



**EMC® NetWorker®
Module for DB2**

Release 2.1

Administration Guide

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As part of an effort to improve and enhance the performance and capabilities of its product lines, EMC periodically releases revisions of its hardware and software. Therefore, some functions described in this document may not be supported by all versions of the software or hardware currently in use. For the most up-to-date information on product features, refer to your product release notes.

If a product does not function properly or does not function as described in this document, please contact your EMC representative.

Audience

This document is part of the NetWorker Module for DB2 documentation set, and is intended for use by system administrators who are responsible for installing software and maintaining the servers and clients on a network. Operators who monitor the daily backups may also find this guide useful.

Readers of this document are expected to be familiar with the following topics:

- ◆ DB2 terminology and concepts.
- ◆ Backup and recovery procedures on a DB2 Server.
- ◆ Disaster recovery procedures on DB2 Server

Related documentation

Related documents include:

- ◆ *NetWorker Module for DB2, Release 2.1, Multiplatform Version, Installation Guide*
- ◆ *NetWorker Module for DB2, Release 2.1, Multiplatform Version, Release Notes*
- ◆ *NetWorker, Release 7.3, Multiplatform Version, Administration Guide*
- ◆ *NetWorker, Release 7.2, UNIX and Linux Version, Administration Guide*
- ◆ *NetWorker, Release 7.2, Windows Version, Administration Guide*
- ◆ *NetWorker Installation Guide*
- ◆ *NetWorker Release Notes*
- ◆ *NetWorker Command Reference Guide*
- ◆ *EMC Information Protection Software Compatibility Guide*
- ◆ UNIX man pages

Conventions used in this document

EMC uses the following conventions for special notices.

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

**CAUTION**

A caution contains information essential to avoid data loss or damage to the system or equipment.

**IMPORTANT**

An important notice contains information essential to operation of the software.

Typographical conventions

EMC uses the following type style conventions in this document:

Normal	Used in running (nonprocedural) text for: <ul style="list-style-type: none"> Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus) Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, functions, utilities URLs, pathnames, filenames, directory names, computer names, filenames, links, groups, service keys, file systems, notifications
Bold	Used in running (nonprocedural) text for: <ul style="list-style-type: none"> Names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system calls, man pages Used in procedures for: <ul style="list-style-type: none"> Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus) What user specifically selects, clicks, presses, or types
<i>Italic</i>	Used in all text (including procedures) for: <ul style="list-style-type: none"> Full titles of publications referenced in text Emphasis (for example a new term) Variables
Courier	Used for: <ul style="list-style-type: none"> System output, such as an error message or script URLs, complete paths, filenames, prompts, and syntax when shown outside of running text
Courier bold	Used for: <ul style="list-style-type: none"> Specific user input (such as commands)
<i>Courier italic</i>	Used in procedures for: <ul style="list-style-type: none"> Variables on command line User input variables
< >	Angle brackets enclose parameter or variable values supplied by the user
[]	Square brackets enclose optional values
	Vertical bar indicates alternate selections - the bar means "or"
{ }	Braces indicate content that you must specify (that is, x or y or z)
...	Ellipses indicate nonessential information omitted from the example

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Comments and suggestions about our product documentation are always welcome.

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2. Click the **Feedback** link.

This chapter provides information on the main features of the EMC NetWorker Module for DB2 (NMDB2) and NetWorker server, client, and other software required to implement the IBM DB2 Universal Database (DB2) backup and recovery solution.

This chapter includes the following sections:

- ◆ [Revision history of this document](#) 10
- ◆ [Importance of backing up mission-critical data](#) 10
- ◆ [About the NetWorker software](#) 10
- ◆ [About NetWorker Module for DB2](#) 11
- ◆ [DB2 backup and restore utility features](#)..... 13

Revision history of this document

Table 1 lists revisions to this document.

Table 1 Revision history

Date	Description
January 2006	Original release.
August 31, 2007 Rev A01	<ul style="list-style-type: none"> “DB2 Universal Database SQL Messages” on page 74, was modified for message SQL2025N: “An I/O error ‘11’ occurred on media ‘VENDOR’ to include an error when a parameter is incorrectly set.” Updated template, formats, and styles. Updated part number from E2-2452-01 Rev A01 to 300-005-607 Rev A01.
September 18, 2007 Rev A02	Corrected spelling of PRECMD and POSTCMD commands.

Importance of backing up mission-critical data

The reliability of computer equipment has improved greatly in recent years, but system and hardware failures still occur, sometimes with catastrophic results.

It is important to back up computer systems to protect them from the loss of valuable data. In a network environment, where users depend on shared data and the amount of data continuously grows, the need to protect and manage data becomes crucial.

A viable backup strategy includes:

1. Regular backups of databases
2. Archive logs
3. Bootstrap records

These methods are important for the following reasons:

- ◆ Without archive logs, you can recover a database only to the time of its last full backup.
- ◆ Without backups and the relevant logs, you cannot recover a database at all.
- ◆ Without the bootstrap, you may not be able to recover essential file and configuration data following a disaster, such as a disk crash or server failure.

About the NetWorker software

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

The NetWorker software enables a user to:

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

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

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

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

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

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

NetWorker server and NMDB2 software can exist on either the same or separate ones. NetWorker client and NMDB2 software must exist on the computer that contains the DB2 data to be backed up. The computer that runs the DB2 and NMDB2 software is considered a client of the NetWorker server.

For more information on:

- ◆ Installation of the NetWorker server, client, and storage node software, refer to the appropriate *NetWorker Installation Guide*.
- ◆ Configuration and use of the NetWorker software, refer to the appropriate *NetWorker Administration Guide*.

About NetWorker Module for DB2

NetWorker Module for DB2 (NMDB2) enhances NetWorker software and provides the following:

- ◆ Automated management of backup media.
- ◆ Manual (nonscheduled) and scheduled DB2 Universal Database backups.
- ◆ Ability to restore DB2 Universal Database databases or tablespaces.
- ◆ Storage management through automated scheduling, autochanger support, electronic tape labeling, and tracking.
- ◆ Ability to back up to a centralized backup server.
- ◆ Support for multiple, concurrent high-speed devices, such as DLT drives.
- ◆ Integrated backup and restore procedures for DB2 Universal Database.
- ◆ Secure restore of data to alternate database instances (on original machine or different one).
- ◆ Full browse and retention policy support.

NetWorker Module for DB2 utilities

This section describes how the NMDB2 software interacts with the DB2 Universal Database Backup and Restore Utility to back up and restore database data.

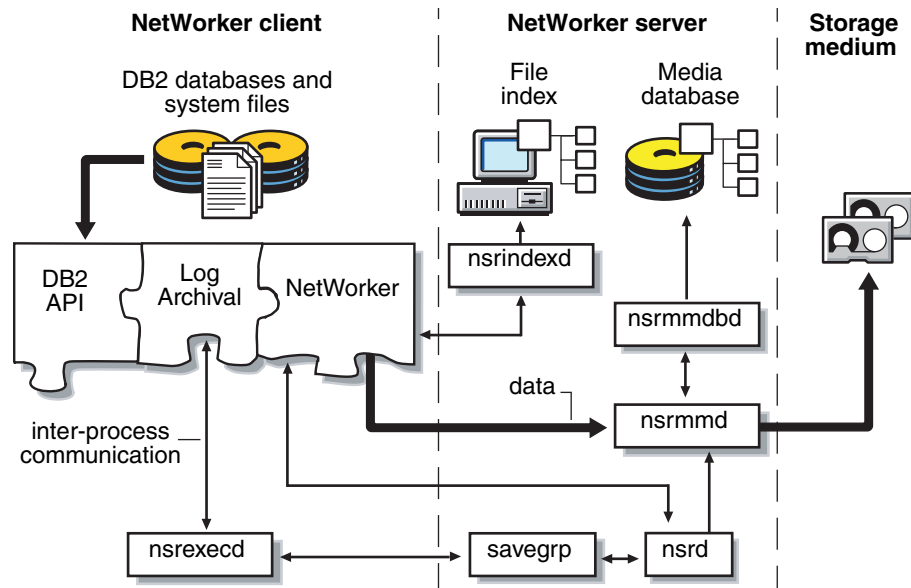
Summary of the NMDB2 backup process

The NMDB2 software connects the DB2 Universal Database backup utility to the NetWorker server through the NetWorker **libnsrdb2** library. When a backup request is initiated, the DB2 backup utility interacts with NetWorker software to coordinate a backup of the database.

When **nsrd** triggers a scheduled backup on the NetWorker server, **savegrp** executes and runs the **nsrdb2sv** binary that invokes the DB2 backup utility to perform a database backup. The NetWorker server software performs all scheduling and storage management tasks.

Figure 1, "Backup operation," on page 12 shows the data flow during a backup operation.

Figure 1 Backup operation

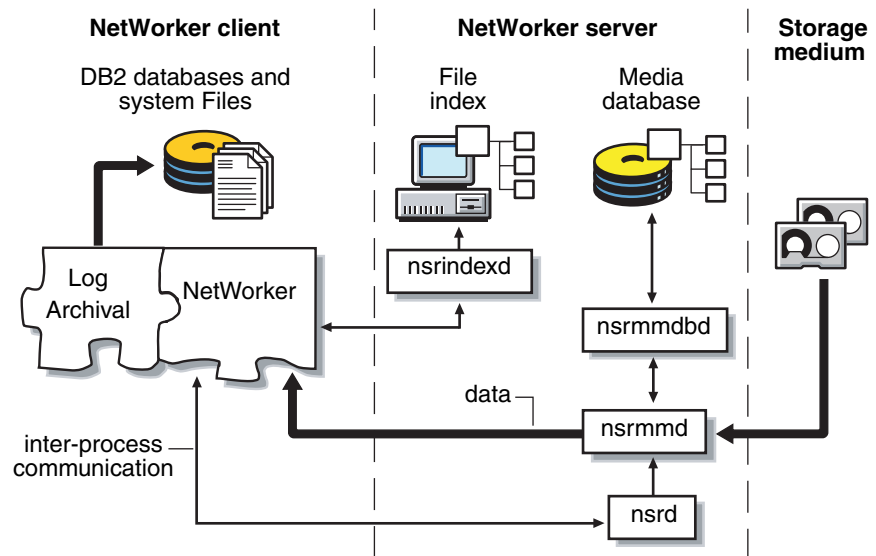


Summary of the NMDB2 restore process

When a DB2 Universal Database manager restore request is initiated, the NMDB2 library translates the object names requested by the database into a format the NetWorker software understands and forwards it to the **nsrd** service on the NetWorker server. The media service, **nsrmmmd**, searches the NetWorker server online media database for the media containing the objects requested and restores the data to the database manager.

Figure 2, “Restore operation,” on page 13 shows the data flow during a recover operation.

Figure 2 Restore operation



DB2 backup and restore utility features

The DB2 Backup and Restore utility, which is included with the DB2 Universal Database, provides:

- ◆ Online or offline concurrent backups of databases and tablespaces in both noncluster and cluster environments.
- ◆ Offline recovery of databases.
- ◆ Online or offline recovery of tablespaces.
- ◆ Automated backup and restore of transaction logs.
- ◆ Multiple session support that allows you to back up and restore several streams of data.
- ◆ On-demand log archiving.
- ◆ DB2 versions 8.1 and 8.2 allow you to close and archive the active log of a recoverable database if the log archival feature is enabled. For example:
`logarchmeth1=VENDOR:/usr/lib/libnsrdb2.xx`

Where *xx* is the suffix information for the `libnsrdb2` libraries. For more information, see Table 2, “Path and suffix for the `libnsrdb2` libraries,”.

Table 2 Path and suffix for the `libnsrdb2` libraries (page 1 of 2)

Operating system	Path with suffix
AIX	/usr/lib/libnsrdb2.o
HP-UX (32-bit, 64-bit)	/usr/lib/libnsrdb2.sl
HP-UX IA64	/usr/lib/libnsrdb2.so

Table 2 Path and suffix for the libnsrdb2 libraries (page 2 of 2)

Operating system	Path with suffix
Linux	/usr/lib/libnsrdb2.so
Solaris	/usr/lib/libnsrdb2.so
Windows NT, Windows 2000, Windows 2003	<drive>:NetWorker_Installation_Directory\nsr \bin\libnsrdb2.dll

This chapter provides information about basic configuration of the the NetWorker Module for DB2 (NMDB2) software for each DB2 server that requires backup and recovery services.

This chapter includes the following sections:

- ◆ [Configuration requirements](#) 16
- ◆ [Configuring the NMDB2 software](#) 16
- ◆ [Considerations for multiple partitioned databases](#)..... 22
- ◆ [Considerations for cluster environments](#) 24

For additional information on configuring:

- ◆ Manual NMDB2 backups, see [Chapter 3, “Manual Backup Procedures,”](#)
- ◆ Scheduled NMDB2 backups, see [Chapter 4, “Scheduled Backup Procedures,”](#)
- ◆ Transaction log backup and recovery services, see [Chapter 5, “Transaction Log Procedures,”](#)
- ◆ Multisession backup and recovery services, see [Chapter 7, “Multiple Session Backup and Restore Procedures,”](#)

Configuration requirements

With a single license, NMDB2 software supports the concurrent backup of DB2 databases on separate computers to the same NetWorker server.

In order to perform concurrent backups, the NMDB2 software must be installed:

- ◆ On the same computer as the DB2 Universal Database manager.
- ◆ Once per computer *only*, regardless of the number of databases to be backed up.

The NMDB2 software also supports the concurrent backup of DB2 databases on separate computers to the same NetWorker server using multiple licenses.

Configuring the NMDB2 software

Before the NMDB2 software can be used, the NMDB2 configuration file must be created and the required NetWorker resources must be configured. Before completing the configurations, ensure that the NMDB2 software is installed on the DB2 server according to the instructions in the *NetWorker Module for DB2, Multiplatform Version, Installation Guide*.

- ◆ To configure NetWorker resources, you can use the NetWorker Management Console program, the NetWorker Administrator program, or the NetWorker Configuration Wizard depending upon the release of NetWorker server software you are using.

For information on how to create the Client resource and its attributes for:

- NetWorker release 7.3, use the NetWorker Management Console to configure all the required NetWorker resources for both manual (nonscheduled) and scheduled NMDB2 backups. For details, refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- NetWorker release 7.2, use the NetWorker Administrator program to configure all the required NetWorker resources for both manual (nonscheduled) and scheduled NMDB2 backups. For details, refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.
- ◆ For NetWorker releases 7.2 and 7.3, you can use the NetWorker Configuration Wizard to create the NetWorker Client and Group resources for scheduled NMDB2 backups *only*. Once the wizard creates a NetWorker resource, the resource can be edited with the NetWorker Management Console or the NetWorker Administrator program.

For detailed information on:

- The NetWorker Configuration Wizard, refer to the following guides depending upon the release of NetWorker server software you are using:
 - *NetWorker Module for DB2, Multiplatform Release, Installation Guide*
 - *NetWorker, Release 7.2, Release Supplement*
 - *NetWorker, Release 7.3, Release Notes*
- The configuration wizard requirements, refer to the *NetWorker Module for DB2, Multiplatform Version, Installation Guide*.
- Configuration of scheduled NMDB2 backups with the configuration wizard, refer to [“About scheduled backups” on page 34](#).

