full path name of the directory that contains the configuration files.
- 5 Specify the clients to back up.

The clients must have the following installed:

- DB2
- NetBackup for DB2

If the client is installed in a NetBackup cluster, add the virtual host name to the client list.

Configuring the Maximum jobs per client

The following procedure shows how to set the **Maximum jobs per client** attribute.

To configure the maximum jobs per client

- 1 In the left pane of the NetBackup Administration Console, expand **NetBackup Management > Host Properties**.
- 2 Select **Master Server**.
- 3 In the right pane, double-click the server icon.
- 4 Click **Global Attributes**.
- 5 Change the **Maximum jobs per client** value to 99.

The **Maximum jobs per client** specifies the maximum number of concurrent backups that are allowed per client. The default is 1.

You can use the following formula to calculate a smaller value for the Maximum jobs per client setting:

Maximum jobs per client = *number_of_sessions* X *number_of_policies*

Refer to the following definitions:

number_of_sessions 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 The number of policies of any type that can back up this client at the same time. This number can be greater than one. For example, a client can be in two policies to back up two different databases. These backup windows can overlap.

Note: Enter a large enough value for the **Maximum jobs per client** attribute to meet the number of jobs that DB2 runs. You may need to experiment with different values at your site.

About adding backup selections to a DB2 policy

The backup selections list in a database policy has a different meaning than that for non-database policies. For example, in a Standard or MS-Windows policy, the list contains files and directories to be backed up.

In a database policy, you specify templates or scripts to be run.

Observe the following rules when you use templates or scripts:

- Make sure the scripts reside on each client in the client list. Scripts can reside in any location. Make sure that NetBackup can access the location you choose and that NetBackup can run the scripts. Note that templates do not reside on the clients. Templates reside on the NetBackup master server.
- NetBackup installs sample scripts when you install the software; you can modify these scripts for your own use. Write the scripts to a location outside of the original installation location. In this way future NetBackup installations do not overwrite your site's scripts.
- If you use NetBackup for DB2 in a NetBackup server cluster, make sure that the scripts reside in a location that is available after a failover.

Add templates or scripts to the backup selections list only if you want to set up a policy for automatic backups. These templates or scripts are run for manual backups and for automatic schedules as specified under the **Schedules** tab. NetBackup runs the templates or scripts in the order that the templates or scripts appear in the backup selections list.

About backup schedules, templates, and scripts

Be aware of what may happen if an automatic schedule invokes a script that a user authored. NetBackup does not provide safeguards to prevent an automatic backup schedule, for example, from running a restore or recovery script.

To help guard against such mistakes, use a template instead of a script whenever possible. When a template runs, it detects the backup type on the schedule. You are responsible for specifying a template with the correct operation type (backup or restore) in the policy.

Adding a template to the backup selections list from the Java interface

The following procedure describes how to add a templates to the backup selections list with the Java interface.

Note: Be sure to specify the correct template name in the backup selections list to prevent an error or a wrong operation.

To add a template to the backup selections list from the Java interface

- 1 Open the Policy dialog box.
To access the Policy dialog box, double-click the policy name in the Policies list in the NetBackup Administration Console.
- 2 Click the Backup Selections tab.
- 3 Click **New**.
- 4 From the **Script or Template** list, select a template or type the name of a template.
Include the `.tpl` extension. Do not include the full path. For example, `weekly_full_backup.tpl`.
- 5 Click **Add** to add the template to the list.
- 6 Click **OK**.

Adding a script to the backup selections list from the Java interface

Note: Be sure to specify the correct script name in the backup selections list to prevent an error or a wrong operation.

To add a script to the backup selections list from the Java interface

- 1 Open the Policy dialog box.
To access the Policy dialog box, double-click the policy name in the Policies list in the NetBackup Administration Console.
- 2 Click the Backup Selections tab.
- 3 Click **New**.
- 4 In the Script or Template box, type the full path name of a script on the client.
For example:

```
/backup_scripts/db/cold_backup.sh  
C:\backup_scripts\db\cold_backup.cmd
```
- 5 Click **Add** to add the script to the list.
- 6 Click **OK**.

Adding a template to the backup selections list from the Windows interface

Note: Be sure to specify the correct template name in the backup selections list to prevent an error or a wrong operation.

To add a template to the backup selections list from the Windows interface

- 1 In the Policy dialog box, click the Backup Selections tab.
To access the Policy dialog box, double-click the policy name in the Policies list in the NetBackup Administration Console.
- 2 Click **New**.
- 3 Click the **Template** button.



Alternatively, you can type the name of the template with the `.tpl` extension. Do not include the full path. For example, `weekly_full_backup.tpl`.

- 4 From the **Template** list, choose the correct template.
- 5 Click **OK**.
- 6 Click **OK**.

Adding a script to the backup selections list from the Windows interface

Note: Be sure to specify the correct script name in the backup selections list to prevent an error or a wrong operation. The script must reside on the client before you try to add it to the backup selections list.

To add a script to the backup selections list from the Windows interface

- 1 In the Policy dialog box, click the Backup Selections tab.
To access the Policy dialog box, double-click the policy name in the Policies list in the NetBackup Administration Console.
- 2 Click **New**.

- 3 Click the **Remote Folder** button.



Alternatively, you can type the full path name of the script on the client. For example:

```
/backup_scripts/db/cold_backup.sh  
C:\backup_scripts\db\cold_backup.cmd
```

- 4 Navigate to and select the script file.
- 5 Click **OK**.
- 6 Click **OK**.

About adding schedules to a NetBackup for DB2 policy

Each policy has its own set of schedules. These schedules initiate automatic backups and specify when a user can initiate operations. A database backup has these types of schedules: application backup and automatic backup.

Configuring a NetBackup for DB2 application backup schedule

A database backup requires an application backup schedule. You cannot perform backups if this type of schedule is not included in the policy. The NetBackup for DB2 agent automatically creates this schedule and names it **Default-Application-Backup**.

The backup window for an application backup schedule must encompass the time period during which all scheduled jobs and unscheduled jobs can occur. This window is necessary because the application backup schedule starts the processes that are required for all database backups, including those started automatically. You can choose to set the window for the application backup schedule for 24 hours per day, seven days per week. This window ensures that your operations are never locked out due to the application backup schedule.

To configure an application backup schedule

- 1 In the **Policy** dialog box, click the **Schedules** tab.
To access the **Policy** dialog box, double-click the policy name in the **Policies** list in the NetBackup Administration Console .
- 2 Double-click the schedule that is named **Default-Application-Backup**.
- 3 Specify the other properties for the schedule.
See “[About NetBackup for DB2 schedule properties](#)” on page 41.

Example application backup schedule for NetBackup for DB2

Specify the application backup schedule name in the `db2.conf` file on the client. The `db2.conf` file is located in the following directory path:

UNIX and Linux: `$DB2_Instance_Home/db2.conf`

Windows: `install_path\NetBackup\dbext\db2\db2.conf`

Assume the following:

- Users perform database backup operations during business hours, 08:00 to 13:00.
- The automatic backups that use this policy start between 18:00 and 22:00.

In this scenario, the application backup schedule must have a start time of 0800 and a duration of 14 hours.

Table 3-3 Example settings for a NetBackup for DB2 application backup schedule

Schedule option	Setting
Retention	2 weeks
Backup window	Sunday through Saturday 00:08:00 - 22:00:00

Configuring NetBackup for DB2 automatic backup schedules

If you plan to have NetBackup perform automatic backups, or if you use Snapshot Client features, you need one or more automatic backup schedules.

To configure an automatic backup schedule

- 1 On the **Policy** dialog box, click the **Schedules** tab.
- 2 Click **New**.

- 3 Specify a unique name for the schedule.
- 4 Select the **Type of backup**.
 See “[About the NetBackup for DB2 backup types](#)” on page 42.
- 5 Specify the other properties for the schedule.
 See “[About NetBackup for DB2 schedule properties](#)” on page 41.
- 6 Click **OK**.

Example automatic backup schedule for NetBackup for DB2

[Table 3-4](#) shows example settings for automatic backup schedules.

Table 3-4 Example settings for NetBackup for DB2 automatic backup schedules

Type of backup	Schedule property	Setting
Automatic Full Backup	Retention (proxy backup only)	2 weeks
	Frequency	Every week
	Backup window	Sunday, 18:00:00 - 22:00:00
Automatic Differential Incremental Backup, Automatic Cumulative Incremental Backup	Retention (proxy backup only)	1 week
	Frequency	Every day
	Backup window	Sunday through Saturday 18:00:00 - 22:00:00

About NetBackup for DB2 schedule properties

This topic describes the schedule properties that have a different meaning for database backups than for file system backups. Other schedule properties vary according to your specific backup strategy and system configuration. Additional information about other schedule properties is available.

See the *NetBackup Administrator's Guide, Volume I*.

Table 3-5 Description of schedule properties

Property	Description
Type of backup	<p>Specifies the type of backup that this schedule controls. The selection list shows only the backup types that apply to the policy you want to configure.</p> <p>See “About the NetBackup for DB2 backup types” on page 42.</p>
Schedule type	<p>You can schedule a backup in one of the following ways:</p> <ul style="list-style-type: none"> ■ Frequency This setting is used only for scheduled backups. It is not used for user-directed backups. Frequency specifies the period of time that can elapse until the next backup or archive operation begins on this schedule. For example, assume that the frequency is seven days and a successful backup occurs on Wednesday. The next full backup does not occur until the following Wednesday. Typically, incremental backups have a shorter frequency than full backups. ■ Calendar This setting is used only for scheduled backups. It is not used for user-directed backups. The Calendar option allows you to schedule backup operations that are based on specific dates, recurring week days, or recurring days of the month.
Retention	<p>The retention period for an application backup schedule refers to the length of time that NetBackup keeps backup images (stream-based backups). The retention period for an automatic schedule controls how long NetBackup keeps records of when scheduled backups occurred (proxy backups). For example, if your database is backed up once every Sunday morning, you should select a retention period of at least 2 weeks.</p> <p>The retention period is affected by the type of schedule you select, as follows:</p> <ul style="list-style-type: none"> ■ Frequency-based scheduling Set a retention period that is longer than the frequency setting for the schedule. For example, if the frequency setting is set to one week, set the retention period to be more than one week. The NetBackup scheduler compares the latest record of the automatic backup schedule to the frequency of that automatic backup schedule 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 is unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog accumulates unnecessary records. ■ Calendar-based scheduling The retention period setting is not significant for calendar-based scheduling.
Multiple copies	<p>If you want to specify multiple copies of a backup for the policy, configure Multiple copies on the application backup schedule.</p>

About the NetBackup for DB2 backup types

Each database agent has a unique set of backup schedules.

Table 3-6 shows the DB2 backup schedules you can specify.

Table 3-6 DB2 backup types

Backup type	Description
Application Backup	<p>The Application Backup schedule enables user-controlled NetBackup operations from the client. These operations include those initiated from the client and those initiated by an automatic schedule on the master server. NetBackup uses the Application Backup schedule when the user starts a backup manually. Configure at least one Application Backup schedule for each database policy. The Default-Application-Backup schedule is configured automatically as an Application Backup schedule.</p>
Automatic Full Backup	<p>An Automatic full backup contains a copy of all the data. A full backup is not the same as a whole database backup. Full means that the backup is not one of the incremental backup types.</p> <p>To perform a stream-based Automatic full backup, also specify an Automatic Full Backup schedule for scheduled NetBackup operations.</p> <p>Snapshot Client only supports this type of backup and the Block-Level Incremental (BLI) Backup.</p>
Automatic Differential incremental backup	<p>An Automatic Differential incremental backup is an incremental backup that is not cumulative. The backup contains a copy of the database data that has changed since the most recent backup, full or otherwise. This type of backup corresponds to the <code>INCREMENTAL DELTA</code> option of the <code>DB2 BACKUP</code> command.</p> <p>This type of backup takes less space and time than a cumulative incremental backup. The backup includes only the data that changed since the last backup of any type.</p> <p>This type of backup is supported only for stream-based backups and for BLI backups.</p>
Automatic Cumulative incremental backup	<p>An Automatic Cumulative incremental backup is an incremental backup that is cumulative. The backup contains a copy of the database data that changed since the most recent full backup. This type of backup corresponds to the <code>INCREMENTAL</code> option of the <code>DB2 BACKUP</code> command.</p> <p>Automatic Cumulative Incremental backups are supported only for stream-based backups and for BLI backups.</p> <p>This backup takes less time and space than a full backup; it contains only the data that changed since the last full backup.</p>

Note: For the types of backup schedules, the information in this topic pertains to stream-based backups. If you use the Snapshot Client option, some of the information in that table may differ.

More information about backup schedules and Snapshot Client features is available. See [“NetBackup for DB2 with Snapshot Client features”](#) on page 99.

Testing configuration settings for NetBackup for DB2

After you configure the master server for NetBackup for DB2, test the configuration settings. Perform a manual backup (or backups) with the automatic backup schedules you created. A description of status codes and other troubleshooting information is available.

See the *NetBackup Status Codes Reference Guide*.

See the *NetBackup Troubleshooting Guide*.

To test the configuration settings

- 1 Log onto the master server as administrator (Windows) or root (UNIX).
- 2 Start the NetBackup Administration Console.
- 3 In the left pane, click **Policies**.
- 4 Click the policy you want to test.
- 5 Select **Actions > Manual Backup**.
The **Schedules** pane contains the name of an automatic schedule (or schedules) configured for the policy that you want to test. The **Clients** pane contains the name of the client(s) listed in the policy that you want to test.
- 6 Follow the directions in the **Manual Backup** dialog box.
- 7 To check the status of the backup, click **Activity Monitor** in the NetBackup Administration Console.

The Activity Monitor and the script output indicate the status of the backup operation.

For more information, see the *Troubleshooting* chapter.

About backing up archive log files with the user exit program

You can configure the user exit program to back up the archive logs. The user exit program is `db2uext2` (UNIX and Linux) or `db2uext2.exe` (Windows).

The backup can be configured in one of the following ways:

- Save archive log files directly with NetBackup.
To back up archive log files in this way, configure an MS-Windows or Standard policy with a User Backup schedule.
See [“Configuring a policy to back up the archive logs”](#) on page 47.
Then specify the `ARCFUNC SAVE` keywords in the configuration file, `db2.conf`.
See [“Creating a db2.conf file for use with the user exit program”](#) on page 48.
- Copy archive log files to another directory for later backup by NetBackup.
To back up archive log files in this way, configure an MS-Windows or Standard policy with a User Archive schedule (this schedule is optional)
See [“Configuring a policy to back up the archive logs”](#) on page 47.
Specify the `ARCFUNC COPY` keywords in the `db2.conf` file.
See [“Creating a db2.conf file for use with the user exit program”](#) on page 48.
You can coordinate the copy of the log files to a directory with a user archive. In this case, the user exit program copies the file to an archive directory. To free disk space, later you can perform a user archive to archive all the files in the `ARCDIR` directory.

Do not specify `ARCFUNC SAVE` or `ARCFUNC COPY` if the `VENDOR DB2` configuration parameter is in effect. In environments with `VENDOR` in effect, NetBackup ignores the information that pertains to these commands.

Whether to specify `ARCFUNC SAVE` or `ARCFUNC COPY` depends on the amount of user intervention you intend to provide.

Determine which command to use, as follows:

- If you specify `ARCFUNC SAVE`, NetBackup backs up the archive logs according to the policy and schedule you specify.
If DB2 later issues a `ROLLFORWARD` request, the user exit program looks for the archive logs on a backup volume. At restoration time, no user intervention is required. The sequential recovery can be slow if there are numerous, large log files.
- If you specify `ARCFUNC COPY`, NetBackup copies the archive logs to the location that is specified on the `ARCDIR` statement in the `db2.conf` file.

The disk to which the archive logs are copied eventually fills with archived log files. Most users want to configure a user archive schedule so they can archive the entire `ARCDIR` directory to NetBackup volumes.

This method requires some user intervention during the recovery. Specifically, you must restore these files before the roll forward operation. Advanced users prefer this approach because of performance and flexibility benefits.

For information about how to restore files to disk, see the *NetBackup Administrator's Guide*.

DB2 objects in the backup window

[Table 3-7](#) explains the DB2 object types displayed.

Table 3-7 DB2 database objects in the backup window

Object	Description
DB2 resource	If NetBackup for DB2 is detected on the client, the browser window displays the DB2 resource. This resource is the top-level DB2 object in the browser. <code>DB2</code> is the DB2 resource.
Instance	The second-level object is a DB2 instance. An instance represents a collection of DB2 databases.
Database	You cannot select a database for backup directly, but by selecting all partitions below it, you can effectively select the whole database. If you select the database for backup, you cannot select other databases. If you select objects within the database, you cannot select objects within other databases at the same time.
Partition	<p>The partition is the highest selectable DB2 object. A partition represents a collection of storage within a database in which tablespaces are stored. Partitions contain tablespaces and log folders. Within a database, you can select one or more partitions.</p> <p>DB2 EEE/DPF environments generally consist of multiple partitions. Other DB2 UDB environments consist of a single partition, which is usually represented as partition zero (0).</p> <p>The display includes only partitions that reside on the same NetBackup client. It does not display other partitions on remote hosts. For more information, see the Caution that follows this table.</p>
Tablespace	A tablespace is a logical entity representing a collection of physical storage containers. Tablespaces are comprised of containers, which represent database storage units. A tablespace is the lowest-level DB2 object that you can select in the browser.

Configuring a policy to back up the archive logs

This topic describes how to create a policy to back up the NetBackup DB2 archive log files directly to tape. Follow these instructions if you want to use the user exit program with the `ARCFUNC SAVE` command.

You do not need to perform this procedure if you use the `VENDOR` method to back up your archive log files.

To configure a policy to back up the archive logs

- 1 Log on to the master server as administrator (Windows) or root (UNIX).
- 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 Create a new MS-Windows (Windows) or Standard (UNIX) policy type.
- 5 Specify the attributes for the policy.
- 6 On the **Schedules** tab, create a **User Backup** schedule.

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

No backup selections list is necessary for this policy because it has a User Backup schedule. It is not an automatic schedule.

- 7 On the **Clients** tab, add the clients you want to back up.

The clients must have the following installed:

- DB2
- NetBackup DB2

If the client is installed in a NetBackup cluster, add the virtual host name to the client list.

- 8 Note the name of this policy.
- 9 When you configure the `db.conf` file, specify the name of the policy you created in this procedure.

See [“Creating a db2.conf file for use with the user exit program”](#) on page 48.

Configuring a policy to archive the archive logs

This topic describes how to create a policy to archive the NetBackup DB2 archive log entries in the `ARCDIR` directory. Follow these instructions if you want to use the user exit program with the `ARCFUNC COPY` command.

When NetBackup performs an archive, it deletes the online files after are backed up successfully.

For more information on user archive schedules, see the *NetBackup Administrator's Guide*.

You do not need to perform this procedure if you use the `VENDOR` method to back up your archive log files.

To configure a policy to back up the archive logs

- 1 Log on to the master server as administrator (Windows) or root (UNIX).
- 2 Start the NetBackup Administration Console .
- 3 If your site has more than one master server, choose the one on which you want to add the policy.
- 4 Create a new MS-Windows (Windows) or Standard (UNIX) policy type.
- 5 Specify the attributes for the policy.
- 6 On the **Schedules** tab, create a **User Archive** schedule.

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

No backup selections list is necessary for this policy because it has a User Archive schedule. It is not an automatic schedule.

- 7 Specify the clients to be backed up.

The clients must have the following installed:

- DB2
- NetBackup for DB2

If the client is installed in a NetBackup cluster, add the virtual host name to the policy.

