VERITAS NetBackup™ 3.4 for Oracle

System Administrator's Guide

Windows NT

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VERITAS

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Preface

This guide describes how to install, configure and use VERITAS NetBackup for Oracle on a Windows NT platform. In this guide, VERITAS NetBackup for Oracle is referred to as NetBackup for Oracle on Windows NT.

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

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

  or

- *NetBackup System Adminstrator's Guide - Windows NT/2000*, if you have a Windows NT/2000 server.

This document is the same as `NetBackup_AdminGuide_Oracle_NT.pdf` distributed with the NetBackup for Oracle on Windows NT software.

Audience

This guide is intended for the:

- Oracle database system administrator responsible for configuring and using the Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager to back up and restore Oracle databases.
- NetBackup system administrator responsible for configuring NetBackup.

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

This guide assumes:

- A basic understanding of system administration.
- A working understanding of the NetBackup client and server software.
- A familiarity with the information covered in the following NetBackup manuals:
  - *NetBackup User's Guide - Microsoft Windows*
  - *NetBackup System Administrator's Guide - UNIX* or *NetBackup System Administrator's Guide - Windows NT/2000*
  - *NetBackup Troubleshooting Guide - UNIX* or *NetBackup Troubleshooting Guide - Windows NT/2000*
- A thorough understanding of:
  - Oracle7 Enterprise Backup Utility
  - Oracle8 Recovery Manager

Organization

This guide is organized as follows:

- The first chapter in this manual describes the technical features and concepts of NetBackup for Oracle.
- The Installation chapter explains how to install NetBackup for Oracle on Windows NT on your system.
- The Advanced Installation Instructions chapter provides details on the integration of NetBackup for Oracle on Windows NT software with Microsoft's System Management Server (SMS).
- Configuration describes how to configure NetBackup and the Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager for use with NetBackup for Oracle on Windows NT. This information supplements the NetBackup administration manuals.
- The Using NetBackup for Oracle on Windows NT explains how to use NetBackup to perform backups and restores of Oracle databases. This information supplements the NetBackup manuals.
- Troubleshooting explains how to use NetBackup logs to troubleshoot NetBackup for Oracle on Windows NT operations. This information supplements the NetBackup manuals.

Related Documents

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

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

- *NetBackup System Administrator's Guide - UNIX*

  Explains how to configure and manage NetBackup on a UNIX system.

- *NetBackup Media Manager System Administrator's Guide - UNIX*

  Explains how to configure and manage the storage devices and media on UNIX NetBackup servers. Media Manager is part of NetBackup.

- *NetBackup Troubleshooting Guide - UNIX*

  Provides troubleshooting information for UNIX-based NetBackup products. You can also refer to www.veritas.com knowledge base for tech notes.

If you have a Windows NT/2000 server, refer to these documents:

- *NetBackup System Administrator's Guide - Windows NT/2000*

  Explains how to configure and manage NetBackup on a Windows NT/2000 server system.

- *NetBackup Media Manager System Administrator's Guide - Windows NT/2000*

  Explains how to configure and manage the storage devices and media on Windows NT/2000 NetBackup servers. Media Manager is part of NetBackup.

- *NetBackup Troubleshooting Guide - Windows NT/2000*

  Provides troubleshooting information for Windows NT/2000-based NetBackup products. You can also refer to www.veritas.com knowledge base for tech notes.

For this product, you may need the following manuals from Oracle:

- *Oracle Enterprise Manager Administrator's Guide*
- *Oracle7 Enterprise Backup Utility Administrator's Guide*
- *Oracle8 Server Backup and Recovery Guide*
- *Oracle7 Enterprise Backup Utility Installation and Configuration Guide*

Conventions

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

Type Style

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

Notes and Cautions

Note This is a Note and is used to call attention to information that makes it easier to use the product or helps you to avoid problems.

Caution This is a Caution and is used to warn you about situations that can cause data loss.

Key Combinations

Some keyboard command sequences use two or more keys at the same time. For example, you may have to hold down the Ctrl key before you press another key. When this type of command is referenced, the keys are connected by plus signs. For example:

Press Ctrl+t

Command Usage

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

brackets [ ]

The enclosed command line component is optional.

Vertical bar or pipe (|)

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

```
command arg1|arg2
```

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

Getting Help

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

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

VERITAS Customer Support can also be reached through electronic mail at:

```
support@veritas.com
```

Introduction 1

NetBackup for Oracle on Windows NT integrates the database backup and recovery capabilities of Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager with the backup and recovery management capabilities of NetBackup and its Media Manager.