How to configure the NMDB2 software

To complete the basic database and NMDB2 configuration, perform the following:

- ◆ [“Task 1: Configure the NMDB2 configuration file” on page 17](#)
- ◆ [“Task 2: Verify the NetWorker user group privileges” on page 18](#)
- ◆ [“Task 3: Configure the NetWorker server resource” on page 19](#)
- ◆ [“Task 4: Configure a Client resource” on page 19](#)
- ◆ [“Task 5: Configure device and label template resources” on page 21](#)
- ◆ [“Task 6: Configure volume pools” on page 21](#)
- ◆ [“Task 7: Configure firewall support” on page 22](#)

You can view and configure NetWorker resources and their attributes using the NetWorker Management Console or the NetWorker Administration program depending upon the release of NetWorker server software you are using. For references about software configuration, see [“References for additional configuration” on page 25](#).

Task 1: Configure the NMDB2 configuration file

To configure the database instance:

1. Create an NMDB2 configuration file that contains all of the required environment settings. For example, the file can be named DB2_CFG.

Use only the environment variables that are listed in [Appendix A, “NMDB2 Configuration File \(DB2_CFG\) Parameters.”](#) Using any other NetWorker environment variables may result in unpredictable behavior.

2. Ensure that the NMDB2 configuration file has the following structure, with the environment variable name followed by an equal sign (=) and then the variable setting value. For example:

```
Environment_Variable=Setting
```

Ensure that you follow the correct syntax in the NMDB2 configuration file, or the backup or restore will *not* run correctly.

3. Add at least one NSR_SERVER environment variable. This variable must be set to the name of the NetWorker server used to back up the database client.

In a cluster environment, the NetWorker server must *not* be part of the cluster.

4. Add the NSR_CLIENT environment variable if you are configuring the file for a cluster environment. Typically the NSR_CLIENT environment variable is set to the cluster virtual hostname.

The following is an example of an NMDB2 configuration file.

Example 1 NMDB2 configuration file (DB2_CFG)

```
DB2_ALIAS=SAMPLE
DB2_NODE_NAME=DB2
DB2_USR=CORP\db2admin
DB2_VENDOR_LIB_PATH=c:\progra~1\Legato\nsr\bin\libnsrdb2.dll
DB2_OPTIONS=DB2BACKUP_OFFLINE
NSR_SERVER=Accounting
NSR_DATA_VOLUME_POOL=Default
NSR_LOG_VOLUME_POOL=Default
NSR_DEBUG_LEVEL=9
NSR_DEBUG_FILE=c:\progra~1\Legato\nsr\applogs\db2.log
```

```
NSR_LIBNSRDB2_DEBUG_LEVEL=9
NSR_LIBNSRDB2_DEBUG_FILE=c:\progra~1\Legato\nsr
\applogs\db2sql.log
DB2_PSWD=Jmfmb*7<8$sa
```

Note: Do not include spaces when listing paths, for example:

NSR_DEBUG_FILE=c:\progra~1\Legato\nsr\ . Including a space when listing paths causes the NMDB2 software to terminate processing the path at the first space.

Task 2: Verify the NetWorker user group privileges

The NetWorker server release 7.x includes an access control feature. This feature allows NetWorker administrators to assign users to NetWorker user groups. Each user group has a specific set of privileges associated with it, as defined in the Privileges attribute of the User Group resource.

The NetWorker server release 7.x is installed with two preconfigured user groups:

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

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

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

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

These default user group configurations are sufficient for NMDB2 backup and restore operations. If the default user group configurations are changed, ensure that the required privileges are assigned for the operations.

Verify that the required user group privileges are granted to the DB2 user that performs the NMDB2 operations, as shown in [Table 3 on page 18](#). The privileges required for NMDB2 release 2.1 differ from those for previous NMDB2 releases.

Table 3 User group privileges required for NMDB2 operations

NMDB2 Operation	Privileges Required with NetWorker Server 7.2 and Earlier	Privileges Required with NetWorker Server 7.3 and Later
Full backup (manual or scheduled)	Back Up Local Data	Back Up Local Data
Restore	Back Up Local Data, Recover Local Data	Recover Local Data

For all NMDB2 operations, if the correct user group privileges are not assigned, the operation *fails* with an error message that indicates the required privileges.

For details on NetWorker user groups and setting user group privileges, and how to modify existing privileges, refer to one of the following guides depending on the release of NetWorker server software you are using:

- ◆ *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*
- ◆ *NetWorker, Release 7.2, Administration Guide* appropriate for your platform

Task 3: Configure the NetWorker server resource

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

[Table 4 on page 19](#) describes the main NetWorker Server resource attributes. Verify that the attribute settings in your Server resource are valid for the DB2 backup environment, modifying the settings as required.

Table 4 NetWorker server resource attributes

Attribute	Description
Name	Specifies the hostname of the NetWorker server.
Parallelism	Specifies the maximum number of backup save streams that the NetWorker software allows to arrive concurrently at the server. The NetWorker server edition determines the maximum parallelism value. When multiple data streams are backed up at the same time, the efficiency of the storage devices is increased.
Administrator	Specifies users with NetWorker Administrator privileges. The default setting of the attribute is <i>root@hostname</i> on UNIX and <i>Administrators@hostname</i> on Windows, where <i>hostname</i> is the NetWorker server hostname.

Task 4: Configure a Client resource

The NetWorker Client resource is a set of attributes assigned to the DB2 server host and stored on the NetWorker server. Before the NMDB2 software can be used for DB2 backup and restore operations, a Client resource must be configured for the DB2 server host.

To configure a Client resource, you can use either the NetWorker Management Console, the NetWorker Administrator program, or the NetWorker Configuration Wizard:

- ◆ To configure the Client resource for an manual (nonscheduled) or scheduled NMDB2 backup, you can use the NetWorker Management Console program or the NetWorker Administrator program depending upon which release of NetWorker server software has been installed.
- ◆ To create the Client resource for a scheduled NMDB2 backup *only*, you can use the NetWorker Configuration Wizard, as described in [“About scheduled backups” on page 34](#). Once the wizard creates a resource, the resource can be edited with the NetWorker Management Console, or the NetWorker Administrator program.

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

To configure the NetWorker Client resource for an DB2 server, see [Table 5 on page 20](#) for the information required in each attribute of the Client resource.

For information on how to create the Client resource and its attributes for:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

Table 5 NetWorker Client resource attributes

Attribute	Description
Name	Specifies the hostname of the DB2 server host.
Backup Command	<i>For scheduled backup only.</i> Specifies the name of the command to be used for a scheduled DB2 backup. For example: nsrdb2sv -f DB2_CFG where DB2_CFG is the NMDB2 configuration file.
Browse Policy	<i>For scheduled backup only.</i> Specifies the length of time that the NetWorker server retains an entry for a DB2 backup in the online client file index. To set a specific browse policy for a manual DB2 backup, use the parameter NSR_SAVESET_BROWSE. Note: If you do not select a value for the Browse policy attribute, the NetWorker server uses the default value of one month. The value for the Browse policy attribute cannot exceed the value for the Retention policy attribute.
Group	<i>For scheduled backup only.</i> Specifies the NetWorker backup group to be used for a scheduled DB2 backup.
Parallelism	Specifies the maximum number of concurrent backup or restore tasks to use for a backup or restore operation. For a backup, this attribute can be used instead of the NSR_PARALLELISM parameter.
Password	For backups, used only if the Remote User is specified. Enter the password of the user specified by the Remote User attribute.
Remote Access	Specifies the fully qualified IP name of a remote system, to enable restores of the DB2 Server backups to that remote system.
Remote User	<i>Optional for backups on Windows.</i> Specifies the user that is allowed to run remote commands on the client or access specific application data on the client.
Retention Policy	<i>For scheduled backup only.</i> Specifies the minimum length of time that the NetWorker server maintains information about DB2 backup data in the online media database. This attribute applies only to scheduled DB2 backups. To set a specific retention policy for a manual DB2 backup, use the parameter NSR_SAVESET_RETENTION. Note: If you do not select a value for the Retention policy attribute, the NetWorker server uses the default value of one year. The Retention policy attribute must be greater than or equal to the value Browse policy attribute.
Save Set	Specifies the database and node to be backed up. For example: DB2:/database_name/node_name
Schedule	<i>For scheduled backup only.</i> Specifies the NetWorker backup schedule to be used for a scheduled DB2 backup.

Task 5: Configure device and label template resources

Additional NetWorker resources may be required for the NMDB2 backups and restores, such as the following:

- ◆ Device resource
- ◆ Label Template resource

Device resource

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

Configure a NetWorker Device resource for each device to be used for NMDB2 backups and restores. Complete any required autochanger or silo configuration procedures. Ensure that each device also contains a labeled and mounted volume.

For more information on NetWorker resources and how to configure them, refer to the following guides depending on the release of NetWorker server software you are using:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

Task 6: Configure volume pools

The following section describes how to use Pool resources to optimize backup and restore performance:

- ◆ [“How to specify pools” on page 21](#)
- ◆ [“Set the NSR_DATA_VOLUME_POOL variable” on page 22](#)
- ◆ [“Set the NSR_LOG_VOLUME_POOL variable” on page 22](#)

For detailed information about volume pools, label templates, and their configuration procedures, refer to the following guides depending on the release of NetWorker server software you are using:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

How to specify pools

When a backup occurs, the software tries to match the characteristics of the data to the attributes configured for a Pool resource. If the data matches the criteria of a pool configuration, the NetWorker software directs the data to a labeled volume belonging to that pool.

Volume pools provide the ability to segregate data such as table spaces and archived logs onto different sets of media. Pools allow you to direct backup data to specific devices.

Each volume pool has a Pool Type attribute. For the NMDB2 software, the only valid pool types are:

- ◆ Backup
- ◆ Backup clone

The NetWorker software uses the attributes configured in the Pool resource to sort backup data to labeled volumes. You can sort backup data by pool type and any combination of backup group or NetWorker client. You might want to organize backup data by department or database type.

You can send backup data to separate media by setting up volume pools for those backups.

Set the NSR_DATA_VOLUME_POOL variable

To specify that the NetWorker server back up the data to a pool *other* than the Default pool, set the NSR_DATA_VOLUME_POOL configuration parameter to the volume pool name in the NMDB2 configuration file (DB2_CFG).

Use the NSR_DATA_VOLUME_POOL configuration parameter for database and tablespace backups. This applies to manual and scheduled backups.

For details about how to use the NMDB2 configuration file, see [“Task 1: Configure the NMDB2 configuration file” on page 17](#).

Set the NSR_LOG_VOLUME_POOL variable

To specify that the NetWorker server back up logs to a pool *other* than the Default pool, set the NSR_LOG_VOLUME_POOL configuration parameter to the volume pool name in the NMDB2 configuration file (DB2_CFG). This environment variable applies to transactional log backups.

For details about transaction log parameters, see [“Transaction log parameters” on page 69](#).

Task 7: Configure firewall support

The NMDB2 software provides firewall support. The ports that the NMDB2 software uses for the firewall depend on the corresponding ports configured for the NetWorker server.

To configure the firewall that the NMDB2 software uses, follow the firewall configuration instructions. Refer to the following guides depending on the release of NetWorker server software you are using:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

Considerations for multiple partitioned databases

When backing up hosts in parallel, consider the following:

- ◆ Configuring one or more hosts as members of the same NetWorker group for scheduled backups, you can enhance backup performance by backing up all hosts in parallel.
- ◆ When running multiple partition database backups in online mode, the second host performing the backup will display the following error message:

```
The database is still in use
```
- ◆ To prevent the error from occurring, run the backup in online mode, and set the group parallelism to 1.

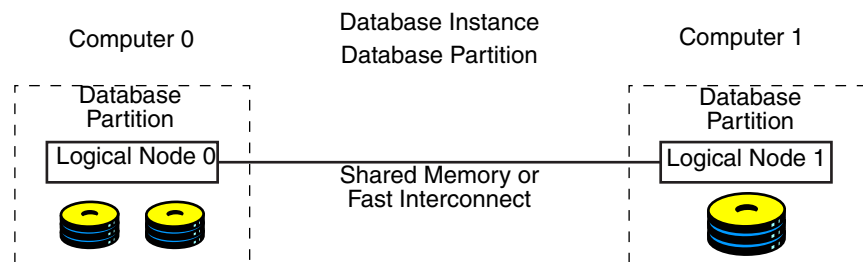
DB2 ESE configurations

This section provides examples of DB2 ESE configurations.

[Figure 3](#) shows a DB2 ESE with Database Partition Feature (DPF) configuration using two separate computers with a single node on each. This configuration requires that you create a separate client resource for each physical computer.

Note: All ESE clients should be members of the same backup group.

Figure 3 DB2 ESE configuration



[Figure 4 on page 23](#) and [Figure 5 on page 24](#) show a DB2 ESE with DPF configuration that uses two separate computers with and without multiple nodes.

This configuration requires that:

- ◆ A separate Client resource is created for each physical computer.
- ◆ Each DB2 ESE client must have a separate Client resource for each DB2 node. The node number is specified in the NSR_SAVESET variable.
- ◆ The format of the NSR_SAVESET environment variable in the Client resource is `DB2:/database_name/node_number`. This guarantees name consistency between manual and scheduled backups and ensures that the save set names for both backups are equal. This also simplifies multinode backups.

Figure 4 DB2 ESE DPF configuration

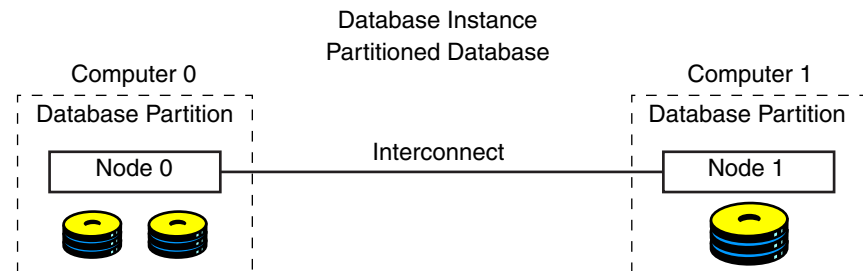
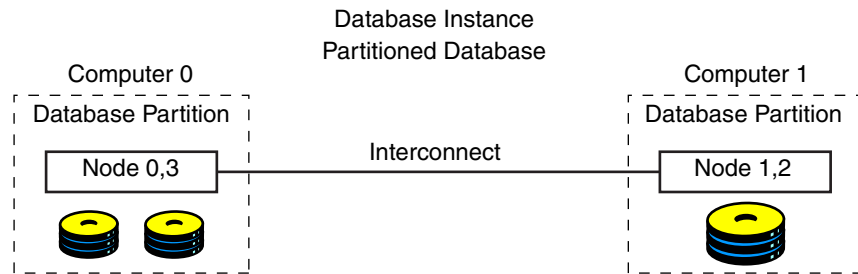


Figure 5 DB2 ESE DPF configuration with multiple nodes



Considerations for cluster environments

In a cluster environment, the savegroup executable `nsrdb2sv` reads the mandatory `NSR_CLIENT` environment variable from the `NMDB2` configuration file (`DB2_CFG`). This guarantees that all indexes are backed up under the virtual hostname.

The `NMDB2` software supports the following configurations:

- ◆ Single DB2 node with failover capability
- ◆ Multiple DB2 node with failover capability
- ◆ Multiple DB2 nodes with mutual failover capability

All data in a noncluster environment can be backed up locally or remotely to the same NetWorker server. In a cluster environment, the NetWorker server must be remote and *not* part of the cluster environment used for the database server.

Cluster configurations

Figure 6, Figure 7, and Figure 8 illustrate examples of cluster configuration.