Configuring the runtime environment

Configuring the runtime environment consists of creating a `db2.conf` file for a standard environment as well as a cluster environment. It also shows the environment variables that NetBackup creates.

Creating a `db2.conf` file for use with the user exit program

The NetBackup for DB2 configuration file, `db2.conf`, consists of a series of keywords and values. This file defines how to back up the database and the archive logs. It must be created on each NetBackup for DB2 client.

The installation package installed a file named `db2.conf` that you can customize. The following procedures show you how to customize this file. Follow the instructions in this section if you use the user exit program to perform backups.

To create a `db2.conf` file for use with the user exit program

- 1 Before you create the `db2.conf` file, you need to create the policies to back up the archive logs and the configuration files.
See “[Configuring a policy to back up the archive logs](#)” on page 47.
See “[Configuring a policy to archive the archive logs](#)” on page 47.
See “[Configuring a policy to back up the configuration files](#)” on page 34.
- 2 Log on to a client computer.
- 3 Copy the sample `db2.conf` file from its location in the sample directory to its active location.

Its location in the sample directory is as follows:

UNIX and Linux: `/usr/opensv/netbackup/ext/db_ext/db2/scripts`

Windows: `install_path\NetBackup\dbext\db2\samples`

The active location for the `db2.conf` file is as follows:

UNIX and Linux: `$DB2_Instance_Home/db2.conf`

Windows: `install_path\NetBackup\dbext\db2\db2.conf`

- 4 In the `db2.conf` file, create an object identifier for backing up the database.
This object identifier starts with the following keyword lines:

```
DATABASE SAMPLE
OBJECTTYPE DATABASE
...
```

- 5 In the `db2.conf` file, create an object identifier for backing up the archive logs.

The form depends on how the archive logs are backed up, as follows:

- If you use `ARCFUNC SAVE`:

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE

POLICY WIN_TYPE_POL_LOGPOL # an MS-Windows-NT type policy

POLICY STD_TYPE_POL_LOGPOL # a standard UNIX or Linux type policy
```

```
SCHEDULE USER_BACKUP_SCHED_LOGSCHED
```

In the `POLICY` line, specify the name of the MS-Windows or Standard policy for backing up the archive logs.

In the `SCHEDULE` line, specify the User Backup schedule that you created earlier for backing up the archive logs.

- If you use `ARCFUNC COPY`:

```
DATABASE SAMPLE  
OBJECTTYPE ARCHIVE
```

```
Windows: ARCDIR C:\MyLogs\arcdire\  
RETDIR C:\MyLogs\arcdire\
```

```
UNIX and Linux: ARCDIR /home/db2inst1/arcdire  
RETDIR /home/db2inst1/arcdire
```

In the `ARCDIR` line, specify the full path to the location of the archive logs.

In the `RETDIR` line, specify the full path to the location from which the archive logs are retrieved. Typically, the `RETDIR` location is the same as the `ARCDIR` location.

- 6 You may need to add other entries to the `db2.conf` file.

See “[db2.conf keywords](#)” on page 55.

- 7 Save and close the `db2.conf` file.

- 8 Repeat this procedure on each client computer.

See “[Example db2.conf file using ARCFUNC SAVE](#)” on page 50.

See “[Example db2.conf file using ARCFUNC COPY](#)” on page 51.

Example db2.conf file using ARCFUNC SAVE

Assume that you need to back up a database named `SAMPLE` and its archive logs. `USEREXIT` is enabled for database `SAMPLE`. The policies for database `SAMPLE` include the required schedules for the backups.

The policies are as follows:

- The `DB2_DB_Policy` backs up the database. This policy has an application backup schedule and an automatic backup schedule. The first definition in the example `db2.conf` file 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 `DB2_Log_Policy` backs up the archive logs. This policy has a user backup schedule named `User`. The second entry in the example file specifies this policy and its user backup schedule.

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

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE
POLICY DB2_Log_Policy
SCHEDULE User
ARCFUNC SAVE
#ARCFUNC COPY
```

```
#ARCDIR C:\MyLogs\arcdire\
#RETDIR C:\MyLogs\arcdire\
```

```
#ARCDIR /home/db2inst1/arcdire
#RETDIR /home/db2inst1/arcdire
```

```
ENDOPER
```

Example `db2.conf` file using `ARCFUNC COPY`

Assume that you need to back up a database named `SAMPLE` and its archive logs. `USEREXIT` is enabled for database `SAMPLE`. The policies for database `SAMPLE` include the required schedules for the backups.

The policies are as follows:

- The `DB2_DB_Policy` backs up the database. This policy has an application backup schedule and an automatic backup schedule. The first definition in the example `db2.conf` file 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 `ARCFUNC COPY` command copies the archive logs to the `ARCDIR` directory.

```
DATABASE SAMPLE
OBJECTTYPE DATABASE
POLICY DB2_DB_Policy
```

```
SCHEDULE Default-Application-Backup
ENDOPER

DATABASE SAMPLE
OBJECTTYPE ARCHIVE
#POLICY DB2_Log_Policy
#SCHEDULE User
#ARCFUNC SAVE
ARCFUNC COPY

ARCDIR C:\MyLogs\arcdire\
RETDIR C:\MyLogs\arcdire\

ARCDIR /home/db2inst1/arcdire
RETDIR /home/db2inst1/arcdire

ENDOPER
```

Creating a db2.conf file (vendor method)

The NetBackup for DB2 configuration file, `db2.conf`, consists of a series of keywords and values. This file defines how to back up the database and the archive logs. It must be created on each NetBackup for DB2 client.

The installation package installed a file named `db2.conf` that you can customize. The following procedures show you how to customize this file. Follow the instructions in this section if you use the vendor method to perform backups.

To create a db2.conf file for use with the vendor method

- 1 Before you create the `db2.conf` file, you need to create the policies to back up the configuration files.
See [“Configuring a policy to back up the configuration files”](#) on page 34.
- 2 Log into a client computer.

- 3 Copy the sample `db2.conf` file from its location in the sample directory to its active location.

Its location in the sample directory is as follows:

UNIX and Linux: `/usr/opensv/netbackup/ext/db_ext/db2/scripts`

Windows: `install_path\NetBackup\dbext\db2\samples`

The active location for the `db2.conf` file is as follows:

UNIX and Linux: `$DB2_Instance_Home/db2.conf`

Windows: `install_path\NetBackup\dbext\db2\db2.conf`

- 4 In the `db2.conf` file, create an object identifier for backing up the database.

This object identifier starts with the following keyword lines:

```
DATABASE SAMPLE
OBJECTTYPE DATABASE
. . .
```

- 5 In the `db2.conf` file, create an object identifier for backing up the archive logs.

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE
POLICY DB2_TYPE_POL_LOGPOL # a DB2 type policy
SCHEDULE DEFAULT-APPLICATION-BACKUP
```

In the `POLICY` line, specify the name of a DB2 policy. This policy can be the same policy that you use to back up the database.

In the `SCHEDULE` line, specify a Default-Application-Backup schedule.

- 6 You may need to add other entries to the `db2.conf` file.

See “[db2.conf keywords](#)” on page 55.

- 7 Save and close the `db2.conf` file.

- 8 Repeat this procedure on each client computer.

See “[Example db2.conf file \(vendor method\)](#)” on page 53.

Example db2.conf file (vendor method)

Assume that you need to back up a database named `SAMPLE` and its archive logs. The `VENDOR` method is enabled for database `SAMPLE`. The policies for database `SAMPLE` specify the required schedules for the backups.

The policies are as follows:

- The `DB2_DB_Policy` backs up the database. This policy has an application backup schedule and an automatic backup schedule. The first definition in the example `db2.conf` file 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 `DB2_ARCH_Policy` backs up the archive logs. This policy has an application backup schedule named `Default-Application-Backup`. The third entry in the example file specifies this policy and its application backup schedule.

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

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

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE
POLICY DB2_ARCH_Policy
SCHEDULE Default-Application-Backup
ENDOPER
```

Configuring `bp.conf` files in a cluster environment

If you configure NetBackup for DB2 in a cluster environment, you need to create the NetBackup `bp.conf` files in multiple places.

Create the file in the following places:

- In `/usr/opensv/netbackup/bp.conf` on the physical client host. This file is the master `bp.conf` configuration file.
- In the DB2 user's home directory on each virtual host.

NetBackup searches for the `bp.conf` file in the DB2 user's home directory first. Specifications in the user `bp.conf` file override those in the master `bp.conf` file.

Configuring a master `bp.conf` file

The following procedures explain how to create a master `bp.conf` file on the physical client host. This file allows other backups to be performed on the host.

To create a system-wide master `bp.conf` file

- 1 Log into the physical host.
- 2 Use `vi(1)` or another editor to open file `/usr/obj/bsmf.netbackup/bp.conf`.
- 3 Set the `CLIENT_NAME` entry to the physical host name of the NetBackup for DB2 client. This action allows other backups to be performed on the host.

For example:

```
CLIENT_NAME=client_name
```

- 4 Save and close the file.

Configuring a user `bp.conf` file

NetBackup options in the `bp.conf` file of the home directory of the DB2 instance owner take precedence over the same options in the master `bp.conf` file. The following procedure explains how to create a `bp.conf` file on the virtual machine that owns the DB2 instance.

To create a system `bp.conf` file on the virtual host

- 1 Log into the machine that owns the DB2 instance.
- 2 Use `vi(1)` or another editor to open file `$DB2_INSTANCE_HOME/bp.conf`.
- 3 Add a line that sets the `CLIENT_NAME` entry to the virtual name of the DB2 instance.

For example:

```
CLIENT_NAME=client_name
```

- 4 Save and close the file.

db2.conf keywords

Rules are available on how to specify keywords in the `db2.conf` file.

The rules are as follows:

- A `db2.conf` file consists of a series of entries that define a policy and a schedule that are based upon an `OBJECTTYPE`.
- Specify a different `POLICY` name for the `DATABASE` object. Also specify a policy name for `ARCHIVE` object when you use `ARCFUNC SAVE`.
- Within a definition, `OBJECTTYPE` is a required keyword. `POLICY` is required for the `DATABASE` object. It is also required for the `ARCHIVE` object if you use `ARCFUNC SAVE` or if you use the `VENDOR` method. `POLICY` is not required if you use `ARCFUNC COPY`.
 All other keywords are optional.
- Terminate each entry with an `ENDOPER` keyword.
- Within a definition, the *keyword value* pairs can appear in any order.
- The keywords are not case sensitive, but their values are.
- Entries are not nested.
- When a pound character (#) appears in the first column, the line is treated as a comment.

The `db2.conf` file accepts the keywords that are described in this topic. If `VENDOR` is configured in your DB2 environment, NetBackup for DB2 ignores certain the following keywords and keyword phrases.

The following keywords and keyword phrases are ignored:

- `ARCDIR`
- `ARCFUNC SAVE`
- `ARCFUNC COPY`
- `PARTITIONTYPE RAW`
- `RETDIR`

[Table 3-8](#) describes the keywords and values that are used.

Table 3-8 Keyword value pairs for the `db2.conf` file

Keyword value	Description
<code>ARCDIR dir</code>	Full path to the location of the archive logs. No default. Required if <code>ARCFUNC COPY</code> is also specified.

Table 3-8 Keyword value pairs for the db2.conf file (*continued*)

Keyword value	Description
ARCFUNC SAVE ARCFUNC COPY	ARCFUNC SAVE saves archive logs to/from NetBackup. ARCFUNC COPY copies archive logs to/from ARCDIR/RETDIR directories. You must specify either ARCFUNC SAVE or ARCFUNC COPY if OBJECTTYPE ARCHIVE is also specified.
CLIENT_NAME <i>client_name</i>	An alternate client Windows server. Use this option when you restore a DB2 database from one Windows server to an alternate client Windows server.
DATABASE <i>db_name</i>	DB2 database name. No default. Required only for alternate restores.
DESTALIAS <i>src_db_name</i> DESTINST <i>src_inst_name</i>	DESTALIAS specifies the database alias name of the destination database for an alternate restore. DESTINST specifies the instance name of the destination instance for an alternate restore. No default. Required only for alternate restores.
ENDOPER	Signals the end of a definition. Required at the end of each definition.
NODE <i>number</i>	Specifies the DB2 node number. Do not specify this keyword unless you operate within a DB2 Enterprise Extended Edition (EEE) environment. Not required. No default.
OBJECTTYPE ALTERNATE OBJECTTYPE ARCHIVE OBJECTTYPE DATABASE OBJECTTYPE TABLESPACE	Specify OBJECTTYPE ALTERNATE to note that the succeeding lines pertain to a performing an alternate restore. Specify OBJECTTYPE DATABASE or OBJECTTYPE TABLESPACE for DB2 policies. Specify OBJECTTYPE ARCHIVE for Standard policies (UNIX and Linux) or MS-Windows-NT policies (Windows). One of OBJECTTYPE ALTERNATE, OBJECTTYPE ARCHIVE, OBJECTTYPE DATABASE, or OBJECTTYPE TABLESPACE is required in all db2.conf files. OBJECTTYPE ALTERNATE is required if you want to perform an alternate restore.

Table 3-8 Keyword value pairs for the db2.conf file (*continued*)

Keyword value	Description
PARTITIONTYPE RAW	Specifies that NetBackup search for archive log files that are backed up from a raw partition during a restore. Not Required. For the POLICY, specify the name of a DB2 policy. This policy can be the same as the one that you use to back up the database. In the SCHEDULE line, specify a Default-Application-Backup schedule.
POLICY <i>pol_name</i>	Name of a NetBackup policy. If not specified, NetBackup uses the first DB2 policy that is found in the configuration on the NetBackup master server. If OBJECTTYPE ARCHIVE is specified, specify the name of the MS-Windows-NT or a Standard policy. This policy is only required if you use ARCFUNC SAVE. If OBJECTTYPE DATABASE or OBJECTTYPE TABLESPACE is specified, then a DB2 policy must be specified.
RETDIR <i>dir</i>	Full path to the location from which the archive logs are retrieved. No default. Required if ARCFUNC COPY is also specified.
SCHEDULE <i>sched_name</i>	NetBackup schedule name in policy. The default is the first application backup in the policy.
SRCALIAS <i>src_db_name</i> SRCINST <i>src_inst_name</i>	SRCALIAS specifies the database alias name of the source database for an alternate restore. SRCINST specifies the instance name of the source instance for an alternate restore. No defaults. Required only for alternate restores.

NetBackup for DB2 environment variables

The NetBackup automatic scheduler creates the environment variables in the following table when it executes a NetBackup for DB2 backup-restore template or script. You can use the DB2_FULL, DB2_INCR, and DB2_CINC variables within a script to specify a backup type.

Note: Only the NetBackup backup and restore templates and scripts use the environment variables in the following table. These variables are unknown to the DB2 backup and restore commands. For example, the backup command and the restore command do not process the `DB2_POLICY` variable. Instead, the templates and scripts use the `POLICY` name. This policy is defined in the `$DB2_INSTANCE_HOME/db2.conf` file (UNIX and Linux) or the `install_path\NetBackup\dbext\db2\db2.conf` file (Windows).

Table 3-9 describes the DB2 environment variables.

Table 3-9 DB2 environment variables

Environment variable	Purpose
For UNIX and Linux: <code>BKUP_IMAGE_PERM</code>	<p>Lets you set the permissions on a backup image at backup time. Possible values are the following:</p> <p>USER - set the permissions to 600. Only the original user who backed up the data has access to the backup images.</p> <p>GROUP - set the permissions to 660. Anyone from the same group as the original user who backed up the data has access to the backup images.</p> <p>ANY - set the permissions to 664. Anyone has access to the backup images.</p> <p>If this keyword is not specified, the permissions default to 660.</p> <p>You can specify the keyword in the <code>db2.conf</code>. For example:</p> <pre> DATABASE SAMPLE OBJECTTYPE DATABASE POLICY db2-bkup BKUP_IMAGE_PERM USER SCHEDULE Default-Application-Backup ENDOPER </pre> <p>You can also specify the keyword by using the <code>OPTIONS</code> directive on the DB2 backup command. For example:</p> <pre> db2 backup db sample load /usr/openv/netbackup /bin/nbdb2.so OPTIONS BKUP_IMAGE_PERM=ANY </pre> <p>If you use the <code>userexit</code> program, no configuration parameter is available and normal file system permission are used. If you use the stream method (<code>LOGARCHMETH1 VENDOR:/usr/openv/netbackup/bin/...</code>), you can use the new keyword in the <code>db2.conf</code> or specify the keyword in the <code>LOGARCHOPT1</code> parameter in the database configuration.</p>

Table 3-9 DB2 environment variables (*continued*)

Environment variable	Purpose
DB2_POLICY	Name of the NetBackup for DB2 policy from which the Automatic Backup was started. This policy name is not necessarily the same policy name that is in 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.
DB2_SERVER	Name of the NetBackup server.
DB2_SCHED	Name of the NetBackup schedule. Enabled 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 backup is a scheduled backup type (Automatic Backup).
DB2_USER_INITIATED	Set to 1 if this backup is a user-initiated backup type (Application Backup backup).
DB2_FULL	Set to 1 for an Automatic full backup .
DB2_INCR	Set to 1 for an Automatic Differential incremental backup .
DB2_CINC	Set to 1 for an Automatic Cumulative incremental backup .

Configuring the log on account for the NetBackup Client Service for NetBackup for DB2 on Windows

Because the NetBackup Client Service is started by default under the `SYSTEM` account, you also must give special attention to database user authentication. The `SYSTEM` account does not have permission to connect to the target database if you use OS authentication instead of passwords.

If you use OS authentication, run the NetBackup client service under an account that has `SYSADM`, `SYSCTRL`, or `SYSMAINT` privileges for DB2. The account name must comply with the DB2 naming rules.

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

To configure the log on account for the NetBackup Client Service

- 1 Open the Windows Services application.
- 2 Double-click on the **NetBackup Client Service** entry.
- 3 Click on the **Log On** tab.
- 4 Type the account name with `SYSADM`, `SYSCTRL`, or `SYSMAINT` privileges.

- 5 Type the password.
- 6 Click **OK**.
- 7 Stop and start the NetBackup Client Service.
- 8 Close the Services control panel application.

About NetBackup for DB2 templates and shell scripts

To perform a scheduled NetBackup for DB2 backup, you must create a template or shell script. The template or shell script controls the backup job on the NetBackup for DB2 client. You add this template or shell script to the Backup Selections list in the NetBackup for DB2 policy on the master server. You can also use the template or shell script to manually start a backup on the client.

The following describes templates and shell scripts.

Templates	<p>The NetBackup for DB2 backup wizard creates backup templates. This wizard is initiated from the NetBackup Backup, Archive, and Restore interface.</p> <p>See “Creating a backup template using the NetBackup for DB2 backup wizard” on page 62.</p> <p>The NetBackup for DB2 backup wizard does not support all of the commands and options that are provided by DB2. If a template does not provide all of the required functionality, you must write a script.</p>
Shell scripts	<p>Sample backup and recovery shell scripts are installed on the client with the NetBackup for DB2 agent. Modify these scripts to meet your individual requirements.</p> <p>Shell scripts are written by the user and must conform to DB2 syntax. On UNIX and Linux, they must conform to the UNIX shell syntax.</p> <p>See “Creating DB2 scripts manually” on page 65.</p> <p>NetBackup for DB2 also provides a utility, <code>bpdbssbdb2</code>, that can generate a shell script from a backup wizard template. This allows you to create a template with the wizard and then generate a shell script from it. You can then run the shell script or modify the shell script further.</p> <p>See “Creating shell scripts using bpdbssbdb2” on page 63.</p>

Specifying the NetBackup master server from the client

To ensure that the templates you create are saved to and run from the correct master server, specify the master server on the client. You select the master server

in the Backup, Archive, and Restore interface. On UNIX and Linux, you can also define it in the `bp.conf` file.