This chapter introduces NetBackup for Oracle on Windows NT and how it relates to Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager and NetBackup. Read this chapter for a description of:

- Features of NetBackup for Oracle on Windows NT
- Terminology for NetBackup for Oracle on Windows NT
- Technical Overview of NetBackup for Oracle on Windows NT

Features of NetBackup for Oracle on Windows NT

This section describes the NetBackup for Oracle on Windows NT main features.

Feature	Description
Media and device management	All devices supported by Media Manager are available to NetBackup for Oracle on Windows NT.
Scheduling facilities	NetBackup scheduling facilities on the master server can be used to schedule automatic and unattended Oracle backups. This also lets you choose the times when these operations can occur. For example, to prevent interference with normal daytime operations, you can schedule your database backups to occur only at night.
Multiplexed backups and restores	NetBackup for Oracle on Windows NT lets you take advantage of NetBackup's multiplexing capabilities. Multiplexing directs multiple data streams to one backup device, thereby reducing the time necessary to complete the operation.
Transparent execution of both Oracle and regular file system backup and restore operations	All backups and restores are executed simultaneously and transparently without any action from the NetBackup administrator. A database administrator can execute database backup and restore operations through NetBackup or use Oracle8 Recovery Manager as if NetBackup were not present. An administrator or any other authorized user can use NetBackup to execute database backups and restores.
Sharing the same devices and tapes used during other file backups	It is possible to share the same devices and media used for other backups or to give Oracle exclusive use of certain devices and media.
Centralized and networked backup operations	From the NetBackup master server, you can schedule database backups or start them manually for any client. The Oracle databases can also reside on hosts that are different from the devices on which NetBackup stores the backups.

Feature	Description
Graphical user interfaces	NetBackup provides the following graphical user interfaces for client users and administrators: ◆ Client user interface on Windows 95/98/2000 and NT clients ◆ Administrator user interface on Java, `jnbSA` ◆ Administrator user interface, `xbpadm` ◆ Administrator user interface on Windows NT/2000 A database administrator or NetBackup administrator can start backup or restore operations for Oracle from the NetBackup graphical user interface on the master server.
Parallel backup and restore operations	NetBackup for Oracle on Windows NT supports the parallel backup and restore capabilities of the Oracle8 Recovery Manager. This permits the user to run more than one tape device at a time for a single Oracle backup or restore, thereby reducing the time necessary to complete the operation.

Terminology for NetBackup for Oracle on Windows NT

This section explains important terms that may be new to an Oracle database administrator or a NetBackup administrator.

NetBackup Terms

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

NetBackup	NetBackup backs up and restores files, directories, raw partitions, and databases on client systems that have Oracle databases.
NetBackup schedule	NetBackup schedules control NetBackup operations such as: when backups can occur, the type of backup (full, incremental) to perform, and how long NetBackup retains the image (retention level).
Administrator directed backups	NetBackup administrators are able to perform remote backups of all files, directories, databases, and raw partitions contained on client systems within a client/server network.
User-directed backups and restores	NetBackup for Oracle on Windows NT users are able to perform backups of all files, directories, databases, and raw partitions contained on client systems within a client system.
Graphical interfaces	Graphical user interfaces are available for both users and administrators.
Media Manager	The Media Manager provides complete management and tracking of all devices and media used during backups and restores.

Oracle Terms

Full Backup	A full backup copies all blocks into the backup set, skipping only datafile blocks that have never been used. Note that a full backup is not the same as a whole database backup; full is an indicator that the backup is not incremental. A full backup has no effect on subsequent incremental backups, which is why it is not considered part of the incremental strategy. In other words, a full backup does not affect which blocks are included in subsequent incremental backups.

Incremental Backup

An incremental backup is a backup of only those blocks that have changed since a previous backup. Oracle allows you to create and restore incremental backups of datafiles, tablespaces, and a database. You can include a control file in an incremental backup set, but the control file is always included in its entirety, no blocks are skipped.

Multi-Level Incremental Backup

Oracle8 Recovery Manager allows you to create multi-level backups. Each level is denoted by an integer, e.g., 0, 1, 2, etc. A level 0 incremental backup, which is the base of subsequent incremental backups, copies all blocks containing data.

When you generate a level n incremental backup in which n is greater than 0, you back up:

- All blocks that have been modified since the most recent backup at a level n or lower (this is the default type of incremental backup, called Differential Incremental Backup)
- All blocks that have been modified since the most recent backup at level n-1 or lower (called a Cumulative Incremental Backup)

The benefit of performing multi-level incremental backups is that you do not back up all of the blocks all of the time. Incremental backups at level greater than 0 only copy blocks that were modified, which means that the backup size may be significantly smaller and require much less time. The size of the backup file depends solely upon the number of blocks modified and the incremental backup level.