Figure 6 Single DB2 node with failover capability

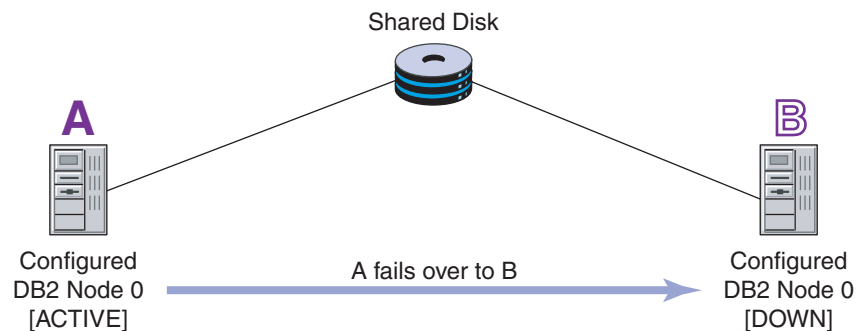


Figure 7 Multiple DB2 node with failover capability

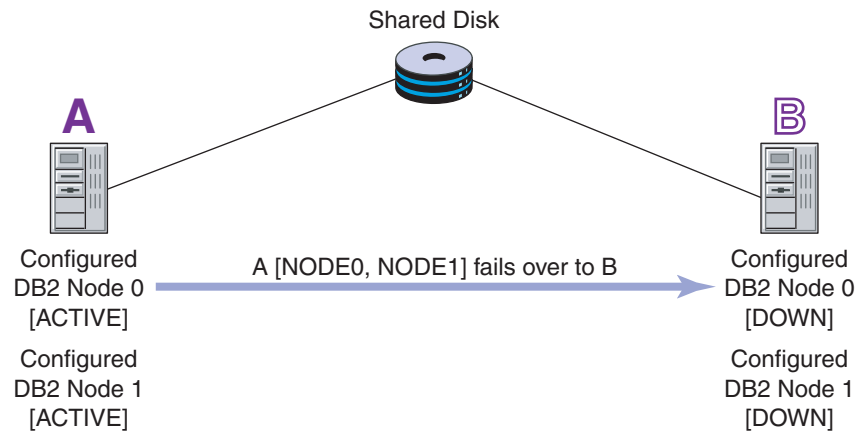
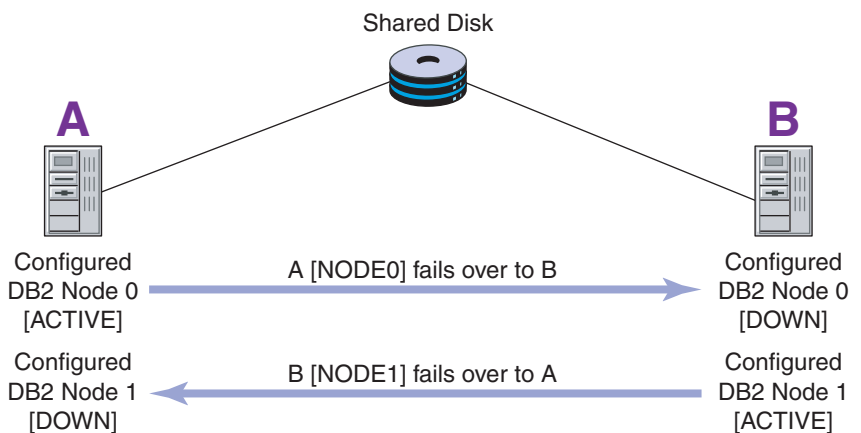


Figure 8 Multiple DB2 nodes with mutual failover capability



References for additional configuration

Additional configuration procedures include the following:

- ◆ Enabling regular file system backups
- ◆ Configuring the Server resource
- ◆ Configuring the Client resource
- ◆ Configuring the Device resource
- ◆ Labeling and mounting volumes
- ◆ Configuring storage nodes

For a complete list of the hardware and software that NetWorker software currently supports, refer to the *Compatibility Guides*.

For detailed information about additional configuration procedures, refer to the following guides depending on the release of NetWorker server software you are using:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

This chapter describes how to configure and use the NetWorker Module for DB2 (NMDB2) software to perform manual (nonscheduled) backups of DB2 data.

This chapter includes the following sections:

- ◆ About manual backups 28
- ◆ Roadmap for configuring a manual backup 28
- ◆ Monitoring manual backups 31
- ◆ Preventing a backup from hanging 30
- ◆ Removing failed backups..... 31
- ◆ Diagnostic and error messages..... 32

An important consideration with manual DB2 backups is maintaining regular NetWorker server bootstrap backups to ensure adequate preparation for disaster recovery.

About manual backups

An NMDB2 backup can be *either* an manual (nonscheduled) or scheduled backup.

- ◆ An manual backup includes the following features:
 - The backup is initiated by the user.
 - The backup is performed by entering the DB2 backup command. For details, see [“Task 2: Perform a manual backup” on page 29](#).
 - The backup does not generate bootstrap files or backup indexes, so it cannot replace scheduled backups.
- ◆ A scheduled backup includes the following features:
 - The backup is initiated automatically by the NetWorker server.
 - The backup cannot start until the proper Client, Group, and Schedule resources must be configured on the NetWorker server. In the Client resource, the backup command must be specified in the Backup command attribute. For details, see [“Roadmap for configuring a scheduled backup” on page 34](#).
 - The backup starts at a scheduled time specified in the Group resource.

Both manual and scheduled NMDB2 backups must be configured properly according to [“Configuring the NMDB2 software” on page 16](#).

Roadmap for configuring a manual backup

Before configuring manual DB2 backups, the DB2 and NetWorker systems must be properly configured, as described in the [“Configuring the NMDB2 software” on page 16](#). The required backup volumes must be labeled and mounted in the storage devices.

To configure a manual backup, perform the following:

- ◆ [“Task 1: Configure a manual backup” on page 28](#)
- ◆ [“Task 2: Perform a manual backup” on page 29](#)

Task 1: Configure a manual backup



CAUTION

Before performing a manual backup, ensure that you have configured the NetWorker Server, Client, Device, and Pool resources. Backup volumes should be labeled and mounted. For more information, see [“Configuring the NMDB2 software” on page 16](#).

To configure a manual backup:

1. Ensure that the NMDB2 configuration file (DB2_CFG) was created. For details, see [“Task 1: Configure the NMDB2 configuration file” on page 17](#).
2. Ensure that at least one NSR_SERVER environment variable has been added to the NMDB2 configuration file. This variable must be set to the name of the NetWorker server used to back up the database client.

In a cluster environment, the NetWorker server must *not* be part of the cluster.

3. Configure a Client resource. For details, see [“Task 4: Configure a Client resource” on page 19](#).

Task 2: Perform a manual backup

To perform a manual backup:

1. Ensure that the NMDB2 configuration file (DB2_CFG) contains the following variable:

```
NSR_SERVER=NetWorker_Servername
```

where *NetWorker_Servername* is the name of the NetWorker server.

2. Use the **load libnsrdb2** option with the **db2 backup** command to direct the backup of the database *SAMPLE* to a NetWorker server.

For example:

- AIX:

```
$ db2 backup db SAMPLE LOAD /usr/lib/libnsrdb2.o options
@pathname/DB2.CFG
```

- HP-UX (32-bit, 64-bit):

```
$ db2 backup db SAMPLE LOAD /usr/lib/libnsrdb2.sl options
@pathname/DB2.CFG
```

- HP-UX IA64:

```
$ db2 backup db SAMPLE LOAD /usr/lib/libnsrdb2.so options
@pathname/DB2.CFG
```

- Linux:

```
$ db2 backup db SAMPLE LOAD /usr/lib/libnsrdb2.so options
@pathname/DB2.CFG
```

- Solaris:

```
$ db2 backup db SAMPLE LOAD /usr/lib/libnsrdb2.so options
@pathname/DB2.CFG
```

- Windows:

```
db2 backup db SAMPLE LOAD
<drive>:\NetWorker_Install_Directory\nsr\bin
\libnsrdb2.dll options @pathname\DB2.CFG
```

where:

- *pathname* is the path to file.
- *NetWorker_Install_Directory* is the path where the NetWorker software has been installed.
- *DB2.CFG* is the NMDB2 configuration file.



CAUTION

Failover during a manual backup is *not* supported and the backup must be manually restarted. This ensures that corrupt data is not restored.

To track the status of a manual backup, see [“Monitoring manual backups” on page 31](#).

NetWorker bootstrap and index backups

By default, manual (nonscheduled) backups of DB2 databases do *not* back up the NetWorker client file indexes and the NetWorker server bootstrap. To back up the NetWorker client file indexes and the server bootstrap, perform scheduled backups. If a scheduled backup is never performed, you must back up the client file indexes and bootstrap *manually*.

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

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

where:

- ◆ *printer_name* is the name of the printer where the bootstrap information is printed.
- ◆ *client_name* is the name of the NMDB2 client.

For more information on the **savegrp** command, refer to the following:

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

The client file indexes and server bootstrap file are crucial for recovering data to DB2 database systems in the event of a disaster. For more information on disaster recovery, refer to the following:

- ◆ [Chapter 6, “Restoring and Recovering Data Procedures,”](#)
- ◆ *NetWorker Disaster Recovery Guide*

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

Preventing a backup from hanging

To prevent a backup from hanging, set the following environment variable to TRUE in the NMDB2 configuration file (DB2_CFG):

```
NSR_NO_BUSY_ERRORS=TRUE
```

If the NetWorker server is temporarily unavailable when you start a backup, the backup waits until the NetWorker server becomes available if this parameter is *not* set to true.

For more information about the NSR_NO_BUSY_ERRORS environment variable, see [Appendix A, “NMDB2 Configuration File \(DB2_CFG\) Parameters,”](#).

Note: If the NSR_NO_BUSY_ERRORS environment variable is set to true and the backup hangs, check to see if **nsrexecd** is running:

```
# ps -ef | grep nsrexecd
```

If **nsrexecd** is *not* running, start it by using the following command:

```
# nsrexecd
```

Removing failed backups

If a backup fails, you might want to remove it manually from the NetWorker server's media database. Restoring failed backups will result in error.

To manually remove a failed backup:

1. If required, use the following command on the NetWorker server to see if the record for the failed backup is in the media database:

```
$ mminfo -v -c client_name.mydomain.com
```

Where *client_name.mydomain.com* is the hostname of the computer that the database resides on.

Note: In a cluster environment, use the virtual hostname that is used for the database server.

2. Use the output of the **mminfo** command to see if a save set was created for a failed backup and is *not* automatically removed by the server. Note the save set id (*ssid*).
3. Use the following command to remove the save set from the media database:

```
$ nsrmm -S ssid -d
```

The *ssid* environment variable is the save set from the output of the **mminfo** command.

Monitoring manual backups

To monitor the status of manual backups, use the following:

- ◆ With a NetWorker server release 7.2 or earlier, use the NetWorker Administrator program.

The Administrator program displays progress and completion messages that advise when a backup is complete, and information on why a backup cannot proceed.

For more information on viewing these types of messages when using the NetWorker Administrator program, refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

- ◆ With a NetWorker server release 7.3 or later, use the NetWorker Management Console.

The NetWorker Management Console displays details of current NetWorker server activities, operations related to devices and libraries, and managed events that require user intervention. It makes administration of NetWorker servers more efficient by providing a centralized means of monitoring all the activity throughout an enterprise.

For more information about the NetWorker Management Console, refer to the *EMC NetWorker Release 7.3, Multiplatform Release, Administration Guide*.

Diagnostic and error messages

By default, diagnostic and error messages specific to the NMDB2 software are posted in the following logs:

- ◆ nsrdb2.log
- ◆ nsrdb2xbsa.log

The logs are recorded by default in the following location:

- ◆ On UNIX: /nsr/applogs
- ◆ On Windows: <drive:>\NetWorker_Install_Directory\nsr\applogs

Configuring error and diagnostic messages

You can specify that NMDB2 error and diagnostic messages are written to different files. You can also control the level of detail reported.

To configure diagnostic messages, set the following environment variables in the NMDB2 configuration file (DB2_CFG):

- ◆ NSR_LIBNSRDB2_DEBUG_FILE — to a valid file pathname.
- ◆ NSR_LIBNSRDB2_DEBUG_LEVEL — to an integer in the range of 0 to 9, where 9 is the highest level of detail and 0 is the lowest.
- ◆ NSR_DEBUG_FILE — to the full pathname and filename to which messages should be written.
- ◆ NSR_DEBUG_LEVEL — to an integer in the range of 0 to 9, where 9 is the highest level of detail and 0 is the lowest.

For more information about environment variables, see [Appendix A, "NMDB2 Configuration File \(DB2_CFG\) Parameters."](#)

This chapter describes how to configure and perform scheduled backups with the NetWorker Module for DB2 (NMDB2) software. It also outlines the procedures for testing, canceling, and monitoring scheduled NMDB2 backups.

This chapter includes the following sections:

- ◆ About scheduled backups..... 34
- ◆ Roadmap for configuring a scheduled backup..... 34
- ◆ Performing a scheduled backup 41
- ◆ Testing the scheduled backup configuration 42
- ◆ Canceling a scheduled backup..... 43
- ◆ Monitoring a scheduled backup 43
- ◆ Diagnostic and error messages..... 44

About scheduled backups

The most reliable way to protect DB2 data is to configure the NetWorker server to run scheduled NMDB2 backups of the data on a regular basis.

A scheduled NMDB2 backup is initiated automatically by the NetWorker server according to the schedule specified by the NetWorker Group and Schedule resources.

To enable a scheduled backup, the proper NetWorker Client, Group, Schedule, and other resources must be configured on the NetWorker server. The DB2 server must be configured as a NetWorker client, with the Client resource containing details on what data to back up and how. The required backup parameters must also be set in the NMDB2 configuration file (DB2_CFG file).

Both manual (nonscheduled) and scheduled NMDB2 backups must be configured according to the instructions in [Chapter 2, “Software Configuration Procedures.”](#)

Roadmap for configuring a scheduled backup

To configure a scheduled backup, perform the following:

- ◆ [“Task 1: Set the DB2 user password” on page 34](#)
- ◆ [“Task 2: Create NetWorker resources for the scheduled backup” on page 34](#)

Task 1: Set the DB2 user password

To set the DB2 user password:

1. On the computer running the DB2 server software, log in as a root user on Solaris, or as a member of the Administrators group on Windows.
2. Type the following command to encrypt the DB2 user password
For example, in C shell:

```
nsrdb2sv -f DB2_CFG -P password
```

where:

- *DB2_CFG* is the NMDB2 configuration file
- *password* is the DB2 password for the DB2 instance

This updates the DB2_PSWD parameter with an encrypted value for the DB2 user password. This encrypted password is added to the NMDB2 configuration file (DB2_CFG), that was created in [“Sub-task 1: Ensure that the schedule backup variables are set” on page 35.](#)

Task 2: Create NetWorker resources for the scheduled backup

You can use either of the following methods to create NetWorker resources for the scheduled backup:

- ◆ To create the basic NetWorker Client and Group resources and the NMDB2 configuration file for the scheduled NMDB2 backup, you can use the NetWorker Client Configuration Wizard. For information about the NetWorker Client Configuration Wizard, see [“Using the NetWorker Client Configuration wizard” on page 35.](#)

- ◆ To configure all the required NetWorker resources for the scheduled NMDB2 backup, you can use the NetWorker Management Console program or the NetWorker Administrator program. For details, see [“Manually update the NetWorker resources” on page 35](#).

Using the NetWorker Client Configuration wizard

Note: The Client Configuration Wizard supports NMDB2 release 2.1 only. You can not use a release of NMDB2 earlier than release 2.1 to run the wizard.