To select the master server in the Backup, Archive, and Restore interface

- 1 In the Backup, Archive, and Restore interface, click the following sequence:
UNIX and Linux: **Actions > Specify NetBackup Machines and Policy Type**
Windows: **File > Specify NetBackup Machines and Policy Type**
- 2 In the **Server to use for backups and restores** list, select the master server.
- 3 Click **OK**.

To use the `bp.conf` file to define the master server (UNIX and Linux), specify the master server in one of the following locations:

- `$DB2_HOME/bp.conf`
- `$NBU_HOME/bp.conf`

Creating a backup template using the NetBackup for DB2 backup wizard

The following procedure shows you how to browse the DB2 environment from the Backup, Archive, and Restore interface on the NetBackup for DB2 client to select database objects for backup. Then it shows how to access the backup wizard to create the backup template.

Note: Because the Backup, Archive, and Restore interface only displays local or resident partitions, templates that are created on the local client do not back up partitions on remote hosts. Create additional templates for the other remote partitions by running the wizard on those clients. To back up the entire EEE/DPF configuration, specify multiple templates in the policy backup selections list.

To create a backup template by using the NetBackup for DB2 backup wizard

- 1 Start the Backup, Archive, and Restore interface:
 - On UNIX and Linux, issue the following command:
`/usr/openv/netbackup/bin/jbpSA &`
 - On the Windows Start menu, choose **All Programs > Symantec NetBackup > Backup, Archive, and Restore**.
- 2 On UNIX and Linux, click the **Backup Files** tab.
On Windows, click the **Select for Backup** button.

- 3 In the left pane, expand the DB2 resource to view a DB2 instance hierarchy.
- 4 Select a node in the left pane to view details in the right pane.

When you select any parent database object, NetBackup for DB2 automatically selects all the child objects beneath it. A description is available of the database object types in the backup window.

See [Table 3-7](#) on page 46.

- 5 After you select the DB2 objects to back up, use the NetBackup for DB2 Backup Wizard to create a backup template for that DB2 element.

Click **Actions > Backup**.

The NetBackup for DB2 backup wizard displays the following screens for you to enter information about the backup operation you want to perform:

- Welcome
- Database Login
- Initial Settings
- Backup Options
- Template Summary

Click **Help** on the wizard panel for more information.

- 6 When you complete the wizard, the Template Complete screen appears. You can save the template for later use, run the template immediately, or both.

Click **Help** for details about saving and running the template you created.

- 7 When you are satisfied with the template, click **Finish** to save, run, or save and run the template you created.

When you run a backup template from the wizard, NetBackup performs a full backup.

Creating shell scripts using `bpdbssbdb2`

`bpdbssbdb2` is a NetBackup for DB2 command that initiates template-based, user-directed backup and recovery. It also generates DB2 shell scripts from templates created by the backup wizard.

To create a shell script, issue this command with the following options:

```
bpdbssbdb2 -backup -g script_file_name -t template_name
```

where:

<i>script file name</i>	Generates a shell script from a template. Enclose <i>script_file_name</i> in quotation marks (" ") if it contains space characters. Do not use this option with this command's -r (for "run") option. See "Using bpdbsbdb2 for a database restore" on page 84.
<i>template_name</i>	Identifies the template. bpdbsbdb2 retrieves backup templates from a known location on the master server. Specify only the file name.

Note: The users needs to review and customize any and all scripts that are generated from templates. Generated scripts are intended to be modified for the user's environment and preferences. For example, settings such as passwords or catalog partition numbers are not generated in the template-to-script conversion, so they require manual editing. In addition, generated scripts do not handle all possible error and failure cases and should be used at your own risk.

Use the `DB2CMD` command processor to run scripts that you generated for Windows. This processor is provided with `DB2, DB2CMD C:\TEMP\SCRIPT.CMD`.

An authorized DB2 user needs to run the scripts that are generated for UNIX.

The user needs to review and modify script execution permissions as desired.

For security purposes, user names and passwords are not included in generated scripts. Add them as needed.

The `DB2 QUIESCE` command is generated when the **Disconnect users and prohibit access** template option is specified. However, this command fails if your version is before DB2 V8.1.

When attempting a point-in-time restore, customize the time value. The command `DB2 RESTORE ... TAKEN AT` strictly interprets the specified time and succeeds only if a backup image with the same time exists. For more information, see your IBM DB2 documentation. This limitation does not exist for templates, which search for an appropriate image.

If a template enables roll-forward recovery, then roll-forward commands are generated for all partitions that are specified in the template, whether or not that partition is configured for roll-forward recovery.

If a script performs a roll-forward recovery, customize the `DB2NODE` variable. In single partition environments, this variable can typically be empty (for example, "`DB2NODE=`"). In a multiple partition environment, set this variable to the catalog partition number.

Creating DB2 scripts manually

On UNIX and Linux, the NetBackup for DB2 installation software includes the following scripts:

- `db2_backup`
- `db2_restore`
- `db2_all_backup_mpp`
- `db2_all_restore_mpp`

On Windows, the NetBackup for DB2 installation software includes the following scripts:

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

After installation, the scripts reside in the following location:

On UNIX and Linux: `/usr/opensv/netbackup/ext/db_ext/db2/scripts`

On Windows: `install_path\NetBackup\dbext\db2\samples\`

Modify these scripts for your environment. Do not store your scripts in the sample directory because they are lost if you upgrade or reinstall. Always relocate your scripts to a safe location. For clustered environments, this location must be available after a failover.

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.

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

Modifying DB2 backup and install scripts

The follow procedure describes how to modify scripts. Special configuration is required for a DB2 EEE (DPF) environment.

See [“Overview of installation and configuration for a DB2 EEE \(DPF\) environment”](#) on page 139.

To modify the DB2 backup and install scripts

- 1 Copy the example scripts to a different directory on your client in a safe location. In clustered environments, this location should be available after a failover.
- 2 On UNIX and Linux, set the access permissions of these scripts to 775.

```
chmod 775 script_name
```

- 3 Use a text editor such as Notepad (Windows) or `vi(1)` (UNIX and Linux) to open the script.
- 4 Follow the instructions in the script.
- 5 On UNIX and Linux, include an `su - user` line (`user` is the DB2 instance account) in your scripts. Otherwise, the scripts do not run with the proper permissions and environment variables.
- 6 Test the scripts that you just created by starting a manual backup of this policy.

See [“Testing configuration settings for NetBackup for DB2”](#) on page 44.

Script parameters

The NetBackup for DB2 templates and scripts read parameters from the environment when they perform backup and restore operations.

The parameters can come from the following sources:

- Environment variables
- UNIX and Linux: NetBackup `bp.conf`
- 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.

About NetBackup template and shell script storage

Template storage	<p>The backup wizard saves a backup template to a location specific to NetBackup on the current NetBackup master server. NetBackup retrieves a backup template from the master server as part of a backup (server-directed, scheduled, or user-directed) and runs it on the client. A backup template is associated with a policy by specifying its name in the policy file or script list. Because backup templates are stored on the server in a known location, server-directed and scheduled backups use the same copy of the template for each client in the policy client list.</p> <p>The recovery wizard saves a restore template to a user-specified location on the client. The location that is specified should include a fully qualified path to a directory where the user has write access. See “Using the NetBackup for DB2 recovery wizard” on page 82.</p> <p>Templates store the encrypted passwords that are decrypted at runtime.</p>
Shell script storage	<p>DB2 scripts must reside on the NetBackup client. Backup scripts are associated with a policy by specifying the file name (including path) in the policy file or script list. For server-directed or scheduled backups, each client in the policy’s client list must have a copy of the script with the same name in the same location. See “About adding backup selections to a DB2 policy” on page 35.</p> <p>The backup processes and recovery processes sometimes require passwords for DB2 database access and system user accounts.</p>
Template and shell script storage in a NetBackup cluster	<p>Templates and shell scripts pertain to NetBackup for DB2 environments that are not installed in a cluster.</p> <p>Refer to the template storage and shell script storage entries in this table.</p> <p>If you operate within a NetBackup cluster, make sure that the restore templates and shell scripts reside in a file system that is shared between all nodes in the cluster.</p>

Performing backups and restores of DB2

This chapter includes the following topics:

- [NetBackup for DB2 backup overview](#)
- [About backups from the NetBackup master server](#)
- [About user-directed backups](#)
- [Using the Backup, Archive, and Restore interface to browse DB2 resources](#)
- [About browsing DB2 backup images with bplist](#)
- [Performing a database restore](#)
- [About an alternate restore](#)

NetBackup for DB2 backup overview

After you have completed installing and configuring NetBackup for DB2, you can start DB2 backups and restores through NetBackup. You can also run DB2 commands directly.

Note: Always specify the correct DB2 script or template when configuring automatic backups or when starting operations through NetBackup. NetBackup for DB2 does not generate an error if a restore DB2 script file is used for a backup operation or a backup DB2 template or script is used for a restore operation.

NetBackup for DB2 provides the following ways to perform a backup:

- Issue a DB2 command from the DB2 control center or command-line processor. The DB2 `BACKUP` and `RESTORE` commands use the policies, schedules, and settings that are specified in the following sources:
 - The NetBackup for DB2 vendor I/O library.
 - On UNIX and Linux, this library is named `nbdb2.ext`, where *ext* differs depending on your platform.
 - On Windows, this library is named `nbdb2.dll`.
 - The NetBackup for DB2 configuration file. This file is named `db2.conf`.
- Run a script from the operating system command line. You can create scripts from scratch, or you can base a script on a template that you created earlier.
- Use templates that are initiated from the template wizards or Template Administration interface.
- Use templates and scripts that are specified in policies. When you back up a NetBackup policy, it uses the templates and scripts that are specified in the policy.

The main types of DB2 backups are as follows:

database copy	<p>A copy of the entire DB2 database or tablespace. This backup is accomplished by issuing a DB2 <code>BACKUP DATABASE</code> command. A database backup can be initiated through NetBackup by an automatic backup of a DB2 policy, a manual backup of a DB2 policy, or a user-directed backup.</p> <p>See “About backups from the NetBackup master server” on page 71.</p> <p>See “About user-directed backups” on page 71.</p>
archive log backup	<p>An archive log backup is a backup of an archive log file for DB2. If <code>VENDOR</code> is enabled in the DB2 configuration files, NetBackup for DB2 backs up the archive logs along with the database files. If the user exit program is enabled in the DB2 configuration file, you need a separate policy and schedule to back up the archive logs.</p>
database copy	<p>A configuration file backup is a backup of the DB2 configuration files that you need to recover the database in the case of a disaster.</p> <p>You can use a Standard policy (UNIX and Linux) or Windows policy with a User Backup schedule to back up the files.</p> <p>For information on which files to back up, see your IBM DB2 documentation.</p>

About backups from the NetBackup master server

You can back up a DB2 policy manually or automatically. To back up manually, the administrator on the master server uses the NetBackup administrator's interface to execute an Automatic Backup schedule for a DB2 policy.

The most convenient way to back up a DB2 policy 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 lists and on all clients that are listed in the client list.

The DB2 scripts initiate the database backup.

Further information is available on how to add a new schedule or change an existing schedule for automatic backups.

See [“About adding schedules to a NetBackup for DB2 policy”](#) on page 39.

When a backup template is run from a NetBackup schedule, the schedule determines the backup type (automatic full, automatic cumulative incremental, or automatic differential incremental).

The following information applies only if you use the user exit program to back up the archive logs:

- If an online backup of a partition is requested, the user exit program must be enabled. If not, an offline partition backup is attempted. An offline backup is also attempted if the database is in backup-pending mode.
- If a tablespace backup is requested, the user exit program must be enabled. If not, template execution fails because DB2 does not support offline tablespace backups.

About user-directed backups

When you run a template, NetBackup for DB2 processes database partitions sequentially in the order that is listed in the template summary. All tablespaces that reside in the same partition are processed together.

For example, tablespace `T1` resides in partition `P1`, and tablespaces `T2` and `T3` reside in partition `P2`. The processing order is as follows:

- Process tablespace `T1` in partition `P1`.
- Process tablespaces `T2` and `T3` in partition `P2`.

You can run a user-directed backup in the following ways:

- Using the DB2 template administration interface

- Using `bpdbssbdb2`.

- Using DB2

A failure in processing a request immediately stops template execution. The error condition must be resolved before the template can be re-run. Except where noted, all DB2 warnings are treated as DB2 errors; they cause template execution to fail.

If the **Disconnect users and prohibit access** template option is selected, the system issues the DB2 `QUIESCE` command before it performs the backup or restore.

Users must have sufficient DB2 permissions to browse DB2 databases and perform backup, restore, and roll-forward operations. Refer to the following DB2 database manager configuration settings: `SYSADM`, `SYSCTRL`, and `SYSMAINT`.

Using the DB2 template administration interface to run a user-directed backup

The DB2 template administration interface is available in the NetBackup Backup, Archive, and Restore interface. The DB2 template administration window provides the following functions:

Run	Processes the selected template.
Edit	Changes the contents of an existing template. The selected template is loaded into the NetBackup for DB2 template generation wizard.
Delete	Removes the selected template. You must be the root user or the template creator to delete a template.
Rename	Changes the name of the selected template. You must be the root user or the template creator to rename a template.
View	Displays a summary of the selected template.

The templates that are created by the NetBackup for DB2 template generation wizard are stored in a predetermined location on the master server.

See [“Creating a backup template using the NetBackup for DB2 backup wizard”](#) on page 62.

To use the DB2 template administration interface

- 1 Start the NetBackup Backup, Archive, and Restore interface.

On UNIX and Linux, type the following from the command line:

```
/usr/opensv/netbackup/bin/jbpSA &
```

On Windows, choose File > **Backup, Archive, and Restore** in the NetBackup Administration Console.

- 2 In the Backup, Archive, and Restore interface, choose Actions > **Administer Database Templates > DB2**.

The DB2 Template Administration window appears.

The Select Template list shows the names and descriptions of the DB2 backup templates that are stored on the current master server.

- 3 Select the name of the backup template you want to run.

- 4 Click **Run**.

- 5 Type your **User Name** and **Password**.

- 6 Click **OK**.

- 7 Click **Run**.

The template runs a full backup. Incremental backups are only available through the NetBackup scheduler.

You can use the View Status tool to see the status of the backup. Click File > **View Status**.

Using bpdbsbdb2 to run a user-directed backup

The `bpdbsbdb2` command runs a backup template that is created by the NetBackup for DB2 Backup Wizard. At the command prompt, issue `bpdbsbdb2` in the following format:

```
# bpdbsbdb2 -backup -r -t template_name -i instance_name
```

Where `-r` runs a template, `-t` identifies the template, and `-i` identifies the instance to use.

For example:

```
# bpdbsbdb2 -backup -r -t DB2_Mon_full.tpl -i DB2INST
```

`bpdbsbdb2` retrieves backup templates from a predetermined location on the master server, so you only need to specify the template file name.

Using DB2 to run a user-directed backup

To start a user-directed backup, run the `DB2 BACKUP DATABASE` command.

You can run this command from the DB2 command line on the client (UNIX and Linux) or from the DB2 command window on the client.

Depending on the release of DB2 that you use, issue the `BACKUP DATABASE` command in one of the following formats to perform a backup.

Table 4-1 BACKUP DATABASE command formats

Format	Description
Supported in all DB2 releases	<p>Issue the command in the following format:</p> <pre>UNIX and Linux: db2 backup db sample load \ /usr/opensv/netbackup/bin/lib</pre> <p>The specification for <i>lib</i> differs depending on your platform.</p> <p>Windows: db2 backup db sample load <i>install_path</i>\NetBackup\bin\nbdb2.dll</p> <p>The <code>db2.conf</code> specifies several variables that the backup operation uses. You can override the policy name and schedule name variables directly on the command line by using the <code>OPTIONS</code> entry. The following example overrides the policy name and the schedule name:</p> <p>UNIX and Linux: db2 backup db sample load /usr/opensv/netbackup/bin/lib OPTIONS "DB2_POLICY=policy3:DB2_SCHEDULE=sched_name4"</p> <p>See “About the NetBackup for DB2 components” on page 16.</p> <p>Windows: db2 backup db sample load <i>install_path</i>\NetBackup\bin\lib OPTIONS "DB2_POLICY=policy3:DB2_SCHEDULE=sched_name4"</p>

Table 4-1 BACKUP DATABASE command formats (*continued*)

Format	Description
Supported in DB2 8.2 and later releases	<p>If you use a DB2 8.2 or later release and if <code>VENDOR</code> is enabled, you can use the command in the following format:</p> <p>UNIX and Linux: <code>db2 backup db sample online load /usr/openv/netbackup/bin/lib include logs</code></p> <p>For <i>lib</i>, specify the same path as shown for the preceding format (Format 1).</p> <p>Windows: <code>db2 backup db sample online load install_path\NetBackup\bin\nbdb2.dll include logs</code></p> <p>The <code>db2.conf</code> file specifies several variables that the backup operation uses. You can override the policy name and schedule name variables directly on the command line by using the <code>OPTIONS</code> entry. The following example overrides the policy name and the schedule name:</p> <p>UNIX and Linux: <code>db2 backup db sample online load /usr/openv/netbackup/bin/libinclude logs OPTIONS "DB2_POLICY=policy3:DB2_SCHED=sched_name4"</code></p> <p>Windows: <code>db2 backup db sample online load install_path\NetBackup\bin\libinclude logs OPTIONS "DB2_POLICY=policy3:DB2_SCHED=sched_name4"</code></p> <p>For more information on the <code>DB2 BACKUP DATABASE</code> command, see your DB2 documentation.</p>

BACKUP DATABASE command options

You can back up a DB2 database to NetBackup with either the `DB2 BACKUP DATABASE` command or with its alternative syntax, `BACKUP DB`.

[Table 4-2](#) lists the command options when used in a NetBackup for DB2 environment.

Table 4-2 DB2 BACKUP command options

Option	Purpose
<code>LOAD NBDB2_library_path</code>	Instructs DB2 to use the <code>NBDB2</code> vendor library when it performs the backup.

Table 4-2 DB2 BACKUP command options (*continued*)

Option	Purpose
<code>OPEN <i>number</i> SESSIONS</code>	Specifies the number of concurrent data streams used for writing data. Use this option if you have multiple backup devices available, or you have multiplexing enabled in NetBackup.
<code>WITH <i>number</i> BUFFERS</code>	Use this option when opening multiple sessions. See <code>OPEN <i>number</i> SESSIONS</code> . The number of buffers must be twice the number of sessions.
<code>BUFFER <i>size</i></code>	Use this option to increase or decrease the buffer size, if necessary. Increased size can benefit performance, but decreased size might be necessary if using numerous buffers. DB2 recommends that the size be a multiple of the extent size. The DB2 <code>DFT_EXTENT_SZ</code> setting defines the default extent size.
<code>WITHOUT PROMPTING</code>	This option is required for unattended backups. It must be specified in backup scripts that NetBackup executes.
<code>INCREMENTAL</code>	Use this option to perform a cumulative backup.
<code>INCREMENTAL DELTA</code>	Use this option to perform a differential backup.
<code>ONLINE</code>	Use this option to back up hot, or active, databases. The DB2 <code>USEREXIT</code> setting must be enabled for online backups.
<code>OPTIONS "<i>options-string</i>"</code>	<p>Specifies options that are to be used for the backup operation. The string passes to the vendor support library, for example TSM, exactly as it was entered, without the quotes.</p> <p>Specifying this option with the <code>DB2_POLICY</code>, <code>DB2_SCHED</code>, <code>BKUP_IMAGE_PERM</code>, or <code>DB2_RESTORE_PRIORITY</code> environment variables overrides their settings in the <code>db2.conf</code> file.</p> <p>See Table 3-9 on page 59.</p> <p>Note: Specifying this option overrides the value that is specified by the <code>VENDOROPT</code> database configuration parameter.</p>

Table 4-2 DB2 BACKUP command options (*continued*)

Option	Purpose
PARALLELISM <i>n</i>	Determines the number of tablespaces which can be read in parallel by the backup utility. DB2 automatically chooses an optimal value for this parameter unless you explicitly enter a value.