Differential Incremental Backup

In a differential level n incremental backup, you back up all blocks that have changed since the most recent backup at level n or lower. For example, in a differential level 2 backup, you back up all blocks modified since the last level 2, level 1, or level 0 backup. Incremental backups are differential by default.

Cumulative Incremental Backup

In a cumulative level n incremental backup, you back up all blocks that have changed since the most recent backup at level n-1 or lower. For example, in a cumulative level 2 backup, you back up all blocks changed since the most recent level 1 or level 0 backup.

Cumulative incremental backups reduce the work needed for a restore by ensuring that you only need one incremental backup from any particular level at restore time. Cumulative backups require more space and time than Differential Incremental Backups, however, because they duplicate the work done by previous backups at the same level.

Oracle7 Terms

Oracle7 Enterprise Backup Utility

The Oracle7 Enterprise Backup Utility (EBU) is a program provided by the Oracle Corporation that lets database administrators back up and restore Oracle databases. Although EBU is able to configure and track the execution of those operations, it cannot directly manage the storage devices and media used in its backups. It must be integrated with an application that has these capabilities. NetBackup for Oracle on Windows NT provides device and media management capability by integrating the Oracle7 Enterprise Backup Utility with NetBackup and its media management software. Other advantages are access to NetBackup's automatic scheduling facilities and the graphical interfaces.

The Enterprise Backup Utility uses a Catalog Database to store information about the Oracle7 databases being backed up or restored through EBU. The Catalog Database also stores information about backups that have been performed. It is used to determine what needs to be restored from previous backups. The use of a Catalog Database with EBU is not optional, one must be used.

`ebu` command

The command that you use to start a backup or restore by the Oracle7 Enterprise Backup Utility. This command is described in the *Oracle7 Enterprise Backup Utility Administrator's Guide*.

EBU script

A script that specifies the action that the `ebu` commands (for example, backups, and restores).

Refer to the *Oracle7 Enterprise Backup Utility Administrator's Guide* (available from the Oracle Corporation) for a description of the script.

Oracle8 Terms

Oracle Enterprise Manager The Oracle Enterprise Manager-Backup Manager is a graphical user interface for the Recovery Manager (`rman`). This interface allows you to use the point and click method to perform backups and recoveries. For more information about the Oracle Enterprise Manager, see the *Oracle Enterprise Manager Administrator's Guide*.

Oracle8 Recovery Manager Oracle8 Recovery Manager (RMAN) is used to back up, restore, and recover database files. Oracle8 Recovery Manager starts Oracle8 server processes on the target database. These Oracle8 server processes actually perform the backup and restore. Oracle8 Recovery Manager performs important backup and recovery procedures, and greatly simplifies the tasks administrators perform during these processes. However, it cannot directly manage the storage devices and media used in its backups and must be integrated with an application that has these capabilities. NetBackup for Oracle on Windows NT provides device and media management capability by integrating the Oracle8 Recovery Manager with NetBackup and its media management software. Other advantages are access to NetBackup's automatic scheduling facilities and the graphical interfaces.

NetBackup for Oracle on Windows NT currently supports Oracle8 Recovery Manager, Release 804 and later.

Recovery Catalog The recovery catalog is a repository of information that is used and maintained by Oracle8 Recovery Manager. Oracle8 Recovery Manager uses this information to determine how to execute requested backup and restore actions.

Oracle recommends that you use Oracle8 Recovery Manager with a recovery catalog, especially if you have 20 (or more) datafiles. However, you are not required to maintain a recovery catalog with Oracle8 Recovery Manager.

Because most information in the recovery catalog is also available in the target database's control file, Oracle8 Recovery Manager supports an operational mode where it uses the target database control file instead of a recovery catalog. This operational mode is appropriate for small databases where installation and administration of another database, for the sole purpose of maintaining the recovery catalog, would be burdensome.

For a detailed description of the recovery catalog, refer to Chapter 7, "Recovery Manager Concepts," in the *Oracle8 Server Backup and Recovery Guide*.

`rman command`

The `rman` command is used to start a backup or restore by the Oracle8 Recovery Manager. Recovery Manager is an integral part of Oracle8, unlike the Oracle7 Enterprise Backup Utility which is an optional, stand-alone add-on. This command is described in the *Oracle8 Server Backup and Recovery Guide*.

RMAN script

The RMAN script specifies the commands that Oracle8 Recovery Manager will perform (for example, backups, and restores). This command file is described in the *Oracle8 Server Backup and Recovery Guide* (available from the Oracle Corporation).