To launch the wizard:

1. On the computer running the DB2 server software, log in as a root user on Solaris, or as a member of the Administrators group on Windows.
2. Follow the wizard pages to create an NMDB2 client for the scheduled backup.

Once the wizard creates a NetWorker resource, the resource can be edited with the NetWorker Management Console or the NetWorker Administrator program.

For information on how to install the NetWorker Client Configuration Wizard, refer to the *NetWorker Module for DB2, Release 2.1, Multiplatform Release, Installation Guide*.

For information on how to run the NetWorker Client Configuration Wizard, refer to the following:

- ◆ *NetWorker, Release 7.2.x, Release Supplement*
- ◆ *NetWorker 7.3, Multiplatform Version, Administration Guide*
- ◆ Descriptive inline text and What’s This Help in the wizard

Manually update the NetWorker resources

When creating a NetWorker Client resource for a schedule backup, perform the following:

- ◆ [“Sub-task 1: Ensure that the schedule backup variables are set” on page 35](#)
- ◆ [“Sub-task 2: Set the NetWorker resources” on page 36](#)

For more information on how to configure a Schedule and Group resource by using the:

- ◆ NetWorker Management Console, refer to the *NetWorker Release 7.3, Multiplatform Release, Administration Guide* appropriate for your platform
- ◆ NetWorker Administrator program, refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

To track the status of scheduled backups, see [“Monitoring a scheduled backup” on page 43](#).

Sub-task 1: Ensure that the schedule backup variables are set

Before scheduling a backup, edit the NMDB2 configuration file (DB2_CFG):

1. Add the following parameters to the NMDB2 configuration file:
 - DB2_NODE_NAME
 - DB2_ALIAS
 - DB2_USR
 - INSTHOME (on UNIX only)
 - DB2PATH (on Windows only)
 - DB2_VENDOR_LIB_PATH

2. Optional, add the following environment variable to back up one or more tablespace names. For example:

```
DB2_OPTIONS=DB2BACKUP_TABLESPACE
```

Note: Ensure that the tablespaces are separated by a comma in the DB2_TABLESPACES environment variable.

For detailed information about:

- ◆ The NMDB2 configuration file parameters, see [Appendix A, “NMDB2 Configuration File \(DB2_CFG\) Parameters.”](#)
- ◆ How to configure and use the NMDB2 configuration file, see [“Task 1: Configure the NMDB2 configuration file” on page 17.](#)

Sub-task 2: Set the NetWorker resources

When creating a NetWorker Client resource for a scheduled backup, you must update the following resources:

- ◆ [“NetWorker Schedule resource” on page 36](#)
- ◆ [“NetWorker Group resource” on page 36](#)
- ◆ [“NetWorker Client resource” on page 37](#)

NetWorker Schedule resource

Note: The NetWorker Schedule resource is required for scheduled NMDB2 backups *only*.

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

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

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

Customize a Schedule resource for an NMDB2 backup by using the NetWorker Management Console or the NetWorker Administrator program. Select one of the following backup levels for each day of the week:

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

The NMDB2 software does *not* support any other backup levels, such as level 1.

For a scheduled backup only, type the name of the NetWorker schedule in the Schedule attribute of the Client resource, as described in [“NetWorker Client resource” on page 37.](#)

NetWorker Group resource

Note: The NetWorker Group resource is required for scheduled NMDB2 backups *only*.

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

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

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

To use the Default group for testing scheduled NMDB2 backups, change its Autostart attribute to Enabled.

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

For a scheduled backup only, type the name of the NetWorker group in the Group attribute of the Client resource, as described in “[NetWorker Client resource](#)” on [page 37](#).

NetWorker Client resource

Before performing a manual or scheduled backup, you must configure a NetWorker Client resource on the host NetWorker server for each DB2 client to be backed up.

Note: Each database instance requires a separate Client resource. In a cluster environment, a separate Client resource must be created for each virtual and physical hostname.

For scheduled backups *only*, specify the following attributes in the Client resource as shown in [Table 6](#).

Table 6 NetWorker Client resource attributes for a scheduled backup (page 1 of 3)

Attribute	Description
Aliases	Specify all known aliases for the system where the DB2 software is installed.
Application Information	<p>Specifies the name of one or more database instances that require restore permission on the same or different host.</p> <ul style="list-style-type: none"> • Separate database instances with a colon, and insert a colon after the last instance. For example: DB2_R=database_name:db2inst1:db2inst2: This allows the instances db2inst1 and db2inst2 to restore the database database_name. Instances are always separated by a colon after the database name. • Add additional lines in the Application Information attribute for other databases that you want to add to a Client resource. For example: DB2_R=database_name:db2inst1:db2inst2: DB2_R=second_database:db2inst3:db2inst4: <p>Note: When you type database instances, ensure that you always insert a colon after the last instance.</p>
Backup Command	<p>Specifies the name of the command to be used for a scheduled DB2 backup. For example: nsrdb2sv -f DB2_CFG where <i>DB2_CFG</i> includes the filename and the full path of the NMDB2 configuration file.</p>

Table 6 NetWorker Client resource attributes for a scheduled backup (page 2 of 3)

Attribute	Description
Browse Policy	<p><i>For scheduled backup only.</i> Specifies the length of time that the NetWorker server retains an entry for a DB2 backup in the online client file index.</p> <p>Note: If you do not select a value for the Browse policy attribute, the NetWorker server uses the default value of one month. The value for the Browse policy attribute cannot exceed the value for the Retention policy attribute.</p>
Group	<p><i>For scheduled backup only.</i> Specifies the NetWorker backup group to be used for a scheduled DB2 backup.</p> <p>Note: Ensure that the Autostart attribute has been enabled for the selected Group resource. A scheduled backup will not occur if you do not enable the Autostart attribute in the backup group.</p> <p>For more information, refer to “NetWorker Group resource” on page 36.</p>
Name	Specifies the hostname of the DB2 server host.
Parallelism	Specifies the maximum number of concurrent backup or restore tasks to use for a backup or restore operation. For a backup, this attribute can be used instead of the NSR_PARALLELISM parameter.
Password	For backups, used only if the Remote User is specified. Type the password of the user specified by the Remote User attribute.
Remote Access	<p>Specifies the fully qualified IP name of a remote system, to enable restores of the DB2 Server backups to that remote system.</p> <p>To restore backups from:</p> <ul style="list-style-type: none"> • One database computer to another, add the fully qualified hostname of that computer from which the data will be restored. • A cluster environment, add the physical and virtual hostnames of the client.
Remote User	<i>Optional for backups on Windows.</i> Specifies the user that is allowed to run remote commands on the client or access specific application data on the client.
Retention Policy	<p><i>For scheduled backup only.</i> Specifies the minimum length of time that the NetWorker server maintains information about DB2 backup data in the online media database. This attribute applies only to scheduled DB2 backups.</p> <p>Note: If you do not select a value for the Retention policy attribute, the NetWorker server uses the default value of one year. The Retention policy attribute must be greater than or equal to the value Browse policy attribute.</p>

Table 6 NetWorker Client resource attributes for a scheduled backup (page 3 of 3)

Attribute	Description
Save Set	<p>Specifies the database and node to be backed up. For example: DB2:/database_name/node_name</p> <ul style="list-style-type: none"> The save set name in the media database is created in the XBSA library with arguments passed from the DB2 Universal Database manager in the following way: DB2:/database_name/node_name. For a single node partition, if you type DB2:/SAMPLE/NODE0000 in the Client resource Save Set list, the save set names created in the media database will be: DB2 : / SAMPLE / NODE0000 For a multiple node partition, if you type DB2:/SAMPLE/NODE0000 and DB2:/SAMPLE/NODE0001 in the Client resource Save set list, the save set name created in the media database will be: DB2 : / SAMPLE / NODE0000 DB2 : / SAMPLE / NODE0001 If multiple save set names are specified in the Save Set attribute of the Client resource and the NMDB2 configuration file (DB2_CFG) has a well-defined PRECMD and/or POSTCMD variable, the preprocessing and postprocessing command files are: <ul style="list-style-type: none"> - Common for all the backups - Executed once for each backup
Schedule	<p><i>For scheduled backup only.</i> Specifies the NetWorker backup schedule to be used for a scheduled DB2 backup.</p> <hr/> <p>Note: You can use one of several preconfigured schedules or you can create a custom schedule.</p> <hr/> <p>For more information, refer to "NetWorker Schedule resource" on page 36.</p>

Cluster considerations

To configure a client for the virtual hostname:

- Set only the following attributes in the Client resource:

- Save Set
- Application Information
- Remote Access

To back up nodes in a cluster environment, you must add the physical and virtual hostnames.

- Backup Command

- Add this client to the Group attribute that is scheduled to back up.

The following is an example of a cluster client configuration.

Example 2 DB2 cluster client configuration for the virtual hostname

```
Save set DB2:/SAMPLE/NODE0001
Remote access: db2inst@virtualhostname.com
Backup command: nsrdb2sv -f DB2_CFG
Group: db2group
```

ESE considerations

You can enhance the performance of a scheduled backup by backing up all hosts in parallel. To do this, you must configure one or more hosts as members of the same NetWorker group.

If Extensible Storage Engine (ESE) is configured as a single computer, run the schedule backup in online mode.

If you run the schedule backup in offline mode, set the server or device parallelism to 1. Running ESE backups in offline mode, the second host performing the schedule backup will display the following error message:

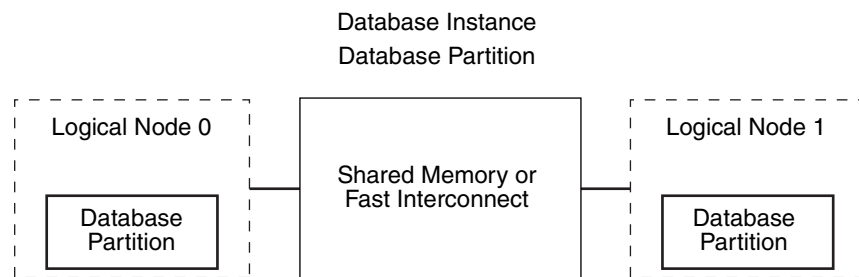
The database is still in use

Shared memory partitions

Figure 9, “DB2 ESE with DPF,” illustrates a configuration where all nodes reside on a single computer with one copy of the operating system running.

Only one copy of the NMDB2 configuration file (DB2_CFG) and one Client resource for a scheduled back up is required.

Figure 9 DB2 ESE with DPF



Single database partitions

The following figures illustrate single database partitions with:

- ◆ “Two computers with two single nodes” on page 40
- ◆ “Two computers with multiple nodes” on page 41

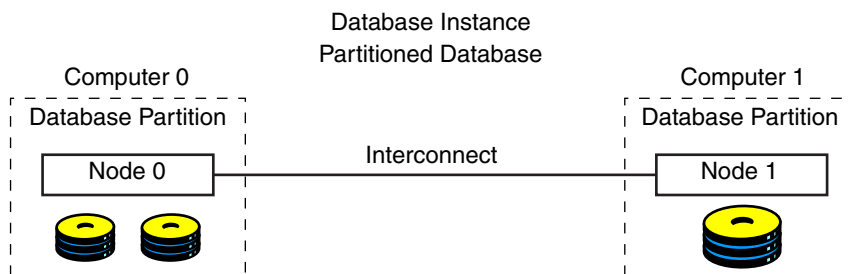
Two computers with two single nodes

Figure 10 on page 41 illustrates a configuration that has two separate computers with a single node on each.

This configuration requires that you create a separate NMDB2 configuration file and Client resource for each physical computer.

Note: All ESE clients should be members of the same backup group.

Figure 10 DB2 ESE SDP configuration



Two computers with multiple nodes

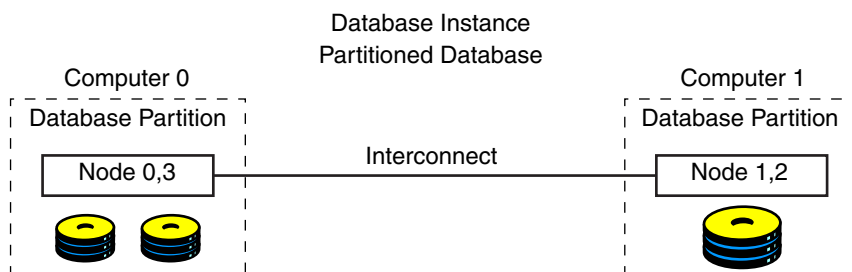
Figure 11, “DB2 ESE SDP configuration with multiple nodes,” illustrates two separate computers with multiple nodes.

This configuration requires that each physical computer has its own Client resource.

For example, in the Client resource, specify the following:

- ◆ For the backup command attribute: `nsrdb2sv -f DB2_CFG`
- ◆ For the save set name: `DB2:/database_name/node_name`

Figure 11 DB2 ESE SDP configuration with multiple nodes



Performing a scheduled backup

Before performing scheduled backups with the NMDB2 software, ensure that manual backups with the NMDB2 software can be performed successfully. For information on manual backups, refer to “Manual Backup Procedures” on page 27.

When creating backup schedules for DB2 data backups, keep in mind that the NMDB2 software supports full and skip backups, defined as the following:

- ◆ Full backup — Backs up all specified files, regardless of whether or not they have changed since the last backup.
- ◆ Level *skip* backup — Specifies that the NetWorker software does *not* run a backup.
 - The NMDB2 software does *not* support NetWorker level 1 to 9 backups. If you set the backup level in the Schedule resource to a value of 1 to 9, the NMDB2 backup *fails*.
 - If you set the backup level in the Schedule resource to *skip*, the NetWorker server does *not* start an NMDB2 backup on that day.

After performing a successful backup, perform a test recovery. For recovery instructions, refer to [Chapter 6, “Restoring and Recovering Data Procedures.”](#)

For information on creating backup schedules, refer to one of the following guides depending upon the NetWorker server release you are using:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

Testing the scheduled backup configuration

The following sections describe how to test scheduled NMDB2 backups after the required configurations are complete. Follow the appropriate instructions, depending on the release of NetWorker server software:

- ◆ [“How to test a scheduled backup with NetWorker server 7.2.x and earlier” on page 42](#)
- ◆ [“How to test a scheduled backup with NetWorker server 7.3 and later” on page 43](#)

Before you run the test, ensure that:

- ◆ The required environment variables are set in the NMDB2 configuration file.
- ◆ The NetWorker Client resource has been created.
- ◆ The pre- and postprocessing scripts are in place (optional).

You can override the scheduled backup start time and start the group manually. This is equivalent to selecting **Start Now** in the Autostart attribute of the Group resource. When a group backup is started manually, the NetWorker server runs the backup at the level of the next scheduled backup, such as full.

How to test a scheduled backup with NetWorker server 7.2.x and earlier

With NetWorker server 7.2.x and earlier, test a scheduled backup using the NetWorker Administrator program:

1. Start the NetWorker Administrator program as the root user on UNIX or Linux, or as a member of the Administrators group on Windows.
2. In the **Group Control** window on UNIX or Linux, or the **Groups** window on Windows, highlight the correct group name for the scheduled NMDB2 backup.
3. To start the scheduled backup, perform one of the following:
 - On UNIX or Linux, click **Start** in the Group Control window.
 - On Windows, click **Start Group** on the NetWorker Administrator program toolbar.