Using the Backup, Archive, and Restore interface to browse DB2 resources

The Backup, Archive, and Restore interface displays the DB2 resource. You can browse the DB2 resources through four levels: instance, database, partition, and tablespace. You can view the containers in a tablespace, but you can select for restore only at the tablespace level or the partition level.

Note: You can also use the DB2 LIST HISTORY command to browse backup images.

This interface does not let you browse previous backups. Instead, it browses the existing DB2 instances and databases. You can select these DB2 objects and use the NetBackup for DB2 recovery wizard to prepare recovery templates for the objects.

See [“Using the NetBackup for DB2 recovery wizard”](#) on page 82.

The following shows a sample restore window in the Backup, Archive, and Restore interface for UNIX and Linux, and for Windows.

Figure 4-1 Restore window (UNIX and Linux)

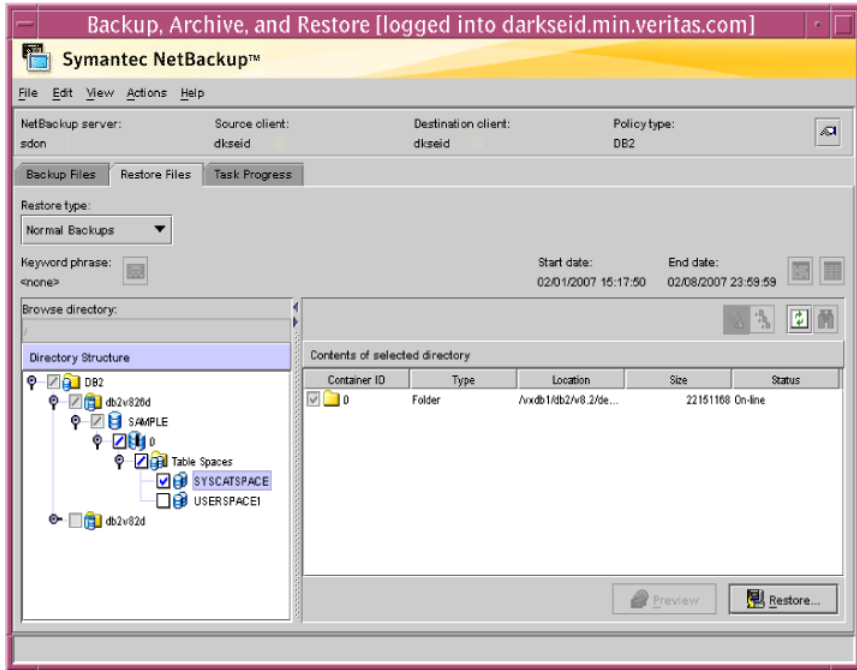
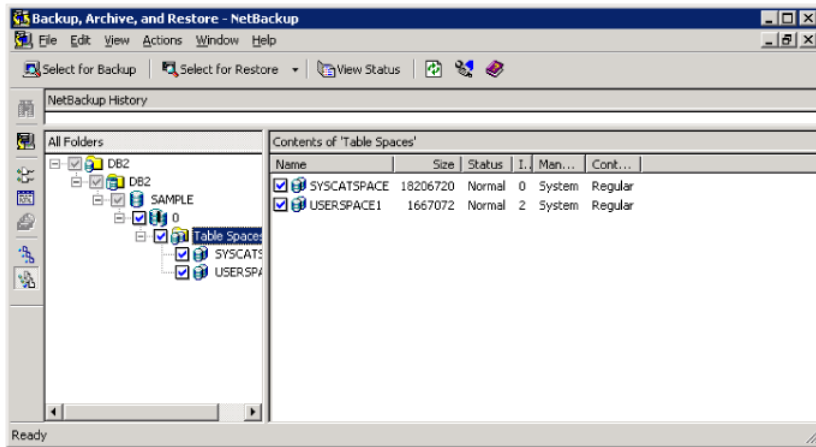


Figure 4-2 Restore window (Windows)



In this example, the DB2 resource is expanded down to the tablespace level. You can select for restore one or more tablespaces, one or more partitions, or one entire database (by selecting all of its partitions).

About browsing DB2 backup images with `bplist`

You can use the `bplist` command to search DB2 backup images. The output from `bplist` differs depending on how you manage your archive log files.

Table 4-3 bplist output

bplist option	Description
-t 18	<p>This example searches all DB2 backup images for a client named <code>camel</code>, which is also the master server. The information comes from the NetBackup catalog on the master server. The user exit program backs up the archive files.</p> <p>The <code>bplist -t 18</code> option specifies the DB2 backup type. The <code>bplist</code> output shows the DB2 database backup images that are stored in the NetBackup database</p> <p>UNIX and Linux:</p> <pre data-bbox="287 552 1194 661">/usr/opensv/netbackup/bin/bplist -C camel -S camel -t 18 -R / /DB2/SAMP/node0000/2009120210515/SAMP.0.DB2.node0000.0.2009120210515.1 /DB2/SAMP/node0000/2009120210473/SAMP.0.DB2.node0000.0.2009120210473.1 /DB2/SAMP/node0000/2009112915411/SAMP.3.DB2.node0000.4.2009112915411.1</pre> <p>Windows:</p> <pre data-bbox="287 743 1194 852">install_path\NetBackup\bin\bplist -C camel -S camel -t 18 -R / DB2:\SAMP\node0000\2009120210515\SAMP.0.DB2.node0000.0.2009120210515.1 DB2:\SAMP\node0000\2009120210473\SAMP.0.DB2.node0000.0.2009120210473.1 DB2:\SAMP\node0000\2009112915411\SAMP.3.DB2.node0000.4.2009112915411.1</pre> <p>Where:</p> <p><code>DB2</code> is the directory name for all DB2 backups.</p> <p><code>SAMP</code> is the name of the database (both occurrences).</p> <p><code>node0000</code> is the node name.</p> <p><code>20091202105150</code> is the time that the backup occurred.</p> <p><code>0</code> is the type of backup taken. Zero (0) indicates a full database backup. Three (3) indicates a tablespace backup.</p> <p><code>DB2</code> is the database instance name. It is one to eight characters in length.</p> <p><code>node0000</code> is the node number. In non-partitioned database systems, the node number is always zero (node0000). In partitioned database systems, the number is <code>nodexxxx</code>, where <code>xxxx</code> is the number assigned to the node in the <code>db2nodes.cfg</code> file.</p> <p><code>0</code> is the last archive log number.</p> <p><code>20091202105150</code> is the timestamp, which includes the date (year, month, day) and time (hour, minute, second).</p> <p><code>1</code> is the session number. This file extension identifies the session number that was specified on the <code>DB2 BACKUP</code> command.</p>

Table 4-3 bplist output (*continued*)

bplist option	Description
<p>-k DB2_Log_Policy</p>	<p>This example searches all DB2 backup images for a client named <code>cow</code>, which is also the master server. The information comes from the NetBackup catalog on the master server. This example assumes that the user exit program is used to back up the archive files.</p> <p>The <code>-k DB2_Log_Policy</code> option specifies files that are backed up with this policy. The policy name originates from the settings in the <code>db2.conf</code> file for archive log files. The <code>bplist</code> output shows the list of DB2 archive log files that are stored in NetBackup.</p> <p>UNIX and Linux:</p> <pre>/usr/opensv/netbackup/bin/bplist -k DB2_Log_Policy -C cow -S cow -R / /home/db2inst/NODE0000/SQL00001/SQLLOGDIR/S0000026.LOG /home/db2inst/NODE0000/SQL00001/SQLLOGDIR/S0000025.LOG /home/db2inst/NODE0000/SQL00001/SQLLOGDIR/S0000024.LOG</pre> <p>Windows:</p> <pre>install_path\NetBackup\bin\bplist -k DB2_Log_Policy -C cow -S cow -R / C:\DB2\NODE0000\SQL00001\SQLLOGDIR\S0000026.LOG C:\DB2\NODE0000\SQL00001\SQLLOGDIR\S0000025.LOG C:\DB2\NODE0000\SQL00001\SQLLOGDIR\S0000024.LOG</pre>
<p>-k log_policy</p>	<p>This example uses <code>bplist</code> to search the DB2 archive log files for a client named <code>cow</code>. The <code>-k log_policy</code> option specifies files that are backed up with this policy. The <code>VENDOR</code> is set and the user exit program is not used to back up the archive logs:</p> <p>UNIX and Linux: <code>/usr/opensv/netbackup/bin/bplist -C cow -S cow -k log_policy -R /</code></p> <pre>/DB2/SAMPLE/LOGFILE/node0000/db2v864d/C0000000_S0000000.LOG</pre> <p>Windows: <code>install_path\NetBackup\bin\bplist -C cow -S cow -k log_policy -R /</code></p> <pre>C:\DB2\SAMPLE\LOGFILE\node0000\db2v864d\C0000000_S0000000.LOG</pre> <p>Where:</p> <p><code>DB2</code> is the directory name for all DB2 backups.</p> <p><code>SAMPLE</code> is the name of the database.</p> <p><code>LOGFILE</code> identifies the entry as a log file.</p> <p><code>node0000</code> is the node name.</p> <p><code>db2v864d</code> is the name of the DB2 instance.</p> <p><code>C0000000_S0000000.LOG</code> is the name of the log file that is provided by DB2.</p>

You can find more information on the `bplist` command in the *NetBackup Commands Reference Guide*.

Performing a database restore

As the DB2 user on UNIX and Linux, you can initiate a database restore with the DB2 Control Center or command-line processor.

On UNIX and Linux, a NetBackup task can execute a restore template or script containing the necessary DB2 commands to perform the restore. You can use the NetBackup for DB2 recovery wizard to create restore templates, or write scripts that contain the commands to perform a restore.

Using the NetBackup for DB2 recovery wizard

NetBackup for DB2 includes a recovery wizard that solicits information from the user about the desired DB2 restore and recover operations. The wizard uses the information to create a template that can be used immediately or saved for later use.

The NetBackup for DB2 recovery wizard saves a recovery template locally in a user-specified location on the NetBackup client. Recovery templates are not stored on the server because recovery is always user directed, not scheduled. Under typical circumstances, a recovery template is run immediately and then deleted.

The recovery process sometimes requires passwords for DB2 database access and system user accounts. Templates store encrypted passwords that are decrypted at runtime.

Because recovery can be a complex process, it might be necessary to perform manual steps as part of the operation. For more information, see your DB2 documentation.

Selecting files for restore

The following procedure describes how to select files for a restore operation.

To select files for restore

- 1 Open the Backup, Archive, and Restore interface.
- 2 On Windows, click File > **Specify NetBackup Machines and Policy Type**.
On UNIX and Linux, click Actions > **Specify NetBackup Machines and Policy Type**.
- 3 In the **Policy type for restores** list, select **DB2**.

- 4 Click **OK**.
- 5 On UNIX and Linux, Click the Restore Files tab.
On Windows, click Choose File > **Select Files and Folders to Restore > from Normal Backup**.
- 6 Expand the DB2 resource in the left pane to view a DB2 instance hierarchy.
- 7 Select a node in the left pane to view details in the right pane.
If the DB2 node is not visible, it is possible that your NetBackup for DB2 client does not have the appropriate policy type specified.

Using the recovery wizard

When you are ready to perform a recovery, complete the following procedure to create and run a template with the recovery wizard. When you run a template, all restore operations are performed before any and all roll-forward operations.

Note the following:

- When you perform a DB2 restore, false alarms are reported in the NetBackup Activity Monitor. DB2 accesses the NetBackup image twice when you perform a restore. The first access reads a partial image, which is reported as "The restore failed to recover the requested files" (status 5) in the Activity Monitor. The next access reads the entire image, which should result in a successful restore (status 0). The template execution status, not the activity monitor, is the best indication of overall success.
- DB2 warning SQL2539W indicates that the requested restore operation replaces the existing database. That is, the existing database files are deleted. When running a template to perform a restore, this warning is logged and the restore proceeds without interruption.
- DB2 warning SQL2523W indicates that the backup image originates from a different database of the same name. This warning is handled as an error to prevent DB2 from deleting log files.
- DB2 error SQL1260N indicates that the restored partition is not configured for roll-forward recovery. If the template is configured to perform a roll-forward, this step is skipped.

To use the recovery wizard

- 1 Log onto NetBackup as the DB2 user.
- 2 In the Backup, Archive, and Restore interface, do one of the following:
UNIX and Linux: Click the Restore Files tab.
Windows: Choose File > **Select Files and Folders to Restore > from Normal Backup**
- 3 Expand a DB2 instance and select the database objects you want to restore.
- 4 UNIX and Linux: Click **Restore**.
Windows: Click Actions > **Restore**
- 5 Enter information about the restore operation you want to perform in the following screens:
 - Welcome
 - Database Login
 - Time Periods
 - Restore Options
 - Recovery OptionsIf you need an explanation of any of the fields on the wizard screens or more details, click **Help** on the wizard screen.
- 6 Run the template immediately after the wizard finishes, to save the template locally, or both. For explanations of your choices, click **Help**.
Template execution does not support the use of local time when performing a roll-forward. The roll-forward time that is specified in the template is passed to DB2, and it is interpreted as GMT by DB2. For more information, see the `ROLLFORWARD` command in your DB2 documentation.

Using `bpdbssbdb2` for a database restore

The `bpdbssbdb2` command lets you run a recovery template that the NetBackup Recovery wizard creates.

At the command line, type the following:

UNIX and Linux: `/usr/opensv/netbackup/bin/bpdbssbdb2 -restore -r -t template_name -i instance_name`

Windows: `install_path\netbackup\bin\bpdbssbdb2 -restore -r -t templ_name -i instance_name`

The `-r` runs a template, and the `-t` identifies the template.

For example:

```
UNIX and Linux: /usr/opencv/netbackup/bin/bpdbsbdb2 -restore -r \ -t  
/db2/restore_templates/full_restore.tpl -i DB2INST
```

```
Windows: bpdbsbdb2 -restore -r -t  
\\db2\restore_templates\full_restore.tpl -i DB2INST
```

Restore templates do not reside in a predetermined location on the master server. They are considered to be temporary in nature and should reside on the client. If the full path is not specified as part of the restore template name, the file might not be found.

You can create a script from a template with `bpdbsbdb2`.

Using DB2 to perform a restore

The exact process for recovering a DB2 database differs from site to site depending on the following: the methods that are used for backing up the archive logs, the settings that are used in the NetBackup for DB2 configuration file, `db2.conf`, and the location of the archive logs.

The following procedures show how to restore an example database to the level of a recent database backup plus archive logs:

- See [“Recovering a DB2 database - Simplest case”](#) on page 85.
Use this procedure if the archive logs are in an accessible location and they were all created with the same parameters in `db2.conf`.
- See [“Recovering a DB2 database - Restoring archive logs”](#) on page 86.
This case is more complex. Use this procedure if you have to browse for archive logs and restore them from secondary storage.

For more information on how to recover a DB2 database, see your DB2 documentation.

Recovering a DB2 database - Simplest case

The DB2 commands for recovering a database differ from release to release. Use this procedure to restore a database if the archive logs are in a location that is known and accessible to DB2 and NetBackup.

For example, you can probably use the procedure in this section if the following are true:

- If `ARCFUNC SAVE` was in effect in the `db2.conf` file when all archive logs were backed up.

- If `ARCFUNC COPY` was in effect in the `db2.conf` file when all archive logs were backed up and the logs were not moved from the `ARCDIR` and `RETDIR` directories.
- If `VENDOR` was in effect in DB2 at the time all the archive logs were created.

The commands in the following procedure restore a DB2 database and its archive logs. These commands assume that the archive log files reside in a location that is known and accessible to DB2 and NetBackup.

To restore a DB2 database when the archive logs are accessible to DB2 and NetBackup

- ◆ Depending on the release level of DB2, enter one of the following commands:

- For DB2 8.2 and later releases, enter the following command:

```
db2 recover db db_name
```

- For DB2 releases before 8.2, enter the following commands:

Windows: `db2 restore db db_name load`

```
install_path\NetBackup\bin\nbdb2.dll db2 rollforward db db_name  
to end of logs and stop
```

Where *db_name* is the name of the DB2 database you want to restore.

UNIX and Linux: `db2 restore db db_name load`

```
/usr/opensv/netbackup/bin/libdb2 rollforward db db_name to end  
of logs and stop
```

Where:

db_name Name of the DB2 database.

lib Full path to the NBDB2 library.

See [“About the NetBackup for DB2 components”](#) on page 16.

Recovering a DB2 database - Restoring archive logs

You can use the procedure in this section if you need to restore the archive logs before you perform the roll-forward.

Use the procedure in this section to restore the archive logs manually if the following situations exist:

- If the archive logs are not in the standard locations. When this situation exists, NetBackup cannot perform a seamless restore of DB2. You may have moved one or more of the needed archive logs to secondary storage such as tape, network storage, or some other location. For example, if `ARCFUNC COPY` is in effect and the old archive logs were moved to tape, perform procedure in this section.

- If `ARCFUNC COPY` was in effect in the `db2.conf` file at the time the archive logs were backed up and the `ARCDIR` and `RETDIR` parameters specify two different locations.
- If `PARTITIONTYPE RAW` was in effect in the `db2.conf` file for some (not all) of the archive log backups.

For more information about the DB2 commands, see your DB2 documentation.

To restore a DB2 database when the archive logs are in a non-standard location

1 Restore the database.

Issue the DB2 `RESTORE DATABASE` command to restore the database itself. For example:

Windows: `db2 restore db db_name load
install_path\NetBackup\bin\nbdb2.dll`

where *db_name* is the name of the DB2 database you are to restore.

UNIX and Linux: `db2 restore db db_name load
/usr/opensv/netbackup/bin/lib`

Where:

db_name Name of the DB2 database.

lib Full path to the NBDB2 library.

See [“About the NetBackup for DB2 components”](#) on page 16.

2 Use NetBackup to browse the archive logs.

If a restore requires log files that are backed up from a file system and log files that are backed up from a raw device, retrieve the logs from the file system manually.

You can use the Backup, Archive, and Restore interface or the `bplist` command to browse the archive logs and find those missing from the restore directories.

If `PARTITIONTYPE RAW` is specified in the `db2.conf` file, the user exit program looks for only those logs when you perform the restore. The missing logs are those that were written when `PARTITIONTYPE RAW` was not in effect.

See [“Using the Backup, Archive, and Restore interface to browse DB2 resources”](#) on page 77.

See [“About browsing DB2 backup images with bplist”](#) on page 79.

- 3 Use operating system commands to copy the missing archive logs to the correct locations in your operating system. For example:

On UNIX and Linux, use the `cp` command.

On Windows, use your mouse to copy the files from one location to another.