The *Oracle8 Server Backup and Recovery Guide* explains the `rman` commands and the command script files. Refer to that guide for details on command syntax and parameters for performance.

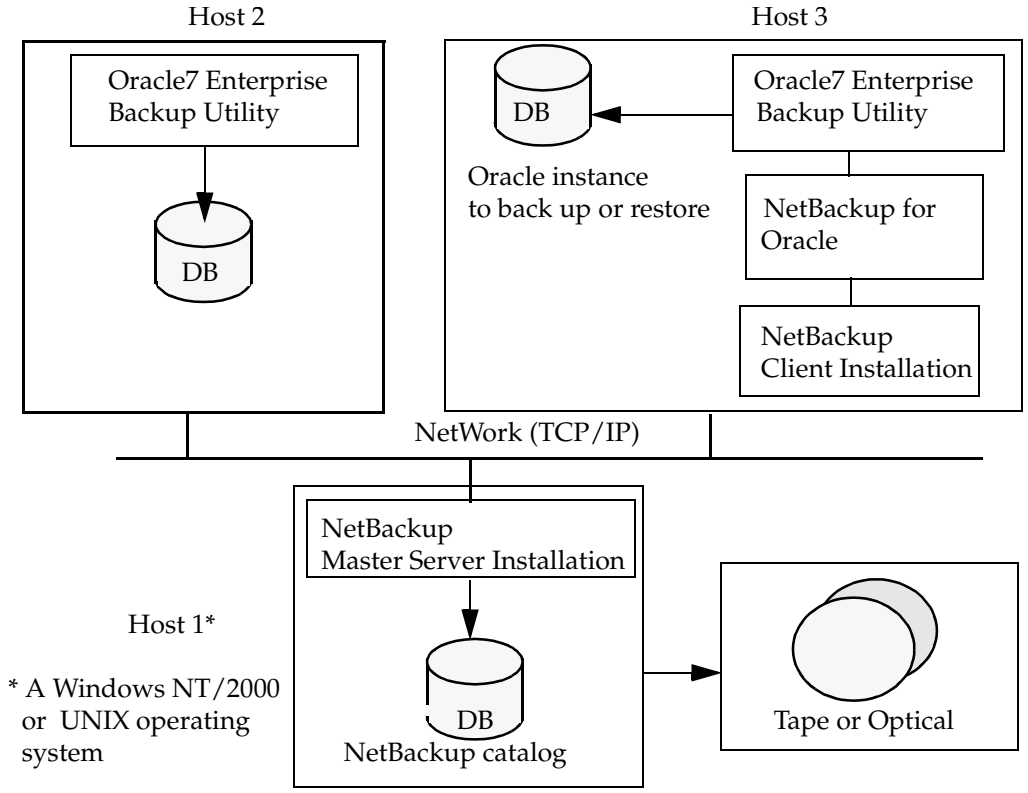
There are example RMAN script in the directory named *install_path*`\NetBackup\dbext\Oracle\samples\rman`. These scripts are executable Oracle8 Recovery Manager command files and are fully commented to explain the features used. We recommend that you review these examples. You can use them as a starting point for developing backup, restore and recovery scripts.

Technical Overview of NetBackup for Oracle on Windows NT

The example network below shows the major components in a NetBackup for Oracle on Windows NT configuration.

The storage devices are connected to the NetBackup master server. The host with the database must be a NetBackup client and have NetBackup for Oracle on Windows NT installed.

Oracle7 Enterprise Backup Utility



How Does the Oracle7 Enterprise Backup Utility Work?

During a backup or restore, the Oracle7 Enterprise Backup Utility provides the interface to the databases and performs the actual extraction and insertion of data.

To start a database backup or restore, the database administrator must execute a command called `ebu`. This command can be executed from the command line, a DOS script, or an application such as NetBackup. An EBU script is used as a parameter to the `ebu` command and defines the type of operation to be performed (for example, backup or restore). The EBU script also defines other components of the operation, such as the database objects to be backed up or restored.

During a backup or restore, the Oracle7 Enterprise Backup Utility controls the data streams going into or out of a database. This utility can access storage devices when it is integrated with a media management system, such as that provided by NetBackup and its Media Manager.

For more information, we recommend that you read the *Oracle7 Enterprise Backup Utility Administrator's Guide*.

How Does NetBackup for Oracle on Windows NT Work?

NetBackup for Oracle on Windows NT includes a library of functions that enable the Oracle7 Enterprise Backup Utility to use NetBackup with its Media Manager. The link to this library is created during an Oracle7 Enterprise Backup Utility installation.