The NetWorker software immediately backs up the clients in the backup group. For details on using the NetWorker Administration program, refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

How to test a scheduled backup with NetWorker server 7.3 and later

With NetWorker server 7.3 and later, test a scheduled backup using the NetWorker Management Console:

1. In the NetWorker Management Console program, click **Enterprise** on the **Console** window taskbar.
2. In the left pane, click the appropriate NetWorker server.
3. In the right pane, click the NetWorker application.
4. From the **Enterprise** menu, select **Launch Application**.
5. Click **Monitoring** on the **Administration** window taskbar.
6. Select the **Groups** tab.
7. Right-click the group to start, and select **Start**.
8. In the **Question** dialog box that appears, click **Yes** as confirmation to start the group backup.

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

For details on the NetWorker Management Console, refer to the *NetWorker 7.3, Multiplatform Version, Administration Guide*.

Canceling a scheduled backup

To cancel a scheduled backup in progress, select **Stop** for the backup group in the NetWorker Management Console or the NetWorker Administrator program.

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

For details, refer to the instructions on how to stop a group in the following guide, depending on the release of NetWorker server software you are running:

- ◆ *NetWorker Release 7.2, Administration Guide* appropriate for your platform
- ◆ *NetWorker Release 7.3, Multiplatform Release, Administration Guide*

Monitoring a scheduled backup

The following section describes how to monitor scheduled NMDB2 backups. Follow the appropriate instructions, depending on the release of NetWorker server software:

- ◆ [“How to monitor a scheduled backup with NetWorker server 7.2.x and earlier” on page 43](#)
- ◆ [“How to monitor a scheduled backup with NetWorker server 7.3 and later” on page 44](#)

How to monitor a scheduled backup with NetWorker server 7.2.x and earlier

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

If the backup takes a long time and no new messages appear in the status window, it could mean that the database being backed up is very large, or that there is no backup

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

For more information about the NetWorker Administrator program, refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

How to monitor a scheduled backup with NetWorker server 7.3 and later

With NetWorker server 7.3 and later, test a scheduled backup using the NetWorker Management Console.

The NetWorker Management Console provides the ability to view details of current NetWorker server activities, operations related to devices and libraries, and managed events that require user intervention. It makes administration of NetWorker servers more efficient by providing a centralized means of monitoring all activity throughout an entire enterprise.

For more information about the NetWorker Management Console, refer to the *NetWorker 7.3, Multiplatform Version, Administration Guide*.

Diagnostic and error messages

If a scheduled backup fails, you will receive error messages and debugging information. Follow the appropriate instructions, depending on the release of NetWorker server software:

- ◆ [“How to view diagnostic messages with NetWorker 7.2.x and earlier” on page 44](#)
- ◆ [“How to view diagnostic messages with NetWorker 7.3 and later” on page 44](#)
- ◆ [“How to configure debug levels and error logging” on page 45](#)

By default, diagnostic and error messages specific to the NMDB2 software are posted in the following logs:

- ◆ nsrdb2.log
- ◆ nsrdb2xbsa.log

The logs are recorded by default in the following location:

- ◆ On UNIX: /nsr/applogs
- ◆ On Windows: <drive>:\NetWorker_Install_Directory\nsr\applogs

How to view diagnostic messages with NetWorker 7.2.x and earlier

If a scheduled backup fails, you will receive error messages and debugging information.

To obtain more details, do one of the following:

1. **Select Server > Group Control > Details.**
2. View the savegrp.log file in the NetWorker logs directory located at /nsr/logs/savegrp.log.

How to view diagnostic messages with NetWorker 7.3 and later

With NetWorker server 7.3 and later, you can view group backup details and log files using the NetWorker Management Console.

Viewing group backup details

To view detailed information about a group backup:

1. In the NetWorker Management Console program, click **Enterprise** on the **Console** window taskbar.
2. In the left pane, click the appropriate NetWorker server.
3. In the right pane, click the NetWorker application.
4. From the **Enterprise** menu, select **Launch Application**.
5. Click **Monitoring** on the **Administration** window taskbar.
6. Select the **Groups** tab.
7. Right-click the group you want to view, then select **Show Details**.

The **Group Backup Details** dialog box appears.

8. View detailed information related to the group backups. If any messages were generated, the **Show Messages** button is enabled. Click this button to view the messages.
9. Click **OK** to close the **Group Backup Details** dialog box.

Viewing log files

To view the most recent general notification logs:

1. In the NetWorker Management Console program, click **Enterprise** on the **Console** window taskbar.
2. In the left pane, click the appropriate NetWorker server.
3. In the right pane, click the NetWorker application.
4. From the **Enterprise** menu, select **Launch Application**.
5. Click **Monitoring** on the **Administration** window taskbar.
6. Click the **Log** tab. The priority, time, source, category, and message for each log appears.
7. If a particular log file is no longer available, check the log file on the NetWorker server.

How to configure debug levels and error logging

You can specify that NMDB2 error and diagnostic messages are written to different files and you can also control the level of detail reported.

To configure diagnostic messages, set the following environment variables in the NMDB2 configuration file (DB2_CFG):

- ◆ **NSR_LIBNSRDB2_DEBUG_FILE** — to a valid file pathname.
- ◆ **NSR_LIBNSRDB2_DEBUG_LEVEL** — to an integer in the range of 0 to 9, where 9 is the highest level of detail and 0 is the lowest.
- ◆ **NSR_DEBUG_FILE** — to the full pathname and filename to which messages should be written.
- ◆ **NSR_DEBUG_LEVEL** — to an integer in the range of 0 to 9, where 9 is the highest level of detail and 0 is the lowest.

- ◆ NSR_DB2SV_DEBUG_FILE — to the full pathname and filename to which messages should be written. Only used for scheduled backups.
- ◆ NSR_DB2SV_DEBUG_LEVEL — to an integer in the range of 0 to 9, where 9 is the highest level of detail and 0 is the lowest. Only used for scheduled backups.

For more information about environment variables, see [Appendix A, “NMDB2 Configuration File \(DB2_CFG\) Parameters”](#).

This chapter describes how to back up and configure transaction log files.

This chapter includes the following sections:

- ◆ [Configuring transaction log backups.....](#) 48
- ◆ [Restoring transaction logs.....](#) 49

Configuring transaction log backups

Log files are not backed up by default. To configure transaction log backups:

- ◆ [“Task 1: Create the NMDB2 configuration file to set log archiving” on page 48](#)
- ◆ [“Task 2: Enable the logarchmeth1 and logarchopt1 parameters” on page 48](#)

Task 1: Create the NMDB2 configuration file to set log archiving

Create the NMDB2 configuration file to save DB2 log files to the NetWorker server.

1. Create a file to contain any environment variables that pertain to log archival and retrieval. For example:

```
DB2_CFG_LOGOPT
```

Note: Use only environment variables that are listed in [Appendix A, “NMDB2 Configuration File \(DB2_CFG\) Parameters,”](#). Using any other NetWorker environment variables may result in unpredictable behavior.

2. Ensure that the file has the following structure, with the environment variable name followed by an equal sign (=) and then the variable setting value. For example:

```
Environment_Variable=Setting
```

Note: Ensure that you follow the correct syntax in the NMDB2 configuration file, or it will *not* run correctly.

3. Add the NSR_SERVER environment variable. This variable must be set to the name of the NetWorker server used to back up the database client.

In a cluster environment, the NetWorker server must *not* be part of the cluster.

4. Add the NSR_CLIENT environment variable if you are configuring the file for a cluster environment. Typically the NSR_CLIENT environment variable is set to the cluster virtual hostname.

The following is an example of a NMDB2 configuration file:

```
NSR_LOG_VOLUME_POOL=Default
NSR_SERVER=TURBO
```

Task 2: Enable the logarchmeth1 and logarchopt1 parameters

To automatically back up logs as they become full, configure the database for roll-forward recovery by enabling the logarchmeth1 configuration parameter and setting the required options using the logarchopt1 parameter.

For example:

```
$ db2 update db cfg for database_name using logarchmeth1
VENDOR:/usr/lib/libnsrdb2.xx logarchopt1 @DB2_CFG
```

where:

- ◆ *database_name* is the database name.
- ◆ *xx* is the suffix information for the libnsrdb2 command. For more information, see [Table 7, “Path and suffix information for libnsrdb2 libraries,”](#).

- ◆ *DB2_CFG* is the full name and path of the NMDB2 configuration file.

Table 7 Path and suffix information for libnsrdb2 libraries

Operating System	Path with Suffix
AIX	/usr/lib/libnsrdb2.o
HP-UX (32-bit, 64-bit)	/usr/lib/libnsrdb2.sl
HP-UX IA64	/usr/lib/libnsrdb2.so
Linux	/usr/lib/libnsrdb2.so
Solaris	/usr/lib/libnsrdb2.so
Windows NT and Windows 2000	<drive>:\NetWorker_Installation_Directory\nsr \bin\libnsrdb2.dll

Task 3: Run a full backup of the DB2 database

To run a full backup of the database, type the following command:

```
$ db2 backup db database_name load /usr/lib/libnsrdb2.xx options
@DB2_CFG
```

where:

- ◆ *database_name* is the database name.
- ◆ *xx* is the suffix information for the **libnsrdb2** command. For more information, see [Table 7 on page 49](#).
- ◆ *DB2_CFG* is the full name and path of the NMDB2 configuration file.

Restoring transaction logs

To restore the transaction logs:

1. Restore the database:

```
$ db2 restore db database_name load /usr/lib/libnsrdb2.xx options
@DB2_CFG
```

where:

- *database_name* is the name of the DB2 database.
 - *xx* is the suffix information for the **libnsrdb2** command. For more information, see [Table 7 on page 49](#).
 - *DB2_CFG* is the full name and path of the NMDB2 configuration file.
2. Roll forward changes in a database or tablespace using the **db2 rollforward** command. The following command restores all the logs that were created after the database backup and reapplies the transactions:

```
$ db2 rollforward db database_name to end of logs and complete
where database_name is the name of the DB2 database.
```

When you issue the **db2 rollforward** command, the database manager calls the library specified by the `logarchmeth1` parameter. This library restores the required logs, and the transactions recorded in the logs will be reapplied to the restored

database. For more information about the **db2 rollforward** command, refer to the DB2 Universal Database *Administration Guide: Design and Implementation*.

This chapter provides details about setting up and running DB2 data restore operations. It also describes the basic procedures for restoring the database to a consistent state. The NetWorker Module for DB2 (NMDB2) software enables you to run restores using the command line interface (CLI).

This chapter includes the following sections:

- ◆ [About restoring data](#) 52
- ◆ [Configuring a restore operation](#) 52
- ◆ [Performing a restore operation](#) 53

About restoring data

You can only restore database data that has been backed up according to the instructions in:

- ◆ “Roadmap for configuring a manual backup” on page 28
- ◆ “Roadmap for configuring a scheduled backup” on page 34

During a backup, the NetWorker server adds an entry for each backup save set in the online client file index and records the location of the data in the media database. These entries provide information required to restore DB2 backed-up data.

The NetWorker server maintains entries as follows:

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

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

The NMDB2 software uses the client file index entries to restore DB2 backup save sets. Set the browse policy to a period long enough to retain the client index entries for restoring the backup save sets.

After a browse policy expires, the NetWorker **scanner** program can be used to rebuild the online indexes. An NMDB2 backup comprises save sets that contain the backed-up file data. If the backup index is lost, information about the save sets must be re-created in the index with the **scanner** program; otherwise, backups *cannot* be restored.

Note: Database data must be restored using the database CLI. You can *not* use the NetWorker client and server command line, the NetWorker Management Console, or the NetWorker Administrator program to perform a restore operation.

For more information on how the NetWorker server uses browse and retention policies to manage backup data and track the location and status of the data on backup volumes, refer to one of the following guides depending on the release of NetWorker server software you have installed:

- ◆ NetWorker release 7.3, use the NetWorker Management Console and refer to the *EMC NetWorker, Release 7.3, Multiplatform Release, Administration Guide*.
- ◆ NetWorker release 7.2, use the NetWorker Administrator program and refer to the *NetWorker Release 7.2, Administration Guide* appropriate for your platform.

Configuring a restore operation

The NMDB2 software restores database data based on NMDB2 configuration file (DB2_CFG) parameters.

To configure a restore operation:

1. Ensure that the following variable has been set in the NMDB2 configuration file (DB2_CFG):

```
NSR_SERVER
```

This environment variable must be set to the name of the NetWorker server that contains the backup that is to be restored.

2. Determine which NetWorker volume pool the backup needs to be retrieved from. If it is a pool other than the default pool, then set the following variable in the NMDB2 configuration file (DB2_CFG):

```
NSR_DATA_VOLUME_POOL
```

3. Set the Remote Access attribute in the Client resource to the host on which you are restoring data, if required.



CAUTION

To restore a backup of a DB2 Universal Database computer to a different computer, add the fully qualified domain name of that computer to the Remote Access attribute in the Client resource.

4. Use the **taken at date-time** option to specify which backup that you want to restore if you have full database backups and tablespace backups on the NetWorker server.
 - If you do *not* use the **taken at date-time** option, the database manager cannot distinguish between backups, and the **db2 restore** command will generate error messages.
 - If you did *not* save the timestamp at the time of the backup:
 - a. Use the **db2** command to query all backups:


```
$ db2 list history backup all for SAMPLE
```

 Where *SAMPLE* is the name of the database.
 - b. Determine which database backup you want to restore.

Performing a restore operation

The following section describes how to restore DB2 Universal Database data:

- ◆ [“About the db2 restore command” on page 54](#)
- ◆ [“The libnsrdb2 libraries” on page 54](#)
- ◆ [“Restoring a database or tablespace to a particular point-in-time” on page 54](#)
- ◆ [“Performing a redirected restore” on page 55](#)
- ◆ [“Restoring data backed up with a previous release of NMDB2” on page 56](#)
- ◆ [“Restoring and recovering a database” on page 56](#)

The libnsrdb2 libraries

Table 8 lists the path and the suffix information for the libnsrdb2 libraries.

Table 8 Path and suffix for the libnsrdb2 libraries

Operating System	Path with Suffix
AIX	/usr/lib/libnsrdb2.o
HP-UX (32-bit, 64-bit)	/usr/lib/libnsrdb2.sl
HP-UX IA64	/usr/lib/libnsrdb2.so
Linux	/usr/lib/libnsrdb2.so
Solaris	/usr/lib/libnsrdb2.so
Windows NT and Windows 2000	<drive>:\NetWorker_Installation_Directory\nsr\ bin\libnsrdb2.dll

About the db2 restore command

The **db2 restore** command restores the most recent database backup on the NetWorker server.

To perform a restore:

```
$ db2 restore db database_name load /usr/lib/libnsrdb2.xx options
@DB2_CFG
```

where:

- *database_name* is the name of the database.
- *xx* is the suffix information for the **libnsrdb2** command. For details, see [Table 8 on page 54](#).
- *DB2_CFG* is the name of the NMDB2 configuration file.

For the details about the syntax of the **db2 restore** command, refer to the following guides:

- ◆ *DB2 Universal Database Command Reference*
- ◆ *DB2 Universal Database Administration Guide: Design and Implementation*

Restoring a database or tablespace to a particular point-in-time

You can restore a database or tablespace to a particular point-in-time:

- ◆ If the database is enabled for roll-forward restore by setting the `logarchmeth1` configuration parameter. For example:

```
logarchmeth1=VENDOR:/usr/lib/libnsrdb2.xx
```

Where *xx* is the suffix information for the **libnsrdb2** command. For details, see [Table 8, "Path and suffix for the libnsrdb2 libraries."](#)

- ◆ If you created log backups.

Performing a redirected restore

You can perform a redirected restore to either the same database instance or a different one.