If `ARCFUNC COPY` is in effect and the `ARCDIR` and `RETDIR` parameters specify different locations, copy the logs in the `ARCDIR` directory to the `RETDIR` directory. If `ARCDIR` and `RETDIR` specify the same location, you do not have to take any action. If some of the log files have been moved to secondary storage, restore these files to the `RETDIR` directory.

- 4 Use NetBackup to restore the archive logs.

Use either the NetBackup Backup, Archive, and Restore interface or the `bprestore` command. For example:

UNIX and Linux: `bprestore`

```
/vedb2/db2/v8/db2V82d/NODE0000/SQL0001/SQLLOGDIR/S00009.LOG
```

Windows: `bprestore`

```
C:\vedb2\db2\v8\db2V82d\NODE0000\SQL0001\SQLLOGDIR\S00009.LOG
```

- 5 Bring the database online.

When the roll-forward is initiated, DB2 sends a request to NetBackup to restore the log files it needs. DB2 then reapplies the transaction information in the archive logs since the last full backup was performed. DB2 brings back the database online.

For example, you can use the following command options if `PARTITIONTYPE RAW` was not specified when any of the log files were backed up:

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

The `ROLLFORWARD DATABASE` command issues messages if it cannot locate all the archive log files it needs. If you receive these messages, browse and restore the missing archive log files, and issue the `ROLLFORWARD DATABASE` command again.

After the database is successfully restored, the `ROLLFORWARD DATABASE` command restores and reapplies the transactions that are recorded in the archive log files since the last backup was performed. 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.

RESTORE DATABASE command options

You can restore a DB2 database with either the `DB2 RESTORE DATABASE` command or with its alternative syntax, `RESTORE DB`. The `DB2 RESTORE DATABASE` command restores a database from NetBackup.

[Table 4-4](#) provides reference information for the command options when used in a NetBackup for DB2 environment.

Table 4-4 DB2 `RESTORE` command options

Option	Purpose
<code>LOAD NBDB2_Library_Path</code>	Instructs DB2 to use the NBDB2 vendor library when you perform the restore.
<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 if you have multiplexing enabled in NetBackup. Typically, you should specify the same number of sessions that were used during the backup. You can use fewer sessions, but it may degrade overall restore performance. No benefit exists if you specify more sessions.
<code>WITH number BUFFERS</code>	Use this option when opening multiple sessions. See <code>OPEN number SESSIONS</code> . The number of buffers must be twice the number of sessions. If you use fewer buffers it can degrade performance or can cause the restore to fail when it reads multiplexed images.
<code>BUFFER size</code>	Use this option to increase or decrease the buffer size if necessary. Increased size can benefit performance, while decreased size may be necessary if you use numerous buffers. DB2 alters the actual size to be a multiple of the size that is used during the backup.
<code>WITHOUT PROMPTING</code>	This option is required for unattended restores, and it must be specified in backup scripts that are executed by NetBackup.
<code>INCREMENTAL</code>	When you use this option, DB2 may not read the entire image from NetBackup media. Consequently, NetBackup logs an error in the activity monitor, which can safely be ignored.

Table 4-4 DB2 RESTORE command options (*continued*)

Option	Purpose
AUTOMATIC	<p>Use this option to restore a series of full and incremental images.</p> <p>An automated restore coordinates the restoration of a full backup and all associated incremental backups. A single automated restore restores a full backup, an optional cumulative incremental backup, and one or more differential incremental backups.</p>
HISTORY FILE	<p>When you use this option, DB2 may not read the entire image from NetBackup media. Consequently, NetBackup logs an error in the activity monitor, which can safely be ignored.</p>
OPTIONS " <i>options-string</i> "	<p>Specifies options to be used for the restore operation. The string passes to the vendor support library, for example TSM, exactly as it was entered, without the quotes.</p> <p>Specifying this option overrides the value that is specified by the VENDOROPT database configuration parameter.</p>
PARALLELISM <i>n</i>	<p>Specifies the number of buffer manipulators that are to be spawned during the restore operation. DB2 automatically chooses an optimal value for this parameter unless you explicitly enter a value.</p>
DB2_MEDIA_SERVER	<p>Allows the user to explicitly specify the media server to be used to perform the restore.</p>
DB2_COPY_NUMBER	<p>Allows the user to explicitly specify the copy number to be used to perform the restore.</p>

About an alternate restore

An alternate restore lets you restore a DB2 database to a different client or to a different instance. You can also change the name of the database during the restore.

Alternate restores differ from regular restores as follows:

- Use the regular restore procedures if you want to restore a database into the same instance on the same NetBackup client that hosted it previously. In this case, the database also retains its original name.

- Use alternate restore procedures if you want to restore a database to a different instance or to a different client or if you must rename the database during the restore.

Databases within an instance must have unique names. If you restore a database into an instance that already has a database by that name, the alternate restore process overwrites the existing database.

Table 4-5 summarizes the types of restores you can perform and whether you need to use regular or alternate restore procedures.

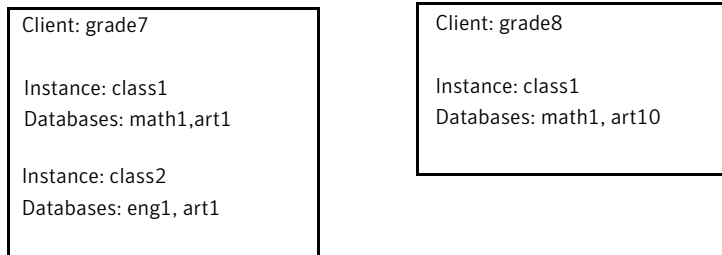
Table 4-5 Types of restores permitted

Object	Regular restore	Alternate restore	Alternate restore	Alternate restore	Alternate restore	Alternate restore	Alternate restore	Alternate restore
Database name	Same	Same	Same	Different	Same	Different	Different	Different
Instance	Same	Same	Different	Same	Different	Different	Same	Different
Client	Same	Different	Same	Same	Different	Same	Different	Different

For example, assume that you have two NetBackup clients, `grade7` and `grade8`. Instances `class1` and `class2` are on `grade7`. Instance `class1` is on `grade8`.

Figure 4-3 illustrates this example.

Figure 4-3 Alternate restore example



The following list shows some of the types of restores you can perform with alternate restore procedures:

- You can restore database `eng1` from instance `class2` on client `grade7` into instance `class1` on client `grade8`. Database `eng1` can retain its name because it is unique to instance `class1`.
- You can restore database `math1` from instance `class1` on client `grade7` into instance `class1` on client `grade8`. During the restore, you need to rename

`math1` to `math2` because instance `class1` on `grade8` already has a database named `math1`. Without renaming, the existing database `math1` would be overwritten.

- You can restore database `art1` from instance `class2` on client `grade7` into instance `class1` on client `grade7`. During the restore, you need to rename `art1` to `art2` because instance `class1` already has a database named `art1`. Without renaming, the existing database `art1` would be overwritten.

Preparing the master server for an alternate restore

The examples in the following procedure assume that database `SAMPLE` was backed up by `client2`, and you want to restore `SAMPLE` to `client1`.

For more information on how to manage client restores, see the *NetBackup Administrator's Guide*.

To prepare the NetBackup master server for alternate restores

- 1 Log onto the NetBackup master server that hosts the policy that backed up database `SAMPLE`.
- 2 Create one of the following files on the NetBackup master server:
 - UNIX and Linux: `/usr/opensv/netbackup/db/altnames/No.Restrictions`
 - UNIX and Linux: `/usr/opensv/netbackup/db/altnames/dest_client_name`
 - Windows: `install_path\NetBackup\db\altnames\No.Restrictions`
 - Windows: `install_path\NetBackup\db\altnames\dest_client_name`

Where `dest_client_name` is the name of a client that is allowed to be a destination client for alternate restores. For example, `client1`.

- 3 If you created a `dest_client_name` file, add the name of the NetBackup for DB2 source client to the `dest_client_name` file. For example, add the following line to this file:

```
client2
```

For more information on managing client restores, see the *NetBackup Administrator's Guide*.

Performing the alternate restore on the clients

The following procedures explain how to restore a DB2 database and its transaction logs. The procedure builds a request to DB2 to find the backup images that correspond to the database you try to restore. Type the commands in this procedure from the client that receives the restored database.

To perform an alternate restore of a DB2 database

1 Modify the `db2.conf` file on the destination client.

Add the following new object identifiers:

- One to specify the alternate restore
- One to define the new database
- One to define the old database
- One to define the new log files
- One to define the old log files

The following example shows the keyword lines that are needed to specify the alternate restore:

```
OBJECTTYPE ALTERNATE # Specifies an alternate restore
SRCINST db2v832d     # Names the source instance that was backed up
SRCALIAS SAMPLE      # Names the source database that was backed up
DESTINST db2v832t    # Names the destination instance name
DESTALIAS NEWSAMPL   # Names the destination database alias name
ENDOPER              # Ends the object identifier
```

The following example shows the keyword that are needed to define the new database:

```
DATABASE NEWSAMPL
OBJECTTYPE DATABASE
POLICY db2-bkup
SCHEDULE Default-Application-Backup
CLIENT_NAME Client1
ENDOPER
```

The following example shows the keyword that are needed to define the old database:

```
DATABASE SAMPLE
OBJECTTYPE DATABASE
POLICY db2-bkup
SCHEDULE Default-Application-Backup
CLIENT_NAME Client1
ENDOPER
```

The following example shows the keyword that are needed to define the new data archive log files:

```
DATABASE NEWSAMPL
OBJECTTYPE ARCHIVE
POLICY db_a_db2
SCHEDULE Default-Application-Backup
#SCHEDULE User
CLIENT_NAME Client1
ARCFUNC SAVE
#ARCFUNC COPY

#ARCDIR /home/db2inst1/arcdire
#RETDIR /home/db2inst1/arcdire -- (UNIX and Linux)

#ARCDIR C:\home\db2inst1\arcdire
#RETDIR C:\home\db2inst1\arcdire -- (Windows)

ENDOPER
```

The following example shows the keyword that are needed to define the old data archive log files:

```
DATABASE SAMPLE
OBJECTTYPE ARCHIVE
POLICY db_a_db2
SCHEDULE Default-Application-Backup
#SCHEDULE User
CLIENT_NAME Client1
ARCFUNC SAVE
#ARCFUNC COPY

#ARCDIR /home/db2inst1/arcdire
#RETDIR /home/db2inst1/arcdire -- (UNIX and Linux)

#ARCDIR C:\home\db2inst1\arcdire
#RETDIR C:\home\db2inst1\arcdire -- (Windows)

ENDOPER
```

- 2 UNIX and Linux: Edit the `bp.conf` file by changing the `CLIENT_NAME` entry to specify the client where the database was originally backed up. Also, change the `SERVER` entry to specify the master server that hosts the policy that originally backed up the database.

Windows: Do the following:

- Start the Backup, Archive, and Restore interface.
- Choose File > **Specify NetBackup Machines and Policy Type.**

- In the **Specify NetBackup Machines and Policy Type** dialog box, from the **Server to use for backups and restores** list, select the name of the master server that contains the policy that backed up the database.
 - From the **Source client for restores** list, select the client (for example, client2).
 - From the **Destination clients for restores** list, select the client to which you want to restore (for example, client1).
- 3 On the destination client, type the DB2 `RESTORE` command.

Type this command in the following format:

```
db2 restore db db_being_restored load lib_path into  
new_db_name redirect
```

where:

<i>db_being_restored</i>	Specify the name of the database that was backed up.
<i>lib_path</i>	Specify the full path to the NetBackup library.
<i>new_db_name</i>	Specify the name for the new database. If the name of the new database matches the name of a database presently included in the new instance, the new database overwrites the existing database.

For example:

```
db2 restore db sample load /opt/opensv/netbackup/bin/nbdb2.sl  
into newsampl redirect -- (UNIX and Linux)
```

```
db2 restore db sample load install_path\NetBackup\bin\nbdb2.dll  
into newsampl redirect -- (Windows)
```

4 Set the location of the data files for the tablespace.

Type this command in the following format:

```
db2 set tablespace containers for 0 using "(path path)"
```

where *path* specifies the DB2 install path.

For example, type one or more commands similar to the following:

```
db2 set tablespace containers for 0 using "(path  
DB2_install_path/db2v832t/NODE0000/SQL00001/SQLT0000.0)"  
-- (UNIX and Linux)
```

```
db2 set tablespace containers for 0 using "(path  
DB2_install_path\db2v832t\NODE0000\SQL00001\SQLT0000.0)"  
-- (Windows)
```

5 Restore the database.

Type the `RESTORE` command in the following format:

```
db2 restore db db_bring_restored continue
```

For example:

```
db2 restore db sample continue
```

6 (Optional) Restore the transaction logs.

See [“Restoring the transaction logs”](#) on page 96.

7 Use the DB2 `ROLLFORWARD` command to restore the logs.

Type this command in the following format:

```
db2 rollforward db new_db_name to end of logs and stop
```

Restoring the transaction logs

Perform this procedure if one of the following is true:

- The archive logs did not originally reside on a raw device.
- The user exit program was used to back up the archive logs.

To restore the transaction logs

- 1 On the destination client, create a directory for the restored transaction log files.

For example:

UNIX and Linux: `mkdir`

`/db/db2_v5/home/db2inst1/NODE0000/SQL00001/SQLOGDIR`

Windows: `mkdir`

`C:\db\db2_v5\home\db2inst1\NODE0000\SQL00001\SQLOGDIR`

- 2 Use the `bprestore` command to restore the logs.

For example:

UNIX and Linux: `bprestore /db/db2_v5/home/db2inst1/NODE0000/SQL00001/SQLOGDIR/S00001.LOG`

Windows: `bprestore install_path\db\db2_v5\home\db2inst1\NODE0000\SQL00001\SQLOGDIR\S00001.LOG`

- 3 If the directory into which you restored the log files is not correct for the destination database, move the logs to the proper location.
- 4 Verify that the correct owner and group permissions are enabled on the log directory.

Using Snapshot Client with NetBackup for DB2

This chapter includes the following topics:

- [NetBackup for DB2 with Snapshot Client features](#)
- [About NetBackup for DB2 with Snapshot Client operations](#)
- [About configuring Snapshot Client with NetBackup for DB2](#)
- [Configuration requirements for snapshot backups with NetBackup for DB2](#)
- [Configuring a snapshot policy for NetBackup for DB2](#)
- [Restoring NetBackup for DB2 from a snapshot backup](#)
- [About configuring NetBackup for DB2 block-level incremental backups on UNIX and Linux](#)
- [About Snapshot Client effects](#)
- [Performing NetBackup for DB2 backups with Snapshot Client methods](#)
- [Performing NetBackup for DB2 restores with Snapshot Client methods](#)

NetBackup for DB2 with Snapshot Client features

To use NetBackup for DB2 with Snapshot Client, NetBackup Snapshot Client and NetBackup for DB2 must both be licensed and installed.

The following NetBackup Snapshot Client features are available for use with NetBackup for DB2.

Table 5-1 Snapshot Client features used with NetBackup for Oracle

Feature	Description
Snapshot backup	A snapshot backup occurs when NetBackup creates a point-in-time disk image of the database and copies that image to disk. This process is nearly instantaneous; so user access to the database is not interrupted during the backup.
Instant recovery	This feature enables instant recovery of backups from disk. It combines snapshot technology with the ability to do rapid disk-based restores. NetBackup creates the image without interrupting user access to data. Optionally, the image is retained on disk as well as backed up to storage. Instant recovery enables block-level restores.
Off-host backup	<p>An off-host backup shifts the burden of backup processing onto a separate backup agent, such as an alternate client. This reduces the effect on the client's computing resources ordinarily caused by a local backup. The backup agent reads the data from the client disk and writes it to storage.</p> <p>On UNIX and Linux, an off-host backup can also be directed to a NetBackup media server, or third-party copy device.</p>
Block-level incremental backup	<p>On UNIX and Linux, a block-level incremental (BLI) backup uses the change tracking capabilities of the Veritas File System (VxFS) Storage Checkpoint feature. In a BLI backup, only the changed blocks of data are backed up, not the entire file or file system. A BLI backup saves time, decreases the amount of backup media that is required, and significantly reduces CPU and network overhead during backups.</p> <p>You can perform a BLI backup with or without RMAN.</p>
Proxy copy	<p>A proxy copy is a special type of backup in which the NetBackup for DB2 agent manages the control of the data transfer. During the backup and restore operations, the proxy copy enables the agent to manage the entire data movement between the disks that contain the data files and the storage devices that NetBackup manages.</p> <p>Backups and restores remain tightly integrated with DB2 and its catalog, greatly simplifying administration tasks.</p>
File-based operations	<p>DB2 provides the list of files that require backup or restore to NetBackup for DB2 with Snapshot Client.</p> <p>More information is available.</p> <p>See “NetBackup for DB2 file-based operations” on page 104.</p>

Table 5-1 Snapshot Client features used with NetBackup for Oracle (*continued*)

Feature	Description
Stream-based operations	<p>Stream-based operations are the standard NetBackup implementation of conventional NetBackup for DB2 backup and restores.</p> <p>More information is available.</p> <p>See “NetBackup for DB2 stream-based operations” on page 103.</p>

About NetBackup for DB2 with Snapshot Client operations

NetBackup users or schedules start database backups or restores by specifying a template or shell script in the backup selections list of the DB2 policy. The template or shell script specifies the objects or commands that perform the backup or restore on the client. You also can use the `bpdb2proxy` command to initiate a NetBackup for DB2 with Snapshot Client backup.

The agent checks that the policy it uses for the backup is configured with the appropriate Snapshot Client attributes. The agent then initiates file-based backups of the DB2 files and uses the NetBackup Snapshot Client interface to perform the data movement.

The NetBackup for DB2 agent uses DB2 APIs to put the data files into quiesce/write suspend mode. NetBackup then creates a snapshot of the files. After the snapshot is created, NetBackup for DB2 uses the DB2 APIs to take the data files out of quiesce/write suspend mode. The data files that are backed up are in quiesce/write suspend mode only for the period of time it takes to create a snapshot of the data.

About the sequence of a NetBackup for DB2 backup operation with Snapshot Client methods

For a backup operation, the NetBackup for DB2 agent performs the following tasks in the order shown:

- Determines the list of files that make up the DB2 database.
- Suspends write activity to the data files (quiesces the database).
- Uses the Snapshot Client method to create a snapshot image of the mapped files.
- Enables DB2 write activity (unquiesces the database).

- Backs up the snapshot image of the data files.

About the sequence of a NetBackup for DB2 restore operation with Snapshot Client methods

For a restore operation, the NetBackup for DB2 agent performs the following tasks:

- Using the DB2 database and a point in time, locates the correct physical backup images.
- Disconnects all users from the database (brings the database offline).
- Restores the images to the original database.
- Uses DB2 APIs to take the files out of the quiesced state, which puts the database in a roll-forward pending state.
- Reruns the transactions from the log files (performs the roll-forward operation).
- Enables user connections to the database (brings the database online).

About database objects supported by advanced backup methods

DB2 allows proxy method backups of databases at the node level, so NetBackup can use file-based Snapshot Client backup methods to back up databases. NetBackup for DB2 cannot use Snapshot Client methods to back up individual tablespaces or container files.

Note: Before you can perform a proxy backup, complete a stream based backup.

DB2 performs only conventional backups for transaction log files. You cannot use Snapshot Client methods for transaction logs backed up with either the user exit program or the `VENDOR` method.

File-based and stream-based backups require different configurations. When you configure NetBackup for DB2 with Snapshot Client backups, be sure to configure policies that allow both kinds of backups.

See [“How Snapshot Client software affects backup types”](#) on page 117.