How to restore a database to the same instance on another computer

To restore a database to the same instance on another computer, perform the following steps on the computer where you will be restoring the data:

1. Install and configure the NMDB2 software on the secondary computer where you will be restoring the data.
2. In the NMDB2 configuration file, set the following environment variables:
 - *NSR_SERVER* — Set to the name of the new NetWorker server.
 - *NSR_CLIENT* — Set to either the name of the NetWorker client that was backed up or to the value of *NSR_CLIENT* used during the backup.
3. Restore the database using the **db2 restore** command with the *NEWLOGPATH* parameter set so the **db2 rollforward** command can locate necessary logs.

The backup image log path can be obtained by typing the following command:

```
nsrinfo -vV -s networker_servername -n
db2 -X all networker_clientname | grep DB2 | grep LOG
```

4. Automatically roll forward the database by ensuring that the:
 - Instance name is the same as the backup image instance name.
 - Node number is the same as the backup image node number.
 - Database name or database alias is the same as the backup image database name.
 - The *NEWLOGPATH* parameter points to the path of backup image log files for the **db2 restore** command. The path is case sensitive.
 - The *NSR_CLIENT* variable is set to the same host that backed up the database.
5. To restore backups to a different computer, you must add the fully qualified domain name of that computer to the Remote Access attribute in the NetWorker Client resource configured for the host.

How to restore a database to a different instance on another computer

To restore the database to a different instance on another computer:

1. Follow the procedures to restore a database to the same instance on another computer. For detailed information, see [“How to restore a database to the same instance on another computer” on page 55](#).
2. Set the Application Information attribute in the Client resource:
 - a. Add the name of one or more database instances that require restore permission on the same or different host in the Application Information attribute. For example, to restore *db2inst1* and *db2inst2*, type the following command:

```
DB2_R=database_name:db2inst1:db2inst2:
```

Note: When you use the **DB2_R=** command, separate each instance with a colon (:), and insert a colon after the last instance.

- b. Add another line in the Application Information attribute for any other databases that you want to add to a Client resource. For example:


```
DB2_R=database_name:db2inst1:db2inst2:
DB2_R=database_name:db2inst3:db2inst4:
```
- c. Run the **db2 restore** command with the appropriate options to restore the database.

For more information, see [“Performing a restore operation” on page 53](#).

Restoring data backed up with a previous release of NMDB2

To restore data that was backed up with NMDB2 releases 1.5, and 1.6:

1. Edit the NMDB2 configuration file and add the following environment variable:

```
NSR_DB2_PREVIOUS_VERSION=yes
```

2. Perform the restore. For example:

```
$ db2 restore db database_name load /usr/lib/libnsrdb2.xx options
@DB2_CFG
```

where:

- *database_name* is the name of the database.
- *xx* is the suffix information for the `libnsrdb2` command. For more information, see [Table 8 on page 54](#).
- *DB2_CFG* is the name of the NMDB2 configuration file.

Restoring and recovering a database

To restore a database and recover the logs automatically, type the following command:

```
db2 recover db database_name to (isotime/end of logs)
```

The **db2 recover** command restores and rolls forward a database to a particular point-in-time or to the end of the logs. For example, as long as the database exists in a database history file, the **db2 recover** command can be used. If the database has been dropped (no history file), then the **restore** command and the **rollforward** command must be used instead.

This chapter describes how to configure multiple session backup and restore operations for DB2 databases.

This chapter includes the following sections:

- ◆ [About multiple session backup and restore operations](#) 58
- ◆ [Configuring a multiple session backup](#) 58
- ◆ [Configuring a multiple session restore](#) 58

About multiple session backup and restore operations

NMDB2 supports the use of multiple sessions for the backup and restore of DB2 databases. Multiple sessions are one or more streams of data that can be extracted, in parallel, from a database, and written in parallel to multiple media devices.

With the NMDB2, multiple sessions can enhance performance significantly when a large amount of data is backed up and restored using multiple tape drives.

Configuring a multiple session backup

Before performing a multiple session backup, do the following:

1. Depending on the release of NetWorker server that is installed, use the NetWorker Management Console or the NetWorker Administrator program:
 - For NetWorker Release 7.2, start the NetWorker Administrator program.
 - For NetWorker Release 7.3, start the NetWorker Management Console.



CAUTION

Before you start a multiple session backup, ensure that the number of sessions specified in the backup command equals the number of devices. Target sessions for each device must be set to a value of 1 for optimal restore performance.

2. Set the **Server Parallelism** attribute to at least one more than the number of sessions you will be using during a backup.

For example, if you are using three sessions, specify a value of 4 or greater for the parallelism.

3. Set the **Client Parallelism** attribute to the same or more than the number of sessions you will be using during a backup.

For example, if you are using three sessions, specify a value of 3 or greater for the parallelism.

4. Set the **Device Target Session** attribute to 1 per device.

Note: This improves performance by eliminating interleaving.

5. Specify a separate backup device for each session in the backup operation.

For optimal performance, consider using a different NetWorker server for backup operations *not* associated with the database server. You can dedicate a storage node exclusively for your multiple session backups.

Configuring a multiple session restore

To perform a multiple session restore:

1. Ensure that you have properly configured a multiple session backup. For detailed instructions, see [“Configuring a multiple session backup” on page 58](#).
2. Set the number of devices to the same value that was used during the backup. For optimal performance, specify a separate device for each session in the restore operation.

3. Set the target sessions for each device to a value of 1.

You can use the `nsrinfo` command to determine the number of sessions that were run during the backup:

```
# nsrinfo -s NetWorker_servername
-n db2 -X all NetWorker_clientname
|grep database_name
```

where:

- `NetWorker_servername` is the name of the NetWorker server.
- `NetWorker_clientname` is the name of the NetWorker client.
- `database_name` is the name of the database.

The nsrinfo command output

The following is sample output from the `nsrinfo` command:

```
# nsrinfo -s wideload -n db2 -X All wideload | grep -i DB_BACKUP | grep
SMS

version=1, DB2, objectname=/SMS/NODE0000 /DB_BACKUP.20051121133338.3,
createtime=Mon Nov 21 13:33:51 2005, copytype=BSACopyType_BACKUP,
copyId=1132598031.1132598032, restoreOrder=1132598031.1,
objectsize=0.0, resourcetype=database, BSAObjectType_FILE,
BSAObjectStatus_ACTIVE,
description=NMDB2_v21:FULL_BACKUP:SMS:NULL_OW, objectinfo=db2inst1:3

version=1, DB2, objectname=/SMS/NODE0000 /DB_BACKUP.20051121133338.2,
createtime=Mon Nov 21 13:33:50 2005, copytype=BSACopyType_BACKUP,
copyId=1132598030.1132598031, restoreOrder=1132598030.1,
objectsize=0.0, resourcetype=database, BSAObjectType_FILE,
BSAObjectStatus_ACTIVE,
description=NMDB2_v21:FULL_BACKUP:SMS:NULL_OW, objectinfo=db2inst1:3

version=1, DB2, objectname=/SMS/NODE0000 /DB_BACKUP.20051121133338.1,
createtime=Mon Nov 21 13:33:39 2005, copytype=BSACopyType_BACKUP,
copyId=1132598019.1132598020, restoreOrder=1132598019.1,
objectsize=0.0, resourcetype=database, BSAObjectType_FILE,
BSAObjectStatus_ACTIVE,
description=NMDB2_v21:FULL_BACKUP:SMS:NULL_OW, objectinfo=db2inst1:3
```

Note: The `objectinfo=db2inst1:3` output is the information that is required to proceed with the multiple session restore. The `db2inst1:` value is the instance that did the backup and 3 is the number of sessions that were used for the backup.

This appendix provides information on the parameters that can be set in the NMDB2 configuration file (DB2_CFG). It outlines the syntax rules for the configuration file contents, and the default and valid values that can be assigned to all of the supported parameters.

This appendix includes the following sections:

- ◆ [Syntax rules for the NMDB2 configuration file](#) 62
- ◆ [Backup Parameters](#) 63
- ◆ [Transaction log parameters](#)..... 69
- ◆ [Restore parameters](#)..... 71

Syntax rules for the NMDB2 configuration file

The contents of the NMDB2 configuration file (DB2_CFG) must conform to the following syntax rules:

- ◆ Each parameter setting must be in one of the following formats:

NAME = value

NAME = value1, value2, value3

where:

- *NAME* is the uppercase parameter name.
- *value, value1, value2, value3* are values assigned to the parameter.
- ◆ Multiple values for a parameter must be separated by commas.
- ◆ The values of a parameter can be specified over multiple lines if each line ends in a comma. For example:

```
NAME = value1,
        value2,
        value3
```

- ◆ If the line specifying a parameter does *not* end in a comma, the next line must contain a new parameter setting.
- ◆ White space is ignored.
- ◆ Text on a line after the # symbol (where # is *not* enclosed in quotes) is considered a comment, and is ignored. A comment may appear after a parameter setting on the same line.
- ◆ A space, comma, or # symbol *in* a parameter value must be surrounded by single quotes (' '), double quotes(" "), or backward quotes (` `).
- ◆ Parameter names and values are case-sensitive, unless specified otherwise in [Appendix A, "NMDB2 Configuration File \(DB2_CFG\) Parameters,"](#).

The following [Example 3, "Sample NMDB2 Configuration File,"](#) shows a sample NMDB2 configuration file (DB2_CFG).

Example 3 Sample NMDB2 Configuration File

```
#
DB2_ALIAS=SAMPLE
DB2_NODE_NAME=DB2
DB2_USR=CORP\db2admin
DB2_VENDOR_LIB_PATH=c:\progra~1\Legato\nsr\bin
\libnsrdb2.dll
DB2_OPTIONS=DB2BACKUP_OFFLINE
NSR_SERVER=Accounting
NSR_DATA_VOLUME_POOL=Default
NSR_LOG_VOLUME_POOL=Default
NSR_DEBUG_LEVEL=9
NSR_DEBUG_FILE=c:\progra~1\Legato\nsr\applogs\db2.log
NSR_LIBNSRDB2_DEBUG_LEVEL=9
NSR_LIBNSRDB2_DEBUG_FILE=c:\progra~1\Legato\nsr
\applogs\db2sql.log
DB2_PSWD=Jmfmb*7<8$sa
```

Backup Parameters

Table 9, “NMDB2 Backup Parameters,” on page 63 and Table 10, “DB2 Backup Parameters,” on page 66, lists NMDB2 and DB2 backup parameters, which are used by the NMDB2 software during a manual or scheduled backup. These parameters can be set in the NMDB2 configuration file (DB2_CFG).

Both tables provide the following information for each parameter:

- ◆ The definition of the parameter.
- ◆ The default value of the parameter.
- ◆ The valid values that can be assigned to the parameter.

NMDB2 Backup Parameters

Table 9 lists all the supported NMDB2 backup parameters, which are used by the NMDB2 software during a manual or scheduled backup. These parameters can be set in the NMDB2 configuration file (DB2_CFG).

Table 9 NMDB2 Backup Parameters (page 1 of 4)

NMDB2 backup parameter	Definition	Default and valid values
NSR_DB2_BACKUP_INFO	<i>Optional.</i> Specifies whether other recovery information should be saved along with a scheduled backup. Set for scheduled backups only.	<ul style="list-style-type: none"> • Possible values are (yes or no). The default value is no. • The following parameters must also be set: <ul style="list-style-type: none"> - DB2_ALIAS - DB2PATH (Windows) - INSTHOME (UNIX, Linux)
NSR_CLIENT	<i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the NetWorker Client resource to use for a manual NMDB2 backup.	<ul style="list-style-type: none"> • The hostname of the NetWorker client where the NMDB2 software is installed (default). • A valid hostname of a NetWorker client.
NSR_DATA_VOLUME_POOL	<i>Optional.</i> Do <i>not</i> set for a scheduled backup. Specifies the NetWorker volume pool to use for a manual backup.	<ul style="list-style-type: none"> • The predefined NetWorker volume pool named Default (default). • A valid name of a NetWorker volume pool.
NSR_DB2_CONFIG_FILE	<i>Optional.</i> Specifies a list of files to be backed up in addition to the database backup. These files will be backed up as part of the scheduled backup command separately from and before the POSTCMD command if defined.	<p>NSR_DB2_CONFIG_FILE = "{Full Path to Filename}" - where the file contains a list of files that the user wishes to backup. For example:</p> <pre>NSR_DB2_CONFIG_FILE= /spacel/nmdb2_savelist.txt</pre> <p>For example, the nmdb2_savelist.txt file can contain:</p> <ul style="list-style-type: none"> • /space12/vendor.cfg • /space12/db2inst1/sqlib/db2nodes.cfg
NSR_DB2LOG_QUERY_DBNAME	<i>Optional.</i> Used in disaster recovery to recover logs that were backed up using a different database name than the one to which the logs are currently being restored. For example, the specified database name is used to restore logs in the following command: db2 rollforward db DBNAME to end of logs and complete	NSR_DB2LOG_QUERY_DBNAME = "{DBNAME}" - where the DBNAME is a different database.

Table 9 NMDB2 Backup Parameters (page 2 of 4)

NMDB2 backup parameter	Definition	Default and valid values
NSR_DB2SV_DEBUG_FILE	<p><i>Optional.</i> Specifies the complete pathname of the log file that receives debug information during a scheduled backup.</p> <hr/> <p>Note: Set for scheduled backups only. The file itself does <i>not</i> have to exist, but the complete directory path must exist.</p> <hr/> <p>The parameter NSR_DB2SV_DEBUG_LEVEL specifies the level of the debug information.</p>	<ul style="list-style-type: none"> • Undefined (default). • A valid complete pathname of a debug log file.
NSR_DB2SV_DEBUG_LEVEL	<p><i>Optional.</i> Specifies the level of debug information that is written during a scheduled backup to the log file specified by the parameter NSR_DB2SV_DEBUG_FILE.</p> <hr/> <p>Note: Set for scheduled backups only.</p>	<ul style="list-style-type: none"> • 0 (default) = No debug information. • 1 = Information on fatal system errors. • 2 = Information on all network-related errors. • 3 = Information about the operation taking place. • 4 = Information about all starting and ending of sessions. • 5 = Information on all entries and exits from the NMDB2 software. • 6 = Information on all entries and exits from internal NMDB2 functions. • 7 = Information on all internal NMDB2 errors. • 8 = Information on all NMDB2 parameters. • 9 = All possible NMDB2 debugging messages.
NSR_DEBUG_FILE	<p><i>Optional.</i> Specifies the complete pathname of the log file that receives debug information during a backup.</p> <hr/> <p>Note: The file itself does <i>not</i> have to exist, but the complete directory path must exist.</p> <hr/> <p>The parameter NSR_DEBUG_LEVEL specifies the level of the debug information.</p>	<ul style="list-style-type: none"> • Undefined (default). • A valid complete pathname of a debug log file.
NSR_DEBUG_LEVEL	<p><i>Optional.</i> Specifies the level of debug information that is written during a backup to the log file specified by the parameter NSR_DEBUG_FILE.</p>	<ul style="list-style-type: none"> • 0 (default) = No debug information. • 1 = Information on fatal system errors. • 2 = Information on all network-related errors. • 3 = Information about the operation taking place. • 4 = Information about all starting and ending of sessions. • 5 = Information on all entries and exits from the NMDB2 software. • 6 = Information on all entries and exits from internal NMDB2 functions. • 7 = Information on all internal NMDB2 errors. • 8 = Information on all NMDB2 parameters. • 9 = All possible NMDB2 debugging messages.