About multistreaming and DB2 backups

You can use either the `-s` option on the `bpd2proxy` command or the `sessions` parameter in the Backup Options screen of the backup wizard to specify the number of proxy copy backup streams to start. NetBackup for DB2 splits the files

into a number of groups as specified by either of these parameters, based on file size. NetBackup for DB2 attempts to create streams of equal size.

About symbolic links and DB2 backups and restores (UNIX and Linux)

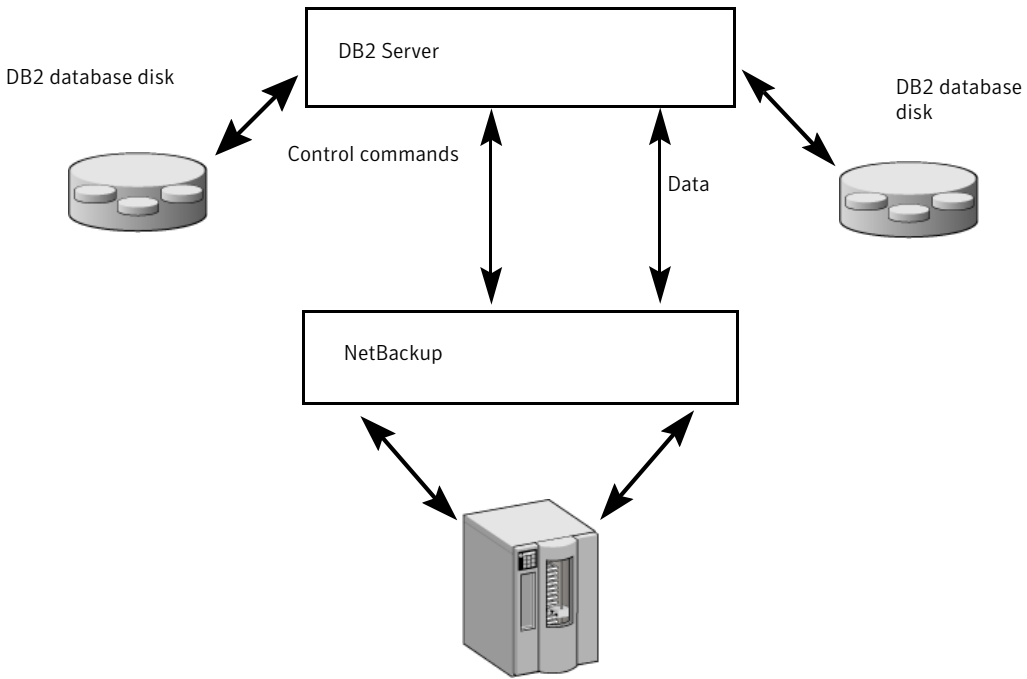
NetBackup for DB2 with Snapshot Client fully supports backups and restores of data files that consist of symbolic links and regular files. Both the symbolic link and the actual file are backed up and restored. However, if you select **Retain snapshots for instant recovery**, the symbolic link must reside on the same file system as the data file. When you use instant recovery, if the symbolic link resides on a different file system than the data file it points to, the restore fails.

NetBackup for DB2 stream-based operations

Stream-based operations are the standard NetBackup implementation of conventional NetBackup for DB2 backup and restores. In a stream-based backup, NetBackup moves the data that is provided by the server process. NetBackup captures the data stream content that is provided by DB2. If the user has specified multiple streams, then NetBackup for DB2 opens multiple streams and NetBackup catalogs them as separate images.

[Figure 5-1](#) represents a stream-based backup or restore.

Figure 5-1 NetBackup for DB2 stream-based backup or restore

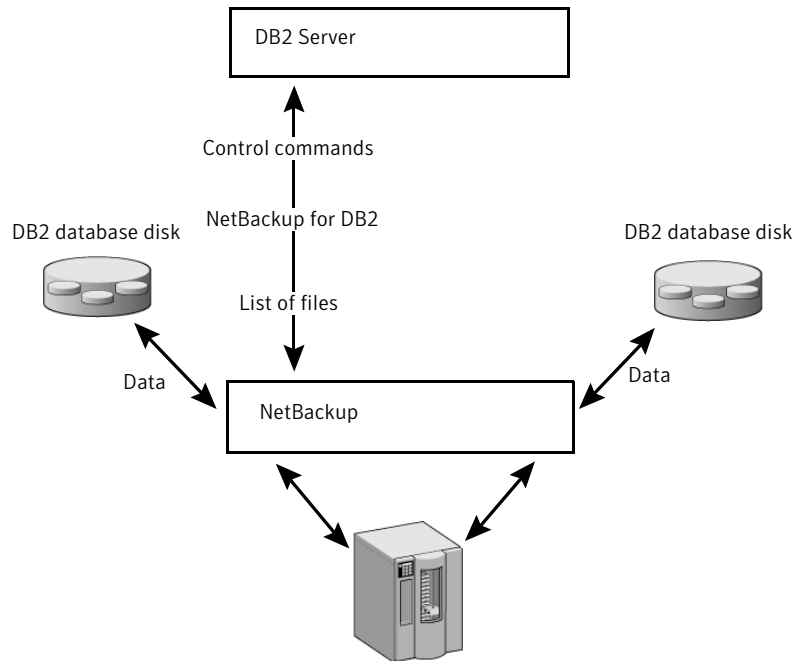


NetBackup for DB2 file-based operations

In a file-based operation, DB2 provides the list of files that require backup or restore to NetBackup for DB2 with Snapshot Client. NetBackup for DB2 with Snapshot Client performs the data movement.

[Figure 5-2](#) represents a file-based backup or restore.

Figure 5-2 NetBackup for DB2 with Snapshot Client file-based backup or restore



Example: multiple channels for a DB2 command with proxy method

The following NetBackup for DB2 sample command initiates a database backup (which includes the transaction logs) on a per node basis:

```
bpdb2proxy -backup -d sample -u db2user -p password -s 3 -n 0
```

The agent splits the files into three streams and initiates a file-based backup for each stream. After the proxy backup is done, DB2 starts a non-proxy conventional backup of the transaction logs.

Issue this command on each node of the database.

About configuring Snapshot Client with NetBackup for DB2

This topic explains how to configure snapshot and instant recovery backups for the DB2 policy. For information on how a snapshot method is automatically selected and details on the types of backup methods, see the *NetBackup Snapshot Client Administrator's Guide*.

Snapshot backups do not back up all database objects. Your backup configuration must include policies to perform file-based and stream-based backups. This configuration ensures that the entire database can be restored successfully.

For snapshot or instant recovery backups, configure the following policies and schedules as follows:

- A DB2 policy with the following attributes:
 - Snapshot methods for the file systems in which the database files reside.
 - A backup method on the policy attributes dialog box.
 - An Automatic Full Backup schedule to perform file-based snapshot and off-host backups of the database.
 - (Conditional) An Application Backup schedule to back up the transaction logs. Configure this policy if you use the `VENDOR` method. DB2 does not support proxy backups of transaction logs.
- On UNIX and Linux, a Standard policy to perform stream-based backups of transaction logs. Configure this policy if you use the user exit program. DB2 does not support proxy backups of database transaction logs.
- On Windows, an MS-Windows policy to perform stream-based backups of transaction logs. Configure this policy if you use the user exit program. DB2 does not support proxy backups of database transaction logs.

Configuration requirements for snapshot backups with NetBackup for DB2

Each agent has its own hardware requirements, software requirements, compatibility with certain features, and the snapshot methods that are supported. Special requirements apply for specific types of backups. See the *NetBackup Snapshot Client Administrator's Guide* and the Symantec Support Web site for more information. Familiarize yourself with this information before you configure any snapshot backups.

The following list highlights some of the requirements that pertain to database agents:

- Snapshot Client backups do not back up all database objects. Your backup configuration must include policies to perform file-based and stream-based backups. This configuration ensures that the entire database can be restored successfully.
- On UNIX or Linux, the user identification and group identification numbers (UIDs and GIDs) associated with the files to be backed up must be available to

both the primary client and the alternate backup client. The UID on the primary client and the alternate backup client must be the same. Similarly, the GID on the primary client and the alternate backup client must be the same.

Note: The UID number can be different than the GID number.

- Allocate up to three different volumes or file systems for database activities, as follows:
 - Allocate one or more volumes or file systems to the database data files.
 - Allocate a different set of volumes or file systems to the DB2 executables, configuration files, and the transaction logs.

One reason to have two different volumes is to separate the data files from the other files. If the logs are configured on the same volumes (or file systems) as the data files, the logs are temporarily frozen while NetBackup takes the snapshot. The process cannot access the logs when the database is active, so the database activity may freeze until the logs become accessible again.

Another reason for writing the data files to their own repository is because it is required for an instant recovery point-in-time rollback. Only data files can exist on the volume or the file system that you want to restore.

- The hardware and software that is required for the appropriate snapshot method must be installed and configured correctly.
- NetBackup Snapshot Client must be installed and configured correctly, and the license key for this option must be registered.
- To perform off-host backups, perform any special configuration that is required.

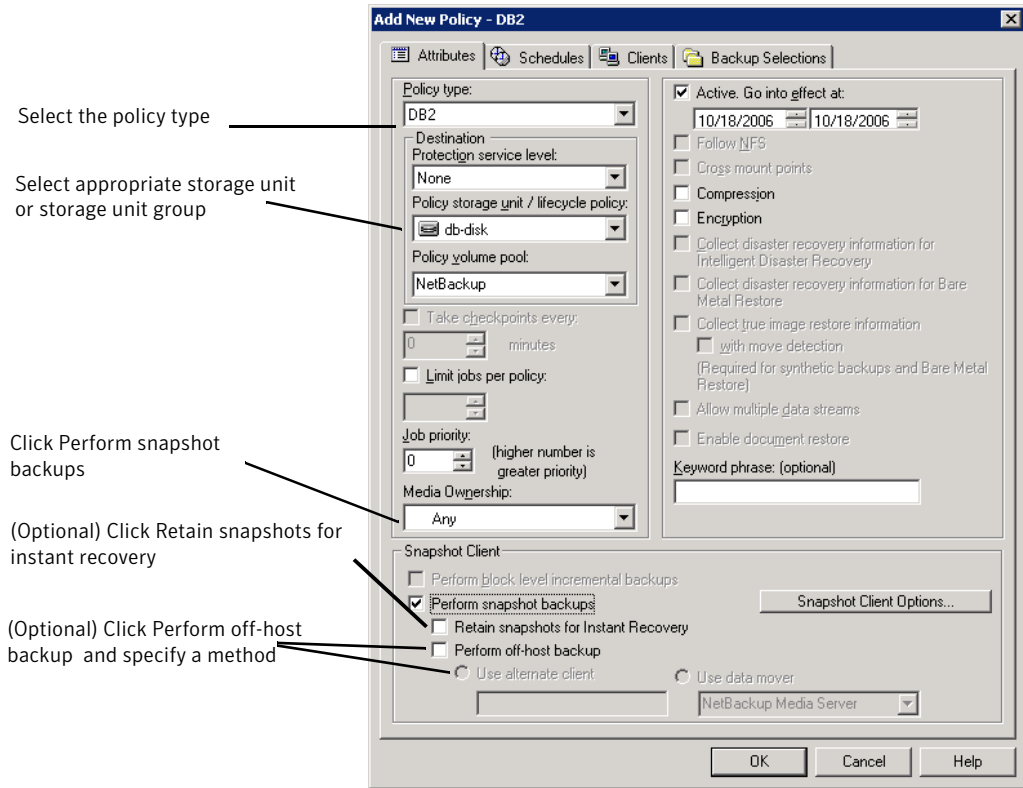
Configuring a snapshot policy for NetBackup for DB2

The following procedure shows how to configure a snapshot policy with optional instant recovery, snapshot retention, and off-host backup.

To configure a snapshot policy

- 1 Open the policy you want to configure.
- 2 Click on the **Attributes** tab.

3 Select the DB2 policy type.



4 Select a policy storage unit from the **Policy storage** list.

Select a policy storage unit in this step even if you plan to select **Snapshots only** later in this procedure.

NetBackup uses this storage unit for the stream-based backups of the control files and the transaction logs that are included in this policy.

On UNIX and Linux, NetBackup also uses this storage unit if you select **Third Party Copy Device** when you configure the schedule.

On UNIX and Linux, **Any available** is not supported for the following data movers: **NetBackup Media Server** or **Third-party Copy Device**.

5 Click **Perform snapshot backups**.

6 (Optional) Click **Options** to choose a snapshot method.

By default NetBackup chooses a snapshot method for you. To choose a snapshot method, click **auto** (the default) or click one of the methods that are presented in the list.

The snapshot method that you can use depends on your hardware environment and software environment. Only certain snapshot methods are supported in certain environments. See the *NetBackup Snapshot Client Administrator's Guide* or the supported platforms matrix on the Symantec Support Web site for more information.

You can configure only one snapshot method per policy. For example, assume that you want one snapshot method for clients a, b, and c, and a different method for clients d, e, and f. Then you need to create two policies for each group of clients and select one method for each policy.

7 (Optional) Select **Retain snapshots for Instant Recovery or SLP management**.

When this option is selected, NetBackup retains the snapshot backup image on disk for later use in recovery.

8 (Optional) Select **Perform off-host backup**.

By default, the client that hosts the database performs the backup. If you want to reduce the I/O processing load on the client that hosts the database, specify an alternate client to perform the backup.

9 (Conditional) Select an off-host backup method.

The following off-host backup methods are available:

Use Alternate client (UNIX and Windows clients) If you select **Alternate client**, also specify the name of the client to perform the backup. This option may require additional configuration. The alternate client must be a client that shares the disk array.

Use Data mover (UNIX clients only). If you click **Data mover**, also select one of the following possible data movers:

- **NetBackup Media Server**
- **Third-Party Copy Device**

10 Click the **Schedules** tab.

11 Click **New**.

12 Configure an Automatic schedule for the database files.

- 13** (Conditional) In the **Schedules** dialog box, in the **Instant Recovery** group, select **Snapshots only**.

This setting suppresses NetBackup's default behavior, which is to copy the snapshot to a storage unit. When you select **Snapshots only**, NetBackup creates the on-disk snapshot copy of the database, but it does not copy the snapshot to a storage unit. The on-disk snapshot becomes the only backup copy. Note that the on-disk snapshot is not considered to be a replacement for a traditional backup.

- 14** (Conditional) Configure an Application Backup for the control files and transaction logs.

NetBackup uses this storage unit for the stream-based backups of the control files and the logs that are included in this policy. Configure this schedule only if you want to use the `VENDOR` method for backing up the transaction logs. NetBackup copies the database's control files and transaction logs to the storage unit you selected.

For UNIX clients, if you select **Third-Party Copy Device** as an off-host backup method, select **Override policy storage unit**. Then select a non-SAN Media Manager or other storage unit type that is appropriate to back up the control files and transaction logs.

- 15** On the **Clients** tab, specify the clients to be included in this policy.

- 16** On the **Backup Selections** tab, specify a template script or backup script.

More information is available about how to use templates and scripts for a NetBackup for DB2 policy with Snapshot Client.

See [“How Snapshot Client software affects templates and scripts”](#) on page 119.

- 17** Configure other attributes and add any additional schedules and backup selections.

Restoring NetBackup for DB2 from a snapshot backup

The following topics describe how to restore files, volumes, and file systems from a snapshot backup:

- See [“About restoring individual files from a NetBackup for DB2 snapshot backup”](#) on page 111.
- See [“About NetBackup for DB2 restores of volumes and file systems using snapshot rollback”](#) on page 111.
- See [“Performing a NetBackup for DB2 point-in-time rollback restore from a SnapVault backup \(UNIX and Linux\)”](#) on page 112.

- See “[Performing a snapshot rollback restore from the Java or Windows interface](#)” on page 112.

About restoring individual files from a NetBackup for DB2 snapshot backup

Data that is backed up with Snapshot Client methods is restored in the same way as data that is backed up without Snapshot Client methods.

See “[Performing a database restore](#)” on page 82.

Use this procedure for the files that were backed up with, or without, instant recovery enabled. In all cases, NetBackup determines the files that were backed up, and it initiates a corresponding restore request to the database agent.

If instant recovery is enabled, NetBackup attempts to restore the file by using the unique restore methods available with the instant recovery feature. The type of restore method that NetBackup uses depends on your environment and the type of backup performed. If NetBackup is unable to use any of the instant recovery methods, it restores the file in the typical manner. Data is copied from the snapshot to the primary file system. Information on the instant recovery methods that NetBackup uses is available.

See the *NetBackup Snapshot Client Administrator’s Guide*.

About NetBackup for DB2 restores of volumes and file systems using snapshot rollback

You can request that an entire volume or an entire file system be restored from an instant recovery Snapshot backup. This type of a restore is called a point in time rollback. All the data in the snapshot is restored; single file restore is not available in a rollback.

You can perform a snapshot rollback from an instant recovery backup that was made with the following methods:

- UNIX and Linux: VxFS_Checkpoint snapshot
- vxvm snapshot
- FlashSnap snapshots

See the *NetBackup Snapshot Client Administrator’s Guide*.

The following considerations are relevant for NetBackup for DB2 restores:

- Snapshot rollback overwrites the entire volume.

- With NetBackup for DB2, snapshot rollback always performs file verification. The agent checks for the following:
 - The requested files (number and names) are identical to those in the snapshot
 - The primary volume does not contain any files that were created after the snapshot was madeIf verification fails, the rollback aborts with 249.
- Use snapshot rollback with database files only. Database files and archive logs should exist on different file systems or volumes.

Performing a NetBackup for DB2 point-in-time rollback restore from a SnapVault backup (UNIX and Linux)

When you select a point-in-time rollback restore from a SnapVault backup, NetBackup restores the entire subvolume (qtree) to a new subvolume (qtree) on the primary host. The restore does not overwrite the existing subvolume. File verification is not performed.

The format of the new subvolume name is as follows:

mountpointname_restore.timestamp

For example: `subvol1_restore.2005.05.19.10h49m04s`

To perform a NetBackup for DB2 point-in-time rollback restore from a SnapVault backup (UNIX and Linux)

- 1 Unmount the original subvolume, which is the subvolume that the restore process did not overwrite.
- 2 Rename the original subvolume.
- 3 Rename the new subvolume with the name of the original.
- 4 Mount the new subvolume on the client. Use the `ALTER DATABASE RENAME DATAFILE` command to point to the restored data file on the newly created subvolume.

Performing a snapshot rollback restore from the Java or Windows interface

This topic describes how to perform a snapshot rollback restore from the Java or Windows interface.

To perform a snapshot rollback restore from the Java or Windows interface

- 1 If the file .SQLCRT.FLG exists, delete it.

DB2 creates the .SQLCRT.FLG file when it creates a directory (usually during tablespace creation). For volume level rollback restores this file cannot be present. The directory structure must be present at the time DB2 creates a tablespace or you must delete this file after DB2 creates the directory during tablespace creation.
- 2 Open the Backup, Archive, and Restore interface.
- 3 Select one of the following:
 - In the Java interface, click the **Restore Files** tab.
 - In the Windows interface, select **File > Select Files and Folders to Restore**.
- 4 Select **Actions > Select Restore Type > Point in Time Rollback**.
- 5 Use the NetBackup for DB2 recovery wizard for the restore.

See [“Performing a database restore”](#) on page 82.

About configuring NetBackup for DB2 block-level incremental backups on UNIX and Linux

If only a small portion of a database changes on a daily basis, full database backups are costly in terms of time and media. The block-level incremental (BLI) backup interface extends the capabilities of NetBackup to back up only changed data blocks.