Table 9 NMDB2 Backup Parameters (page 3 of 4)

NMDB2 backup parameter	Definition	Default and valid values
NSR_AES_ENCRYPTION	<i>Optional.</i> Specifies that the NetWorker server will encrypt the backup using the existing pass phrase on the server.	Possible values are (TRUE or FALSE). The default value is FALSE. Note: This parameter is supported only for NetWorker servers, release 7.3 and later.
NSR_GROUP	<i>Optional.</i> Do not set for a manual (nonscheduled) backup. Specifies the NetWorker backup group to use for a scheduled DB2 backup. Note: A NetWorker Group resource must be configured for the specified backup group.	<ul style="list-style-type: none"> The NetWorker backup group specified; otherwise, the predefined backup group named Default (default). A valid name of a NetWorker backup group. Any valid NetWorker group name of 1,024 characters or less. Invalid group names may cause authentication or system errors in another routine.
NSR_HARD_SESSION_LIMIT	<i>Optional.</i> Specifies the number of multiplexed/concurrent saves across different NSR devices.	The default value is 1. NSR_HARD_SESSION_LIMIT= 1 Note: Each time the value is increased from 1, the chance of backup and subsequent restore operation failure increases.
NSR_LIBNSRDB2_DEBUG_FILE	<i>Optional.</i> Specifies a file that contains additional debug backup and restore information.	<ul style="list-style-type: none"> Undefined (default). A valid complete pathname.
NSR_LIBNSRDB2_DEBUG_LEVEL	<i>Optional.</i> Specifies the amount of NMDB2 debug logging.	<ul style="list-style-type: none"> 0 (default) = No debug information. 1 = Information on fatal system errors. 2 = Information on all network-related errors. 3 = Information about the operation taking place. 4 = Information about all starting and ending of sessions. 5 = Information on all entries and exits from the NMDB2 software. 6 = Information on all entries and exits from internal NMDB2 functions. 7 = Information on all internal NMDB2 errors. 8 = Information on all NMDB2 parameters. 9 = All possible NMDB2 debugging messages.
NSR_LOG_VOLUME_POOL	<i>Optional.</i> Specifies the NetWorker volume pool to use for a log file backup.	<ul style="list-style-type: none"> The predefined NetWorker volume pool named Default (default). A valid name of a NetWorker volume pool.
NSR_NO_BUSY_ERRORS	<i>Optional.</i> Specifies whether the NMDB2 software waits for a busy NetWorker server or fails immediately upon receiving a busy notification. This parameter corresponds to the NSR_NO_BUSY_ERRORS environment variable.	<ul style="list-style-type: none"> FALSE (default) = NMDB2 software waits for the selected NetWorker server to become available. TRUE = NMDB2 software fails immediately when the NetWorker server is busy and not ready for a request.

Table 9 NMDB2 Backup Parameters (page 4 of 4)

NMDB2 backup parameter	Definition	Default and valid values
NSR_SAVESET_BROWSE	<i>Optional.</i> Do not set for a manual (nonscheduled) backup. Specifies the browse policy of a backup, as the date when the entry for the backup is to be removed from the NetWorker client index.	The browse policy specified in the NetWorker Client resource of the NMDB2 client (default).
NSR_SAVESET_RETENTION	<i>Optional.</i> Do not set for a manual (nonscheduled) backup. Specifies the retention policy of a backup, as the date when the save set becomes recyclable.	<ul style="list-style-type: none"> The retention policy specified in the NetWorker Client resource of the NMDB2 client (default). A valid date in <code>nsr_getdate(3)</code> format.
NSR_SERVER	<i>Mandatory.</i> Set for manual backups. Specifies the hostname of the NetWorker server to use for a manual backup. <i>Optional.</i> Set for scheduled backups.	<ul style="list-style-type: none"> Hostame of the local host (default). A valid hostname of a NetWorker server.

DB2 Backup Parameters

Table 10 lists DB2 backup parameters, which are used by the NMDB2 software during a manual or scheduled backup. These parameters can be set in the NMDB2 configuration file (DB2_CFG).

Table 10 DB2 Backup Parameters (page 1 of 4)

DB2 backup parameter	Definition	Default and valid values
DB2_ACTION	<i>Optional.</i> Specifies the action to be taken by the DB2 software. Set for scheduled backups only.	The most common action that should be used for configuring scheduled backup is DB2BACKUP_BACKUP. One or more of the following values, where multiple values must be separated by commas: <ul style="list-style-type: none"> DB2BACKUP_BACKUP - default DB2BACKUP_PARM_CHK_ONLY — Validates the backup parameters, <i>without</i> performing an actual backup. Validates only DB2 parameters that will be passed to DB2, without performing a backup.
DB2_ALIAS	<i>Optional.</i> Specifies the database alias of the database to be backed up. This alias is typically the same as the database name. Set for scheduled backups only.	<ul style="list-style-type: none"> This variable does not have to be specified since it is derived from the save set name. The variable DB2_ALIAS and partition number are derived from the DB2 save set. The DB2 save set will retain its current form of DB2:/DB_NAME/NODEXXXX. Where XXXX is the partition number. If used, this variable must be set to the DB2 Alias Name.
DB2_BUFFER_SIZE	<i>Optional.</i> Specifies the backup buffer size in 4 KB allocation units (pages). Set for scheduled backups only.	<ul style="list-style-type: none"> A value determined by the DB2 server (default). An integer number of allocation units; where the minimum number is 8.
DB2_NODE_NAME	<i>Mandatory.</i> Specifies the alias of the DB2 instance to which the user must connect for the backup. Set for scheduled backups only.	<ul style="list-style-type: none"> A valid alias of the DB2 instance. If the node you are using is through a local connection, use the Instance Name.

Table 10 DB2 Backup Parameters (page 2 of 4)

DB2 backup parameter	Definition	Default and valid values
DB2_NUM_BUFFERS	<p><i>Optional.</i> Specifies the number of backup buffers to be used.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> A value determined by the DB2 server (default). An integer number of backup buffers, where the minimum number is 2 and the maximum number is limited by the amount of available memory.
DB2_OPTIONS	<p><i>Optional.</i> Specifies the DB2 backup options.</p> <p>Set for scheduled backups only.</p> <p>Note: At a minimum, specify either the DB2BACKUP_DB or the DB2BACKUP_TABLESPACE parameter (not both).</p>	<ul style="list-style-type: none"> Undefined (default). One or more of the following values (case-sensitive), where multiple values must be separated by commas: <ul style="list-style-type: none"> - DB2BACKUP_COMPRESS - DB2BACKUP_DB - DB2BACKUP_DELTA - DB2BACKUP_EXCLUDE_LOGS - DB2BACKUP_FULL - DB2BACKUP_INCLUDE_LOGS - DB2BACKUP_INCREMENTAL - DB2BACKUP_OFFLINE - DB2BACKUP_ONLINE - DB2BACKUP_TABLESPACE <p>The following variables are only supported with DB2 version 8.2:</p> <ul style="list-style-type: none"> - DB2BACKUP_EXCLUDE_LOGS - DB2BACKUP_INCLUDE_LOGS
DB2_PARALLELISM	<p><i>Optional.</i> Specifies the degree of DB2 parallelism.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> A value determined by the DB2 server (default). An integer number for the DB2 parallelism, where the minimum number is 1 and the maximum number is 1024.
DB2_PSWD	<p><i>Mandatory.</i> Specifies the password for the DB2 user that connects to the DB2 instance, as specified by the parameter DB2_USR.</p> <p>Set for scheduled backups only.</p>	<p>A valid DB2 user password. This password should not be typed manually, but should be encrypted via the nsrdb2sv -P option.</p> <p>The following command creates an encrypted password in the NMDB2 configuration file (DB2_CFG):</p> <p>nsrdb2sv -P password -f DB2_CFG</p>
DB2 QUIESCE	<p><i>Optional.</i> Specifies whether to quiesce the DB2 database during a backup.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> Possible values are (yes or no). The default value is no. The DB2_ALIAS parameter must also be set.
DB2_SESSIONS	<p><i>Optional.</i> Specifies the number of parallel NMDB2 sessions to be run with the NetWorker server for the backup.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> The integer number 1 (default). An integer number of parallel NMDB2 sessions.
DB2_TBS_LIST	<p><i>Mandatory.</i> Only for a tablespace backup. Do not set for a database backup.</p> <p>Specifies a list of tablespaces to be backed up.</p> <p>Set for scheduled backups only.</p>	<p>A list of tablespace names, where multiple names must be separated by commas. For example:</p> <p>DB2_TBS_LIST = SYSCATSPACE, USERSPACE1</p>

Table 10 DB2 Backup Parameters (page 3 of 4)

DB2 backup parameter	Definition	Default and valid values
DB2_USR	<p><i>Mandatory.</i> Specifies the name of the DB2 user that connects to the DB2 instance for the backup. The password of the user is specified by the parameter DB2_PSWD.</p> <p>Set for scheduled backups only.</p>	A valid DB2 username.
DB2_VENDOR_LIB_PATH	<p><i>Mandatory.</i> Specifies the complete pathname of the NMDB2 shared library on the DB2 host.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> On UNIX, the default location is assumed if not specified. For example on Solaris: /usr/lib/libnsrdb2.so On Windows, the path is obtained automatically from the registry.
DB2INSTANCE	<p><i>Mandatory.</i> Specifies the name (<i>not</i> the alias) of the DB2 instance that contains the database to be backed up.</p> <p>Set for scheduled backups only.</p>	<p>A valid name of the DB2 instance that contains the database.</p> <p>Note: Ensure that the db2instance environment variable has been set correctly. Refer to the IBM DB2 Universal Database "Administration Guide: Implementation" manual (SC09-4820).</p>
DB2PATH (Windows Only)	<p><i>Mandatory.</i> Set for scheduled backups that have the following parameter set to yes: NSR_DB2_BACKUP_INFO=yes.</p> <p>Specifies the path where the DB2 binaries are located.</p> <p>Set for scheduled backups only.</p>	Set to the path where the DB2 binaries are installed.
INSTHOME (on UNIX)	<p><i>Mandatory.</i> Set for scheduled backups that have the following parameter set to yes: NSR_DB2_BACKUP_INFO=yes</p> <p>Specifies the path where the DB2 binaries are located.</p> <p>Set for scheduled backups only.</p>	Set to the instance home directory.
POSTCMD	<p><i>Optional.</i> Do <i>not</i> use for a manual (nonscheduled) backup. Specifies the complete pathname of a postprocessing script to be run <i>after</i> a scheduled backup. If the scheduled backup fails, the postprocessing script is still run. If the postprocessing script fails, an error message is generated.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> Undefined (default). A valid complete pathname of a postprocessing script file. <p>If the value is undefined or invalid, a postprocessing script is <i>not</i> run after the scheduled backup.</p>

Table 10 DB2 Backup Parameters (page 4 of 4)

DB2 backup parameter	Definition	Default and valid values
PRECMD	<p><i>Optional.</i> Do not use for a manual (nonscheduled) backup. Specifies the complete pathname of a preprocessing script to be run <i>before</i> a scheduled backup. If the preprocessing script fails, an error message is generated and the scheduled backup is <i>not</i> performed.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> Undefined (default). A valid complete pathname of a preprocessing script file. <p>If the value is undefined or invalid, a preprocessing script is <i>not</i> run before the scheduled backup.</p>

Transaction log parameters

Table 11 lists NMDB2 transaction log parameters, which are used by the NMDB2 software during a DB2 backup and restore to a DB2 database.

The table provides the following information for each parameter:

- ◆ The definition of the parameter.
- ◆ The default value of the parameter.
- ◆ The valid values that can be assigned to the parameter.

Table 11 Transaction log parameters (page 1 of 2)

Transaction Log Parameter	Definition	Default and Valid Values
NSR_DEBUG_FILE	<p><i>Optional.</i> Specifies the complete pathname of the log file that receives debug information during a backup.</p> <p>The file itself does not have to exist, but the complete directory path must exist.</p>	Any valid pathname or filename. If the file specified cannot be opened, a BSA_RC_INVALID_KEYWORD error message is written to the default file.
NSR_DB2LOG_RESTORE_DBNAME	<p><i>Optional.</i> Specifies the alias of the DB2 instance to a different database than the one being restored. This recovers logs that are required for disaster recovery.</p>	<ul style="list-style-type: none"> A valid alias of the DB2 instance. If the node you are using is through a local connection, use the Instance Name.
NSR_DB2LOG_RESTORE_PATH	<p><i>Optional.</i> Specifies the complete pathname of the NMDB2 shared library on the DB2 host.</p> <p>Set for scheduled backups only.</p>	<ul style="list-style-type: none"> On UNIX, the default location is assumed if not specified. For example on Solaris: /usr/lib/libnsrdb2.so On Windows, the path is obtained automatically from the registry.

Table 11 Transaction log parameters (page 2 of 2)

Transaction Log Parameter	Definition	Default and Valid Values
NSR_DEBUG_LEVEL	<i>Optional.</i> Specifies the level of debug information that is written during a backup to the log file specified by the parameter NSR_DEBUG_FILE.	<ul style="list-style-type: none"> • 0 (default) = No debug information. • 1 = Information on fatal system errors. • 2 = Information on all network-related errors. • 3 = Information about the operation taking place. • 4 = Information about all starting and ending of sessions. • 5 = Information on all entries and exits from the NMDB2 software. • 6 = Information on all entries and exits from internal NMDB2 functions. • 7 = Information on all internal NMDB2 errors. • 8 = Information on all NMDB2 parameters. • 9 = All possible NMDB2 debugging messages.
NSR_LOG_VOLUME_POOL	<i>Optional.</i> Specifies the volume pool to which transactional logs should be backed up.	<ul style="list-style-type: none"> • The predefined NetWorker volume pool named Default (default). • A valid name of a NetWorker volume pool.

Restore parameters

Table 12 lists restore parameters, which are used by the NMDB2 software during a DB2 restore to a DB2 database.

The tables provide the following information for each parameter:

- ◆ The definition of the parameter.
- ◆ The default value of the parameter.
- ◆ The valid values that can be assigned to the parameter.

Table 12 NMDB2 restore parameters

NMDB2 restore parameter	Definition	Default and valid values
NSR_ENCRYPTION_PHRASES	<i>Optional.</i> Specifies the pass phrase that is required to restore data from the NetWorker server.	<p>The pass phrase setting that is used to restore the data from the NetWorker server must be the same as was used to back up the data on the NetWorker server. For information, refer to the <i>NetWorker Release 7.3, Multiplatform Release, Administration Guide</i>.</p> <p>Multiple pass phrases can be used. For example: <code>NSR_ENCRYPTION_PHRASES="pass_phrase1, pass_phrase2"</code></p> <p>Enclose the pass phrase within quotes. Where multiple pass phrases are used, separate each pass phrase with commas.</p> <hr/> <p>Note: This parameter is supported only for NetWorker servers, release 7.3 and later.</p>
NSR_LIBNSRDB2_DEBUG_FILE	<i>Optional.</i> Specifies a file that contains additional debug backup and restore information.	Any valid path.
NSR_DB2_PREVIOUS_VERSION	<i>Optional.</i> Specifies that data that was backed up with a previous release of NMDB2 will be restored. <i>Do not set for a scheduled backup.</i>	<p>Possible values are (yes or no). The default value is no. Not case-sensitive. For example: <code>NSR_DB2_PREVIOUS_VERSION=yes</code> <code>NSR_DB2_PREVIOUS_VERSION=YES</code> <code>NSR_DB2_PREVIOUS_VERSION=Yes</code></p>
NSR_SERVER	<i>Mandatory.</i> Specifies the hostname of the NetWorker server to use for a DB2 restore.	A valid hostname of a NetWorker server.