A database BLI backup is done at the file system block level, which means only changed blocks are backed up. Changed files are not backed up. VxFS Storage Checkpoint facility identifies changed blocks in real time. BLI backup does not need to search the entire database for the modified blocks. BLI backup saves time, decreases the amount of backup media that is required, and significantly reduces CPU and network overhead during backups. In addition, BLI backup allows more frequent backups, so backup images are more up to date.

BLI backup is particularly useful for any large databases that are sized in terms of hundreds of gigabytes or terabytes. Most traditional methods for database backup require that any change in the database—no matter how small—requires that the entire database is backed up. With BLI backup, only modified data blocks need to be backed up.

The recommended method for performing BLI backups is the proxy BLI agent with NetBackup for DB2. This method supports the other features of NetBackup for DB2, including the policy types and schedules and the convenience of the

template generation wizard. It also remains tightly integrated with NetBackup for DB2 and its catalog, which greatly simplifies administration tasks.

How BLI works with NetBackup for DB2 (UNIX and Linux)

NetBackup supports BLI full backups and BLI incremental backups of DB2 databases.

BLI backup supports two types incremental backups: differential and cumulative. Full, differential incremental, and cumulative incremental backups are specified as part of the backup schedule. When performing a restore, NetBackup restores an appropriate full backup. Then it applies the changed blocks from the incremental backups.

Restoring any of the incremental backup images requires NetBackup to restore the last full backup image and all the subsequent incremental backups until the specified incremental backup image is restored. NetBackup performs this restore process automatically, and it is completely transparent. The media that stored the last full backup and the subsequent incremental backups must be available, or the restore cannot proceed.

Note that restoring a file rewrites all blocks in that file. The first subsequent differential incremental backup and all subsequent cumulative incremental backups back up all the blocks in the restored file. After restoring an entire database, the first subsequent backup results in a full backup.

The restore destination can be a VxFS, UFS (Solaris), JFS (AIX), or HFS (HP-UX) file system. The destination VxFS file system does not need to support the Storage Checkpoint feature to restore files, but a VxFS file system with the Storage Checkpoint feature is needed to perform BLI backups of the restored data.

This topic uses the following terms to describe BLI backups:

- **Full Backup.**

A backup in which NetBackup backs up the entire database file, not just data blocks changed since the last full or incremental backup.

- **Cumulative BLI Backup.**

This is a backup of all the data blocks of database files that changed since the last full backup. A cumulative BLI backup image contains only the data blocks of database files that changed since the last full backup, but a cumulative BLI backup can reduce the number of incremental backup images that must be applied to a restore operation. This speeds up the restore process.

- **Differential BLI backup.**

This is a backup in which NetBackup performs a backup of only those data blocks of database files that changed since the last backup of any type (full, cumulative incremental, or differential incremental backup) was performed.

When NetBackup initiates full database backups, followed by BLI backups, it creates, manages, and uses the appropriate Storage Checkpoints of the DB2 container file systems. These Storage Checkpoints identify and maintain a list of modified blocks.

About the Storage Checkpoint facility and NetBackup for DB2

The BLI backup methodology uses the Storage Checkpoint facility in the Veritas File System (VxFS). This facility is available through the Storage Foundation for DB2.

The VxFS Storage Checkpoint facility keeps track of data blocks modified by the database since the last backup. NetBackup with BLI backup leverages this facility to back up only changed blocks, not the entire database, for an incremental backup.

VxFS Storage Checkpoint is a disk-efficient and I/O-efficient snapshot of file systems. A Storage Checkpoint provides a consistent, stable view of a file system at the instant when the file system was snapped or checkpointed. Instead of making a physically separate copy of the file system, a Storage Checkpoint identifies and maintains only changed file system blocks, saving disk space and significantly reducing I/O overhead.

By keeping track of changed blocks, the VxFS Storage Checkpoint enables BLI backups. VxFS Storage Checkpoint facility provides a consistent view of file systems, which allows BLI backup to freeze the database image during database backups.

The Storage Checkpoint operation is similar to the snapshot file system mechanism. However, unlike a snapshot, the Storage Checkpoint persists after a system reboot. Also, the Storage Checkpoint operation is totally transparent to administrators. The Checkpoint image is managed and available only through NetBackup or through the VxDBA utility for database backup available with the Veritas Storage Foundation.

For more information on Storage Checkpoints, see the *Veritas Storage Foundation* documentation.

You can take a Storage Checkpoint while the database is online or offline. To take a Storage Checkpoint while the database is online, you must enable archive log mode. During the creation of the Storage Checkpoint, all tablespaces are placed in backup mode.

Configuration requirements for BLI backups with NetBackup for DB2

Before you configure BLI backups, make sure your configuration meets the following requirements:

- NetBackup for DB2 is installed, licensed, and configured.
- NetBackup Snapshot Client is installed and configured, and the license key for this option is registered.
- Veritas Storage Foundation for DB2 must be installed and configured.
- Veritas File System must have Storage Checkpoint licensed.

For more information on requirements, see the *NetBackup Snapshot Client Administrator's Guide*.

Configuring policies for BLI backups with NetBackup for DB2

This topic explains how to configure BLI backups for DB2 policies. BLI backups do not back up the transaction logs. Include policies to perform file-based and stream-based backups.

Your backup configuration must ensure that the entire database can be successfully restored.

To configure a policy for BLI backups, configure the following:

- The BLI backup method on the policy attributes dialog box.
- An **Automatic Backup** schedule to perform full and incremental file-based backups of the data files.
- (Conditional) An Application Backup schedule to perform a stream-based backup of transaction logs. Specify this schedule if you use the `VENDOR` method for backing up the transaction logs. These files are backed up with the standard NetBackup for DB2 operations.
- (Conditional) A User Backup schedule to perform a stream-based backup of transaction logs. Specify this schedule if you use the user exit program to back up the transaction logs.

To configure a policy for BLI backups

- 1 Open the policy you want to configure.
- 2 Click the **Attributes** tab.
- 3 From the **Policy Type** list, choose **DB2**.
- 4 Select a **Policy storage**.
- 5 Select **Perform block level incremental backups**.
- 6 To configure schedules, click the **Schedules** tab.

DB2 does not support proxy backups of database control files and archive logs.

To perform a whole database proxy backup, configure the following:

- One or more automatic backup schedules to perform proxy BLI backups of the database.
This backup automatically includes a backup of the control file.
- An Application Backup schedule type to back up the control files and archive logs.

7 On the **Clients** tab, specify clients to be backed up with this policy.

8 On the **Backup Selections** tab, specify the template or script.

About the types of NetBackup for DB2 BLI backups

NetBackup performs proxy BLI backups with Automatic Full Backup, Automatic Differential Incremental Backup, and Automatic Cumulative Incremental Backup schedules.

NetBackup for DB2 checks that a full backup was performed before it proceeds with an incremental backup. If the NetBackup scheduler or user initiates an incremental backup, and NetBackup for DB2 finds no record of a full backup using the same policy, it performs a full backup.

To ensure that it has a proper set of images to restore, NetBackup performs a full backup when it encounters the following situations:

- If the number of backup streams that is specified changed from the previous backup. This change can be made through the GUI or through a DB2 command.
- If NetBackup does not have a valid full backup image for the same policy in its database. For example, this situation can occur if images were expired.

NetBackup for DB2 always initiates a full backup under these conditions, even if you want to perform an incremental backup.

About Snapshot Client effects

The following topics describe how the Snapshot Client software affects backup types, schedule properties, and templates. Snapshot Client also affects scripts.

How Snapshot Client software affects backup types

The backup types available on the Schedules tab of the policy play a different role for NetBackup for DB2 with Snapshot Client backups.

See [Table 5-2](#) on page 118.

Table 5-2 Backup types for DB2 policies

Backup type	Description
Application Backup	The Application Backup schedule enables stream-based NetBackup operations. The Default-Application-Backup schedule is automatically configured as an Application Backup schedule. On UNIX and Linux clients, if you want to use Third-party Copy as your off-host backup method, override the policy storage unit. Specify a non-SAN media manager or other storage unit type for the Application Backup schedule.
Automatic Full Backup Automatic Differential Incremental Backup, Automatic Cumulative Incremental Backup	For file-based proxy copy backups, the automatic backup schedule types automatically start the backups by running the NetBackup for DB2 scripts or templates. If you specify any of the automatic backup types, a full backup is performed.

How Snapshot Client software affects schedule properties

Some schedule properties have a different meaning for Snapshot Client database backups than for a regular database backup. For a description of other schedule properties, see the information that is specific to standard database agent backups.

See [“About NetBackup for DB2 schedule properties”](#) on page 41.

[Table 5-3](#) explains the properties for Snapshot Client backups.

Table 5-3 Schedule properties

Property	Description
Retention	Frequency based scheduling For proxy backups, NetBackup uses the retention period for the automatic type of backup to specify how long to keep proxy file-based backup images. Calendar based scheduling For proxy backups, NetBackup for DB2 with Snapshot Client uses the retention period for the automatic type of backup to specify how long to keep proxy file-based backup images.
Multiple copies	For proxy file-based backups, configure Multiple copies on the automatic backup schedule.

How Snapshot Client software affects templates and scripts

You can use a template that was created by the backup wizard to perform backups with Snapshot Client. After they are created, templates reside on the NetBackup master server and are available for use by other NetBackup for DB2 clients.

See “[About NetBackup for DB2 templates and shell scripts](#)” on page 61.

Whether you use a template or script, you must enable the advanced backup method for your clients. Configure this method on the Attributes tab of the policy. At run time, the template checks the policy attributes to determine if a Snapshot Client backup method is configured. Then it initiates the proxy file-based backup.

If you use a script, the script must reside on each client that is included in the policy. Include the `DB2bpdb2proxy` command in the script to perform the advanced backup method. Sample scripts are included with the installation.

Performing NetBackup for DB2 backups with Snapshot Client methods

After configuration is complete, performing NetBackup for DB2 with Snapshot Client backups and restores is similar to regular NetBackup for DB2 operations. The following sections describe some of the differences.

NetBackup for DB2 performs backups with Snapshot Client in the following ways:

- User-directed, by template creation and execution on the client
- User-directed, from the command line as a DB2 user (with the `bpdb2proxy` command)
- Server-directed, both automatic and scheduled from the master server

All of these methods require a DB2 policy with Snapshot Client configuration.

User-directed backups using templates To perform a backup from the Backup, Archive, and Restore interface, run a template through DB2 Template Administration (click Actions > **Administer Templates > DB2**). You can also create a new template using the DB2 Backup Wizard, and run the template from the Template Complete screen.

The backup that results from the template is an Snapshot Client backup if the policy for the client is configured for Snapshot Client methods. Specify the policy by adding the client to that policy on the master server.

On UNIX and Linux, you can also specify the policy in the `db2.conf` file on the client.

User-directed backups using `bpdb2proxy` Use the `bpdb2proxy` command to perform a Snapshot Client backup of your DB2 database from the command line. You must be the DB2 user to use the `bpdb2proxy` command. For backups, specify the `-backup` option with `bpdb2proxy`.

Use the `bpdb2proxy` command in the following format to back up a DB2 database with a Snapshot Client method:

UNIX and Linux: `/bin/bpdb2proxy -backup -d dbalias -u user -p password`

Windows: `install_path\NetBackup\bpdb2proxy -backup -d dbalias -u user -p password`

Server-directed backups The following describes the process for configuring policies for DB2 backups with Snapshot Client.

See [“Configuring a snapshot policy for NetBackup for DB2”](#) on page 107.

These policies specify Snapshot Client backups for the DB2 database.

Performing NetBackup for DB2 restores with Snapshot Client methods

Perform NetBackup for DB2 Snapshot Client restores from the DB2 client. The following describes two methods of user-directed restores and restoring from a snapshot backup:

Restore using the Backup, Archive, and Restore interface (user-directed)	Use the NetBackup for DB2 Recovery Wizard to select the files you want to restore and the parameters for the restore. If the backup image was created with Snapshot Client methods, the restore uses Snapshot Client methods.
Restore using the command line (user-directed)	<p>Use the <code>bpdb2proxy</code> command. You must be the DB2 user to use the <code>bpdb2proxy</code> command. For restores, specify the <code>-restore</code> option with <code>bpdb2proxy</code>.</p> <p>Note: The backup image you restore with <code>bpdb2proxy</code> must be from a Snapshot Client method backup, otherwise, the restore fails.</p> <p>Use the <code>bpdb2proxy</code> command in the following format to restore a DB2 database with a Snapshot Client method:</p> <p>UNIX and Linux: <code>/bin/bpdb2proxy -restore -d <i>dbalias</i> -u <i>user</i> -p <i>password</i></code></p> <p>Windows: <code><i>install_path</i>\NetBackup\bpdb2proxy -restore -d <i>dbalias</i> -u <i>user</i> -p <i>password</i></code></p>
Restore from a snapshot backup	See “About NetBackup for DB2 restores of volumes and file systems using snapshot rollback” on page 111.

Troubleshooting NetBackup for DB2

This chapter includes the following topics:

- NetBackup debug logs and reports
- Enabling the debug logs for a NetBackup for DB2 client automatically (Windows)
- Enabling the debug logs for NetBackup for DB2 manually (Windows)
- Enabling the debug logs for a NetBackup for DB2 for UNIX or Linux client
- About the NetBackup for DB2 log files
- Setting the debug level on a NetBackup for DB2 Windows client
- Setting the debug level on a UNIX or Linux client
- About NetBackup server reports
- Minimizing timeout failures on large database restores
- Minimizing loading and unloading of tapes for database backups (UNIX and Linux)
- Using `NET_BUFFER_SZ` to speed up a slow restore
- About false restore failures reported in the activity monitor
- About the error message codes

NetBackup debug logs and reports

The NetBackup server and client software let you enable detailed debugging logs. The information in these log files can help you troubleshoot the problems that occur outside of either the database agent or the DB2 commands.

Note the following with regard to these logs:

- These logs do not reveal the errors that occur when DB2 commands are running unless those errors also affect NetBackup. DB2 may (or may not) write errors in the application to the NetBackup logs. Your best sources for DB2 error information are the logs provided by DB2.
- Generally, each debug log corresponds to a NetBackup process and executable.

Information about the debugging log files is available.

See the *NetBackup Troubleshooting Guide*.

Also refer to the following file:

Windows: `install_path\NetBackup\logs\README.debug file`

UNIX and Linux: `/usr/opensv/netbackup/logs/README.debug file`

Enabling the debug logs for a NetBackup for DB2 client automatically (Windows)

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

```
install_path\NetBackup\logs\mklogdir.bat
```

Or, you can manually create the directories for the log files you want created.

See [“Enabling the debug logs for NetBackup for DB2 manually \(Windows\)”](#) on page 125.

Enabling the debug logs for NetBackup for DB2 manually (Windows)

Creating the NetBackup for DB2 for Windows database agent logs manually

- 1 Create the following directories on the client in a DOS window:

```
install_path\NetBackup\logs\bpbbackup
install_path\NetBackup\logs\bpbkar32

install_path\NetBackup\logs\bpdsbdb2

install_path\NetBackup\logs\bphdb

install_path\NetBackup\logs\bprestore

install_path\NetBackup\logs\bpubsdb2
install_path\NetBackup\logs\dbclient

install_path\NetBackup\logs\tar32
install_path\NetBackup\logs\bpdb2
```

For example:

```
cd install_path\NetBackup\logs
mkdir bphdb
```

- 2 Make sure there is share access to the log directories.
- 3 Enable logging for the `nbpem`, `nbjm`, and `nbrb` scheduling processes, which use unified logging.

NetBackup writes unified logs to `install_path\NetBackup\logs`.

You do not need to create log directories for processes that use unified logging. For information on how to use logs and reports, see the *NetBackup Troubleshooting Guide*.

Enabling the debug logs for a NetBackup for DB2 for UNIX or Linux client

Enabling the NetBackup for DB2 logs manually (UNIX/Linux)

- 1 Create the following directories on the client:

```
/usr/opensv/netbackup/logs/bpbackup  
/usr/opensv/netbackup/logs/bpbkar  
  
/usr/opensv/netbackup/logs/bpdb2  
/usr/opensv/netbackup/logs/bpdsdb2  
  
/usr/opensv/netbackup/logs/bphdb  
  
/usr/opensv/netbackup/logs/bprestore  
  
/usr/opensv/netbackup/logs/bpubsdb2  
/usr/opensv/netbackup/logs/dbclient  
  
/usr/opensv/netbackup/logs/tar  
/usr/opensv/netbackup/logs/bpdb2  
chmod 777 /usr/opensv/netbackup/logs/bpdb2
```

For example:

```
cd /usr/opensv/netbackup/logs  
mkdir bphdb
```

- 2 The `user_ops`, each of the log directories, and any subdirectories should have 777 permissions. They must exist and be accessible for the applications to operate correctly.

For example:

```
chmod 777 bphdb
```

See [“About permissions for NetBackup for DB2 log files \(UNIX and Linux\)”](#) on page 30.

- 3 Enable logging for the `nbpem`, `nbjm`, and `nbrb` scheduling processes that use unified logging.

NetBackup writes unified logs to `/usr/opensv/logs`.

You do not need to create log directories for processes that use unified logging.

Information on how to use logs and reports is available.

See the *NetBackup Troubleshooting Guide*.

About the NetBackup for DB2 log files

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

See [“About the bphdb directory on the Windows database client”](#) on page 127.

See [“About the bphdb directory on the UNIX or Linux database client”](#) on page 127.

About the bphdb directory on the Windows database client

The `install_path\NetBackup\logs\bphdb` directory contains log files.

The following types of logs exist:

- `db2_stdout.mmdyy.hhmmss.txt`

Unless it is redirected elsewhere, NetBackup writes DB2 script output to this file.

- `db2_stderr.mmdyy.hhmmss.txt`

Unless it is redirected elsewhere, NetBackup writes DB2 script errors to this file.

- `mmdyy.log`

This log contains debugging information for the `bphdb` process. `bphdb` is the NetBackup database backup binary. It is invoked when an automatic backup schedule is run. NetBackup for DB2 uses this client process for DB2 script execution.

About the bphdb directory on the UNIX or Linux database client

The `/usr/opensv/netbackup/logs/bphdb` directory contains logs.

The following types of logs exist:

- `db2_stdout.mmdyy`

Unless it is redirected elsewhere, NetBackup writes DB2 script output to this file.

- `db2_stderr.mmdyy`

Unless it is redirected elsewhere, NetBackup writes DB2 script errors to this file.

- `log.mmdyy`

This log contains debugging information for the `bphdb` process. `bphdb` is the NetBackup database backup binary. It is invoked when an automatic backup schedule is run. NetBackup for DB2 uses this client process for DB2 script execution.

About the `bpdb2` directory on the UNIX or Linux database client

The `/usr/opensv/netbackup/logs/bpdb2` directory contains execution logs.

The following execution log exists:

- `log.mmdyy`

This log contains debugging information and execution status for the NetBackup for DB2 client process.

About the `bpdbsbdb2` directory on the client

On UNIX and Linux, the `/usr/opensv/netbackup/logs/bpdbsbdb2` directory contains the following execution log:

`log.mmdyy`

On Windows, the `install_path\NetBackup\logs\bpdbsbdb2` directory contains the following execution log:

`mmdyy.log`

This log contains debugging information and execution status for the NetBackup for DB2 backup and recovery wizards and for the `bpdbsbdb2` command line utility. This log also contains the debugging information and execution status information that is generated when a DB2 template is run from an automatic schedule (when `bphdb` invokes `bpdbsbdb2` to run the template).

Setting the debug level on a NetBackup for DB2 Windows client

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

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

Note: Information from both the Verbose and the Database debug settings is logged to the same file, `mmdyy.log`

To set the debug level on a NetBackup for DB2 for Windows client

- 1 From the Windows Start menu, choose **Programs > Symantec NetBackup > Backup, Archive, and Restore**.
- 2 Select **File > NetBackup Client Properties**.
- 3 Click the **Troubleshooting** tab.
- 4 Set the **Verbose** debug level.
Set this level to adjust the amount of information from the user exit program.
- 5 Set the **Database** debug level.
Set this level to adjust the amount of information from the NBDB2 vendor library.
- 6 Click **OK** to save your changes.

Setting the debug level on a UNIX or Linux client

To control the amount of information that is written to the debug logs, change the “Database” debug level. Typically, the default value of 0 is sufficient. However, Technical Support may ask you to set the value higher to analyze a problem.

The debug logs are located in `/user/opensv/netbackup/logs`.

To set the debug level on a UNIX or Linux client

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

```
VERBOSE = X
```

Where *X* is the debug level you want.

About NetBackup server reports

NetBackup provides other reports that are useful in isolating problems. One such report is All Logs Entries on the server. Information on server reports is available.

See the *NetBackup Administrator's Guide*.

Minimizing 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 while waiting for media or device access. If the delay is too long, the restore session times out. Use the following procedure to minimize session timeouts and to allow the restores to complete successfully.

To minimize timeout failures on large database restores

- 1 In the NetBackup Administration Console, expand **NetBackup Management > Host Properties > Clients**
- 2 Set the **Client read timeout** property to a large value.

The default for the **Client read timeout** setting is 300 seconds (5 minutes). For database agent clients, increase the value significantly from the recommended value.

See the *NetBackup Administrator's Guide, Volume 1*.

For example, change this setting to 30-60 minutes to minimize timeout errors.
- 3 Click **OK** for each client.

Minimizing loading and unloading of tapes for database backups (UNIX and Linux)

You can minimize excessive unloading and reloading of tapes between multistreamed database backups by making changes on the NetBackup media server.

To minimize loading and unloading of tapes

- ◆ In the `/usr/opensv/netbackup/bp.conf` file on the NetBackup media server, add the following options:
 - `MEDIA_UNMOUNT_DELAY.`

- `MEDIA_REQUEST_DELAY`. Use this variable only with non-robotic drives, such as tape stackers.

Using NET_BUFFER_SZ to speed up a slow restore

If file restores are slow and your NetBackup master server is a UNIX machine, you can increase file restore speeds. Create a file called `NET_BUFFER_SZ` on the NetBackup master server in the NetBackup install directory.

To create the NET_BUFFER_SZ file

- 1 Log into a UNIX master server.
- 2 Use `vi(1)` or another editor to create file `/usr/opensv/netbackup/NET_BUFFER_SZ`.
- 3 Add a line that specifies the socket size, in bytes.

For example:

```
32768 bytes = 32K
```

- 4 Save and close the file.

About false restore failures reported in the activity monitor

In some restore scenarios, DB2 reports a successful restore status, but the NetBackup activity monitor reports failures. This can occur during restores if DB2 reads a portion of a backup image but not the entire image.

About the error message codes

The following table describes the DB2 and NetBackup reason codes. For more information about an error message, see the log files.

Errors can occur while accessing the NetBackup shared library (UNIX and Linux) or DLL (Windows) during the processing of a DB2 database utility `BACKUP` or `RESTORE`.

Table 6-1 DB2 and NetBackup error codes

Error code	Description
300	<p>Message: ERR - No match for a database image file was found based on the following criteria.</p> <p>Cause: The restore criteria of database name, instance, type, and backup time object cannot be found in the NetBackup database.</p> <p>Action: Use <code>bp1ist</code> to make sure the image you want to restore exists. Make sure the correct instance is used.</p> <p>Make sure the correct values are set in <code>db2.conf</code>. Also, on UNIX and Linux check the values in <code>bp.conf</code>.</p> <p>If logging is enabled, check the current log file in the following directory for more information:</p> <p>UNIX and Linux: <code>/usr/opensv/netbackup/logs/bpdb2</code> Windows: <code>install_path\NetBackup\logs\bpdb2\</code></p>
305	<p>Message: ERR - found more than one object.</p> <p>Cause: Multiple DB2 backup images were found in the NetBackup database that matched the restore criteria of database name, instance, type, and backup time.</p> <p>Action: This error should not occur under typical operations. If logging is enabled, check the current log file in the following directory for more information:</p> <p>UNIX and Linux: <code>/usr/opensv/netbackup/logs/bpdb2</code> Windows: <code>install_path\NetBackup\logs\bpdb2\</code></p>
310	<p>Message: ERR - <code>bp.config</code> failed with <code>status</code> status.</p> <p>Cause: UNIX and Linux: Unable to read configuration file <code>/usr/opensv/netbackup/bp.conf</code>. Windows: Unable to read configuration file.</p> <p>Action: Make sure the file exists and is properly configured.</p> <p>If logging is enabled, check the current log file in the following directory for more information:</p> <p>UNIX and Linux: <code>/usr/opensv/netbackup/logs/bpdb2</code> Windows: <code>install_path\NetBackup\logs\bpdb2\</code></p>

Table 6-1 DB2 and NetBackup error codes (*continued*)

Error code	Description
330	<p>Message: ERR - Invalid options encountered for action <i>action</i>.</p> <p>Cause: Invalid option(s) encountered for <i>action</i>.</p> <p>Action: Make sure the action parameters are used properly.</p>
335	<p>Message: ERR - in get DB2 UDB level.</p> <p>Cause: NetBackup server and the NetBackup for DB2 shared library (UNIX and Linux) DB2 DLL (Windows) or are not at the same level.</p> <p>Action: Make sure that the NetBackup and the NetBackup for DB2 shared library (UNIX and Linux) or the DB2 DLL (Windows) are at the same level. Check the log file in the following directory:</p> <p>UNIX and Linux: <code>/usr/opensv/netbackup/logs/bpdb2</code></p> <p>Check the version number of the shared library and the version number for NetBackup. If they are not the same, install the same level.</p> <p>Windows: <code>install_path\NetBackup\logs\</code></p>
380	<p>Message: ERR - db2.conf read status error <i>error</i>.</p> <p>Cause: <code>db2.conf</code> read status error.</p> <p>Action: Make sure the directory is accessible with read and write permissions. Make sure the file exists and has read permission.</p>
385	<p>Message: ERR - Found multiple <DATABASE> entries before an <ENDOPER> entry was encountered.</p> <p>Cause: Found multiple <code>DATABASE</code> entries before an <code>ENDOPER</code> entry was encountered in the following file:</p> <p>UNIX and Linux: <code>\$HOME/db2.conf</code></p> <p>Windows: <code>install_path\NetBackup\dbext\db2.conf</code></p> <p>Action: Remove the extra <code>DATABASE</code> entry.</p>
390	<p>Message: ERR - Found multiple <OBJECTTYPE> entries before an <code>ENDOPER</code> entry was encountered.</p> <p>Cause: Found multiple <code>OBJECTTYPE</code> entries before an <code>ENDOPER</code> entry was encountered in the following file:</p> <p>UNIX and Linux: <code>\$HOME/db2.conf</code></p> <p>Windows: <code>install_path\NetBackup\dbext\db2.conf</code></p> <p>Action: Remove the extra <code>OBJECTTYPE</code> entry.</p>

Table 6-1 DB2 and NetBackup error codes (*continued*)

Error code	Description
395	<p>Message: ERR - Found multiple <POLICY> entries before an <ENDOPER> entries was encountered.</p> <p>Cause: Found multiple POLICY entries before an ENDOPER entry was encountered in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Remove the extra POLICY entry.</p>
400	<p>Message: ERR - Found multiple <SCHEDULE> entries before an <ENDOPER> entries was encountered.</p> <p>Cause: Found multiple SCHEDULE entries before an ENDOPER entry was encountered in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Remove the extra SCHEDULE entry.</p>
405	<p>Message: ERR - Found multiple <ARCFUNC> entries before an <ENDOPER> entries was encountered.</p> <p>Cause: Found multiple ARCFUNC entries before an ENDOPER entry was encountered in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Remove the extra ARCFUNC entry.</p>
410	<p>Message: ERR - Found multiple <ARCDIR> entries before an <ENDOPER> entries was encountered.</p> <p>Cause: Found multiple ARCDIR entries before an ENDOPER entry was encountered in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Remove the extra ARCDIR entry.</p>

Table 6-1 DB2 and NetBackup error codes (*continued*)

Error code	Description
415	<p>Message: ERR - Found multiple <RETDIR> entries before an <ENDOPER> entries was encountered.</p> <p>Cause: Found multiple RETDIR entries before an ENDOPER entry was encountered in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Remove the extra RETDIR entry.</p>
420	<p>Message: ERR - need to specify a valid POLICY or SCHEDULE in db2.conf for <DATABASE <i>database</i>> and <OBJECTTYPE <i>objecttype</i>>.</p> <p>Cause: Policy name or schedule name is not specified in the POLICY or SCHEDULE entry in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Add an appropriate policy name or schedule name to the POLICY or SCHEDULE entry.</p>
425	<p>Message: ERR - need to specify a valid ARCDIR in db2.conf: Errno =<i>error_no</i> : <i>string</i>.</p> <p>Cause: Invalid ARCDIR is specified in db2.conf.</p> <p>Action: Add an appropriate directory name to the ARCDIR entry.</p>
430	<p>Message: ERR - ARCDIR field needs to be specified in the db2.conf file.</p> <p>Cause: No ARCDIR entry found in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Add an ARCDIR field with an appropriate directory name to the following file:</p>

Table 6-1 DB2 and NetBackup error codes (*continued*)

Error code	Description
435	<p>Message: ERR - RETDIR field needs to contain a valid file when OBJECTTYPE is equal to ARCHIVE: <i>string</i>.</p> <p>Cause: RETDIR field does not contain a valid file.</p> <p>Action: RETDIR field must contain a valid file when OBJECTTYPE ARCHIVE is specified in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p>
440	<p>Message: ERR - COPY or SAVE needs to be specified for ARCFUNC when OBJECTTYPE is equal to ARCHIVE.</p> <p>Cause: Found OBJECTTYPE ARCHIVE but no ARCFUNC in the db2.conf file.</p> <p>Action: Specify a copy or save parameter for ARCFUNC if OBJECTTYPE ARCHIVE is also specified.</p>
445	<p>Message: ERR - Invalid <OBJECTTYPE> entries: <i>entry</i>.</p> <p>Cause: Invalid OBJECTTYPE entry in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Add the appropriate object type.</p>
450	<p>Message: ERR - OBJECTTYPE entry needs to be specified.</p> <p>Cause: OBJECTTYPE entry is not specified in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Add the appropriate object type.</p>
455	<p>Message: ERR - POLICY entry needs to be specified.</p> <p>Cause: POLICY entry is not specified in the following file:</p> <p>UNIX and Linux: \$HOME/db2.conf</p> <p>Windows: <i>install_path</i>\NetBackup\dbext\db2.conf</p> <p>Action: Add the appropriate policy name.</p>
502	<p>Message: NetBackup DB2 Handle Invalid</p> <p>Cause: Internal communication between DB2 and NetBackup failed.</p>

Table 6-1 DB2 and NetBackup error codes (*continued*)

Error code	Description
505	<p>Message: The input parameters supplied by DB2 are not valid.</p> <p>Cause: This error can occur when you use an unsupported version of DB2.</p>
507	<p>Message: NetBackup Initialize Failed</p> <p>Cause: NetBackup encountered errors in preparing for the requested operation. This can result from improper configuration.</p>
510	<p>Message: NetBackup Read Config Failed</p> <p>Cause: NetBackup encountered errors in reading configuration settings.</p> <p>Action: Check that the NetBackup client and server settings are configured. Also verify that the <code>db2.conf</code> file exists and that it is configured.</p>
511	<p>Message: NetBackup Write Config Failed</p> <p>Cause: NetBackup encountered errors in preparing for the requested operation. This error can result from improper configuration.</p>
513	<p>Message: NetBackup Begin Action Failed</p> <p>Cause: NetBackup encountered errors when attempting to start the requested operation. This error can indicate a problem in obtaining necessary resources.</p>
514	<p>Message: NetBackup Create Image Failed</p> <p>Cause: NetBackup encountered errors when attempting to create a backup image.</p>
515	<p>Message: NetBackup Get Image Failed</p> <p>Cause: NetBackup encountered errors when attempting to access a backup image.</p>
516	<p>Message: NetBackup Find Image Failed</p> <p>Cause: NetBackup encountered errors when attempting to locate a backup image.</p>
518	<p>Message: NetBackup Write Failed</p> <p>Cause: NetBackup encountered errors when writing a backup image.</p>
520	<p>Message: NetBackup Read Failed</p> <p>Cause: NetBackup encountered errors when reading a backup image.</p>

Table 6-1 DB2 and NetBackup error codes (*continued*)

Error code	Description
523	<p>Message: NetBackup Commit Data Failed</p> <p>Cause: NetBackup encountered errors when attempting to close the backup image.</p>
524	<p>Message: NetBackup Commit Action Failed</p> <p>Cause: NetBackup encountered errors when attempting to complete the requested operation.</p>
526	<p>Message: NetBackup Abort Action Failed</p> <p>Cause: NetBackup encountered errors when attempting to abort the previously requested operation.</p>
528	<p>Message: NetBackup Delete Image Failed</p> <p>Cause: NetBackup encountered errors when attempting to expire an incomplete backup image. This error typically indicates that the previous operation has failed, and DB2 is attempting to delete any incomplete images.</p>

Configuration for a DB2 EEE (DPF) environment

This appendix includes the following topics:

- [Overview of installation and configuration for a DB2 EEE \(DPF\) environment](#)
- [Configuring NetBackup for DB2 in an EEE environment](#)
- [Adding NetBackup policies for DB2 EEE environment](#)
- [Backing up archive logs in a DB2 EEE environment](#)
- [Creating DB2 templates or scripts for a DB2 EEE environment](#)

Overview of installation and configuration for a DB2 EEE (DPF) environment

The IBM DB2 Enterprise Extended Edition (EEE) environment is a database that is distributed across multiple hosts or partitions. In a non-EEE environment, the database is typically centralized on a single host. The Database Partitioning Feature (DPF) is equivalent to the EEE.

All instructions that refer to an EEE environment are also applicable for a DPF environment.

In a DB2 EEE (DPF) environment, install the NetBackup client on every client used by DB2.

Configuring NetBackup for DB2 in an EEE environment

The configuration process for NetBackup for DB2 in a DB2 EEE environment is the same as the configuration process for NetBackup for DB2 in a non-EEE environment with the exception of the procedure for adding a backup policy.

- Set the **Maximum Jobs Per Client** property.
The instructions for setting this property for DB2 EEE are the same as those for DB2.
See [“Configuring the Maximum jobs per client”](#) on page 35.
- Add NetBackup policies for the DB2 EEE environment.
The instructions for adding policies to NetBackup are different for DB2 EEE.
See [“Adding NetBackup policies for DB2 EEE environment”](#) on page 140.
- Create DB2 scripts for the DB2 EEE environment.
The instructions for creating scripts for DB2 EEE are the same as those for DB2.
See [“About NetBackup for DB2 templates and shell scripts”](#) on page 61.
- See [“Creating DB2 templates or scripts for a DB2 EEE environment”](#) on page 141.
- Create a `$DB2_Instance_Home/db2.conf` file.
The instructions for configuring the `db2.conf` files for DB2 EEE are the same as those for DB2.
See [“Configuring the runtime environment”](#) on page 48.
- Test NetBackup for DB2 EEE configuration settings.
The instructions for testing DB2 EEE configuration settings are the same as those for DB2.
See [“Configuring the Maximum jobs per client”](#) on page 35.

Adding NetBackup policies for DB2 EEE environment

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

- A DB2 type policy with an Application Backup schedule type.
 - Include only one Application Backup schedule type. Delete the schedule called Default-Application-Backup.
For complete instructions on how to create this type of schedule, see the following:
See [“Configuring NetBackup for DB2 automatic backup schedules”](#) on page 40.

- In the client list, include all clients you want to back up, including the DB2 catalog node.
- A DB2 policy with an Automatic backup schedule.
 - Include one of the following schedule types: Automatic Full Backup, Automatic Differential Incremental Backup, or Automatic Cumulative Incremental Backup. This policy should contain only one automatic backup schedule type.
For complete instructions on how to create this type of schedule, see the following:
See [“About adding schedules to a NetBackup for DB2 policy”](#) on page 39.
 - Do not specify the automatic backup schedule name in the `$DB2_Instance_Home/db2.conf` file. However, for a proxy backup, do include the automatic backup schedule name.
 - Include only the clients that contain the DB2 catalog node and that run a DB2 script. The script uses the IBM `db2_all` command to archive the DB2 catalog nodes before any other node is backed up.
- Create a Standard type policy with a User Backup type schedule if the following apply:
 - The userexit program for logging is turned on in DB2 UDB.
 - The client is a UNIX machine.
See [“About backing up archive log files with the user exit program”](#) on page 45.
- If you use the VENDOR method, see the following:
See [“Creating a db2.conf file \(vendor method\)”](#) on page 52.

Backing up archive logs in a DB2 EEE environment

The policy you use to back up the archive logs depends on the method you use for log archiving. If you use the user exit program, create a **Standard** policy. If you use the VENDOR method, you can use the DB2 Application Backup schedule.

Creating DB2 templates or scripts for a DB2 EEE environment

Templates and scripts operate on a single NetBackup client. If your EEE/DPF environment spans multiple machines, create at least one template or script for each machine.

For example, assume your database spans two hosts, and host `H1` contains partition `P1`, and host `H2` contains partitions `P2` and `P3`.

You need at least two templates, as follows:

- One template for partition `P1` on host `H1`
- One template for partitions `P2` and `P3` on host `H2`.

Note: Proper backup and restore of the catalog partition is the user's responsibility. Generally, it is recommended that the catalog partition is the first node backed up and the first partition restored. For more information, see your DB2 documentation.

Information is available on how to create backup templates and how to create recovery templates.

See [“Creating a backup template using the NetBackup for DB2 backup wizard”](#) on page 62.

See [“Using the NetBackup for DB2 recovery wizard”](#) on page 82.

Rollforward recovery to a point-in-time (PIT) is not supported. DB2 requires that PIT recovery be run via the same operation for all partitions and tablespaces on all machines. Templates do not span machines.

See [“Backing up archive logs in a DB2 EEE environment”](#) on page 141.

Using NetBackup for DB2 with SAP®

This appendix includes the following topics:

- [About NetBackup for DB2 with SAP](#)
- [Installation of the DB2 user exit program](#)
- [Backup and restore of DB2 databases used by SAP](#)
- [Archive and restore of DB2 log files used by SAP](#)
- [Backup of SAP files](#)

About NetBackup for DB2 with SAP

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. Follow the recommended installation, backup, and restore guidelines to ensure that SAP, DB2, and NetBackup work together.

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`.

The use of the NetBackup user exit program is required because it automatically archives log files to a storage unit and because it enables 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 used by SAP

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

Note: Do not use `SAP CCMS, sapdba, brbackup, or brrestore` commands to initiate backups or restores. They do not invoke NetBackup.

Note: SAP must not be running when you attempt to restore the database.

Archive and restore of DB2 log files used by SAP

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

Note: Do not use `SAP CCMS, sapdba, brarchive` commands, or the SAP Logfile Management window in the DB2 Control Center for log file archival. They depend on the SAP user exit program for proper operation.

Backup of SAP files

Be certain to include any and 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 Backup, Archive, and Restore online help.

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