This appendix describes specific DB2 Universal Database SQL error messages.

For additional information about SQL messages, refer to the *IBM DB2 Universal Database Message Reference Volume*, appropriate for your release of DB2 Universal Database.

This appendix contains the following sections:

- ◆ [The load libnsrdb2 command.....](#) 74
- ◆ [DB2 Universal Database SQL Messages](#) 74

The load libnsrdb2 command

Table 13 lists the path and the suffix information for the `load libnsrdb2` command.

Use the path and suffix information in Table 13 to determine the correct shared library for your operating system.

Table 13 Path and suffix for the load libnsrdb2 command

Operating system	Path with suffix
AIX	<code>/usr/lib/libnsrdb2.o</code>
HP-UX (32-bit, 64-bit)	<code>/usr/lib/libnsrdb2.sl</code>
HP-UX IA64	<code>/usr/lib/libnsrdb2.so</code>
Linux	<code>/usr/lib/libnsrdb2.so</code>
Solaris	<code>/usr/lib/libnsrdb2.so</code>
Windows NT and Windows 2000	<code><drive>:\NetWorker_Installation_Directory\nsr\bin\libnsrdb2.dll</code>

DB2 Universal Database SQL Messages

Table 14 lists DB2 Universal Database SQL error messages.

Table 14 DB2 SQL Error Messages (page 1 of 2)

DB2 SQL Message	Explanation	Cause	Fix
SQL1268N	A roll-forward recovery stopped due to error "SQL1042" while retrieving log file <logfile> for database <db> on node "0".	The variable <code>NSR_ENCRYPTION_PHRASES</code> does not contain the datazone pass phrase that was used to back up the transaction logs.	Change the <code>NSR_ENCRYPTION_PHRASES</code> variable to include the datazone pass phrase that was used to back up the transaction logs.
SQL2025N	An I/O error "25" occurred on media "VENDOR"	The variable <code>NSR_ENCRYPTION_PHRASES</code> does not contain the datazone pass phrase that was used to back up the database.	Change the <code>NSR_ENCRYPTION_PHRASES</code> variable to include the datazone pass phrase that was used to back up the database.
SQL2025N	An I/O error "25" occurred on media "VENDOR".	The user does not have restore privilege on the NetWorker server.	Add "recover local data" privilege for the user.
SQL2025N	An I/O error "11" occurred on media "VENDOR".	Either: <ul style="list-style-type: none"> A variable is missing to restore a backup made with NMDB2 release 1.6 or earlier software. A variable is incorrectly set to restore a backup made with NMDB2 release 2.1 or later software. 	To restore a backup image made with: <ul style="list-style-type: none"> NMDB2 release 1.6 or earlier, add the following variable to the NMDB2 configuration file (<code>DB2_CFG</code>): <code>NSR_DB2_PREVIOUS_VERSION=yes</code> NMDB2 release 2.1 or later, add the following variable to the NMDB2 configuration file (<code>DB2_CFG</code>): <code>NSR_DB2_PREVIOUS_VERSION=no</code>
SQL2025N	An I/O error "3" occurred on media "VENDOR"	The client is <i>not</i> registered on the NetWorker server to which the NMDB2 software is backing up.	Create a valid client on the NetWorker server. Test to make sure the connection between the client and server is valid: save -s <i>servername/testfile</i>

Table 14 DB2 SQL Error Messages (page 2 of 2)

DB2 SQL Message	Explanation	Cause	Fix
SQL2025N	An I/O error "3" occurred on media "VENDOR"	The NSR_CLIENT parameter is set to an invalid client name while running a backup.	Set the NSR_CLIENT environment variable to the name of the client from which the backup is running.
SQL2025N	An I/O error "3" occurred on media "VENDOR"	The vendor configuration file parameter NSR_DATA_VOLUME_POOL is set to a pool name that does <i>not</i> exist, while trying to run a backup	<ul style="list-style-type: none"> Create a pool to the same name that the NSR_DATA_VOLUME_POOL is set. Change the value of NSR_DATA_VOLUME_POOL to a valid pool.
SQL2025N	An I/O error "3" occurred on media "VENDOR"	There is no NMDB2 client license on the server. A separate client license is required for each client.	Obtain a valid NMDB2 client license.
SQL2062N	An error occurred while accessing media "/usr/lib/libnsrdb2.so". Reason code: "0"	Permissions or ownership of debug files are incorrect for the database instance.	Ensure that each database instance has a unique debug file name.
SQL2062N	An error occurred while accessing media "/usr/lib/libnsrdb2.so". Reason code: "11".	A valid timestamp for the object being restored was not specified.	Specify a valid timestamp.
SQL2062N	An error occurred while accessing media "/usr/lib/libnsrdb2.so" Reason code: "4" (For the correct libnsrdb2 path and suffix information, see Table 13 .)	The NSR_CLIENT parameter was set to an incorrect client name while running a restore.	Set the NSR_CLIENT environment variable to the name of the client from which the restore is running.
SQL2062N	An error while accessing media "/usr/lib/libnsrdb2.so" Reason code: "4" (For the correct libnsrdb2 path and suffix information, see Table 13 .)	The client is not registered on the NetWorker server to which the module is restoring.	<ol style="list-style-type: none"> Create a valid client on the NetWorker server. Test to make sure the connection between the client and server is valid: save -s servername/testfile
SQL2062N	An error occurred while accessing media "/usr/lib/libnsrdb2.so" Reason code: "12" (For the correct libnsrdb2 path and suffix information, see Table 13 .)	The NSR_SERVER parameter is set to an invalid servername. For example, the server might <i>not</i> exist and you can <i>not</i> ping.	Set the NSR_SERVER environment variable to a valid NetWorker server that has the DB2 server defined as a client.
SQL2071N	An error while accessing the shared library "/usr/lib/libnsrdb2.so" Reason code: "2" (For the correct libnsrdb2 path and suffix information, see Table 13 .)	An error message occurs when you use: <ul style="list-style-type: none"> 32-bit NMDB2 software to back up a 64-bit database 64-bit NMDB2 to back up a 32-bit database 	Use the correct release of NMDB2 for the database. For example: A 64-bit version of NMDB2 is required to back up a 64-bit database.

This glossary contains terms related to NMDB2. Many of these terms are used in this manual.

A

- ad hoc backup** See “[manual backup.](#)”
- administrator** The person who normally installs, configures, and maintains software on network computers, and who adds users and defines user privileges.
- Administrators group** A Microsoft Windows user group whose members have the rights and privileges of users in other groups, plus the ability to create, modify, and manage the users and groups in the domain.
- autochanger** See “[library.](#)”

B

- backup** An operation that saves data to a volume.
- backup cycle** The period of time from one level full backup to the next level full backup.
- backup volume** A volume used to store backup data. Backup data cannot be stored on an archive volume or a clone volume. See also “[volume.](#)”
- bootstrap** A save set that is essential for the NetWorker disaster recovery procedures. The bootstrap consists of three components that reside on the NetWorker server: the media database, the resource database, and a server index.
- browse policy** A NetWorker policy that specifies the time period during which backup entries are stored in a client file index and the associated backup files are readily accessible to desktop users. See also “[retention policy.](#)”

C

- client** A computer, workstation, or fileserver whose data can be backed up and recovered.
- client file index** A database maintained by the NetWorker server that tracks every database object, file, or file system backed up. The NetWorker server maintains a single index file for each client computer. The tracking information is purged from the index after the browse time of each backup expires.

client initiated backup	See “manual backup.”
clone	A reliable copy of backed up data, which is indexed and tracked. Unlike volumes created with a simple copy command, clone volumes can be used in exactly the same way as the original backup volume. Single save sets or entire volumes can be cloned.
clone volume	An exact duplicate of a backup volume. One of four types of volumes that NetWorker software can track (backup, archive, backup clone, and archive clone). Save sets of these different types may not be intermixed on one volume.
cluster	1. Two or more independent network servers that operate and appear to clients as if they were a single unit. The cluster configuration enables work to be shifted from one server to another, thereby providing "high availability," which allows application services to continue despite most hardware or software failures. Also known as an agent (Sun), logical server (HP TruCluster), package (HP-UX), and virtual server (Microsoft). 2. A group of disk sectors. The operating system assigns a unique number to each cluster and keeps track of files according to which clusters they use.
command line	The line on a display screen, also known as a command prompt or shell prompt, where you enter software commands.
Console server	The software program that is used to manage NetWorker servers and clients. The Console server also provides reporting and monitoring capabilities for all NetWorker processes.
D	
datazone	A group of computers administered by a NetWorker server.
device	1. A storage unit that reads from and writes to backup volumes. A storage unit can be a tape device, optical drive, autochanger, or file connected to the server or storage node. 2. When dynamic drive sharing (DDS) is enabled, refers to the access path to the physical drive. See also “drive.”
drive	A hardware device through which media can be read or written to.
E	
enabler code	A special code that activates the software. The enabler code that unlocks the base features for software is called a base enabler. Enabler codes for additional features or products (for example, library support) are called add-on enablers.
F	
file index	See “client file index.”
file system	1. The software interface used to save, retrieve, and manage files on storage media by providing directory structures, data transfer methods, and file association. 2. The entire set of all files.
full backup	See “level.”

G

group A client or group of client computers that are configured to back up files at a designated time of day.

H

host A computer on a network.

host ID A serial number that uniquely identifies a host computer.

I

incremental (i) backup A backup level in which only files that have changed since the last backup are backed up. [See also "level."](#)

L

label An electronic header on a volume used for identification by NetWorker or other data mover application.

level A backup configuration option that specifies how much data is saved during a scheduled or manual backup. A full (f) backup backs up all files, regardless of whether they have changed. Levels one through nine [1-9] backup files that have changed since the last lower numbered backup level. An incremental (incr) backup backs up only files that have changed since the last backup.

library A hardware device containing one or more removable media drives, as well as slots for pieces of media, media access ports, and a robotic mechanism for moving pieces of media between these components. Libraries automate media loading and mounting functions during backup and recovery. The term library is synonymous with autochanger, autoloader, carousel, datawheel, jukebox, and near-line storage.

M

manual backup A backup that a user performs from the client, also known as an unscheduled backup or an ad hoc backup. The user specifies the files, file systems, and directories to back up. A manual backup does not generate a bootstrap save set.

media The physical storage, such as magnetic tape, optical disk, or file system, to which backup data is written.

media database A database that contains indexed entries of storage volume location and the life cycle status of all data and volumes managed by the NetWorker server.

media index [See "media database."](#)

Media Manager The NetWorker database that tracks save sets stored on backup volumes.

mount To make a database available for use or to place a removable tape or disk volume into a drive for reading or writing.

multiple session backup and restore A method of backing up or restoring multiple streams of data simultaneously.

N

NetWorker	A network-based EMC software product that backs up and recovers file systems.
NetWorker Management Console	See “Console server.”
NetWorker resource	See “resource.”
NetWorker server	The computer on a network that runs the NetWorker server software, which contains the online indexes and provides backup and recovery services to the clients on the same network.
NetWorker storage node	See “storage node.”
nsrd	The master NetWorker server process.
nsrhost	The logical hostname of the computer that is the NetWorker server.
<h2>O</h2>	
override	A different backup level that is used in place of the regularly scheduled backup.
<h2>P</h2>	
parallelism	A method that backs up or recovers data for several clients, or several save sets for one client, at the same time.
pathname	A set of instructions to the operating system for accessing a file. An absolute pathname indicates how to find a file starting from the root directory and working down the directory tree. A relative pathname indicates how to find a file starting from the current location.
physical cluster client	A NetWorker client that is bound to a physical host in the cluster and can have its own resources (private or local).
physical host	A node or host that forms part of a cluster.
policy	A set of constraints that specify how long the save sets for a client are available for recovery. Each client has a browse policy and a retention policy. When the retention policy expires, the save sets associated with that policy are marked recyclable.
pool	A feature to sort backup data to selected storage volumes.
<h2>R</h2>	
recover	To apply transactional logs to a database to make it consistent with a given point in time.
recyclable save set	A save set whose browse and retention policies have expired. Recyclable save sets are removed from the media database.
recyclable volume	A volume whose data has exceeded both its browse and retention policies and is now available to be relabeled and reused.

remote device	A storage device that is attached to a storage node.
Remote Procedure Call (RPC)	The protocol that the NetWorker server uses to perform client requests over a network.
resource	A component that describes the NetWorker server or its clients. Clients, devices, schedules, groups, and policies are all NetWorker resources. Each resource has attributes that define its properties.
resource database	A database of information about each resource.
restore	The process of retrieving individual datafiles from backup storage and copying the files to disk.
retention policy	A setting that determines the length of time that backup data is retained on a volume available for recovery, though not necessarily immediate recovery. See also browse policy.
retrieve	To locate and recover archived files and directories.
roll forward	To apply transactional logs to a database to make it consistent with a given point in time.
root	1. (UNIX only) The UNIX superuser account. 2. (Microsoft Windows and UNIX) The highest level of the system directory structure.
RPC	See "Remote Procedure Call (RPC)."
S	
save	The NetWorker command that backs up client files to backup volumes and makes data entries in the online index.
save set	A group of files or a file system from a single client computer, which is backed up on storage media.
save set ID	An internal identification number assigned to a save set.
save set recover	To recover data by specifying save sets rather than by browsing and selecting files or directories.
save set status	A NetWorker attribute that indicates whether a save set is browsable, recoverable, or recyclable. The save set status also indicates whether the save set was successfully backed up.
save stream	The data and save set information that is written to a storage volume during a backup. A save stream originates from a single save set.
scanner	The NetWorker command used to read a backup volume when the online indexes are not available.
scheduled backup	A type of backup that is configured to start automatically at a specified time for a group of one or more NetWorker clients. A scheduled backup generates a bootstrap save set.

secondary storage	A storage library attached to the NetWorker server or storage node, used to store traditional or snapshot backups. A NetWorker server Device resource must be configured for each secondary storage device. See also primary storage.
server index	See “ client file index. ”
shared disk	The storage disk that is connected to multiple nodes in the cluster.
skip	A backup level in which designated files are not backed up.
ssid	See “ save set ID. ”
storage manager	Application that manages the storage devices and media used for backup and restore requests. The NetWorker Module is a storage manager that connects NetWorker services to the database server to provide storage management for databases and transaction logs.
storage node	A storage device physically attached to a computer other than the NetWorker server, whose backup operations are administered from the controlling NetWorker server.
system administrator	The person normally responsible for installing, configuring, and maintaining NetWorker software.
T	
tablespace	A database structure in which the location of a database and table data are assigned directly to a container, such as a directory name, device name, or filename.
target sessions	The number of backup sessions accepted by a backup device.
temporary enabler	A code that allows operation of the software for an additional 45 days beyond the evaluation period. See also enabler code and permanent enabler.
transaction log	A record of database transactions, stored in a log file to execute fast restore and roll back transactions.
U	
unscheduled backup	See “ manual backup. ”
update enabler	A code that updates software from a previous release. Like other temporary enabler codes, it expires after 45 days.
V	
versions	The date-stamped collection of available backups for any single file.
volume	1. A unit of physical storage medium, such as a magnetic tape, optical disk, or file system to which backup data is written. 2. An identifiable unit of data storage that may reside on one or more computer disks.
volume ID	An internal identification that NetWorker software assigns to a backup volume.
volume name	The name assigned to a backup volume when it is labeled. See also label.
volume pool	See “ pool. ”

X

XBSA Acronym for X/Open Backup Services Application Programming Interface, which connects NetWorker functionality to the NetWorker module.

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