NetBackup users or schedules start database backups or restores by specifying a NetBackup for Oracle script in the file list of the Oracle class. The NetBackup for Oracle script executes the `ebu` command with the EBU script as a parameter.

For a backup:

1. The `ebu` command, with the EBU script as a parameter, starts the requested operation on the databases.

2. When the process requires media to store backup data, `ebu` starts a user-directed backup by issuing a backup request.

3. The NetBackup master server connects to Oracle on the client and transfers the database data to secondary storage.

A restore works in essentially the same manner except that `ebu` issues a restore request. This causes NetBackup to retrieve the data from secondary storage and send it to Oracle on the client.

Since the Oracle7 Enterprise Backup Utility supports parallel operations, a single `ebu` execution can start more than one backup or restore on the NetBackup system.

The status for an `ebu` operation is stored in the Oracle7 Enterprise Backup Utility catalog. This is the only status that a database administrator must check to verify that a backup or restore has been successful.

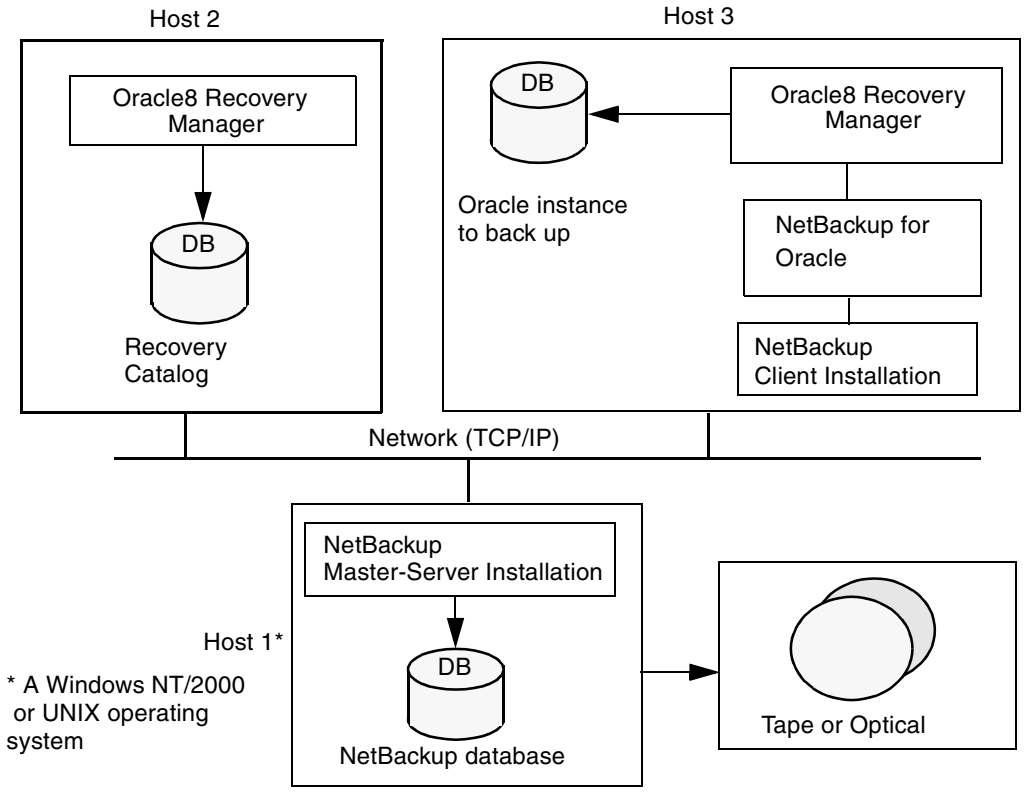
NetBackup also logs status, but only for its own part of the operation. The database administrator cannot use the NetBackup status to determine whether `ebu` was successful. Errors can occur in `ebu` that do not affect NetBackup and are not recorded in its logs.

Incremental Backup of Oracle Databases

The Oracle7 Enterprise Backup Utility does not provide true incremental backups. That is, rather than backing up just the modified data blocks, the utility backs up the entire datafile, regardless of when the file was updated. An online backup and its archived redo logs provide essentially the same protection as incrementals.

Refer to the *Oracle7 Server Administrator's Guide* and the *Oracle7 Enterprise Backup Utility Administrator's Guide* for more complete details on the backup and recovery process.

Oracle8 Recovery Manager



How Does the Oracle8 Recovery Manager Work?

The Oracle8 Recovery Manager (RMAN) performs a wide variety of automated backup and recovery functions. During backup or restore, RMAN provides the interface to the databases and performs the actual extraction and insertion of data.

To start a database backup or restore, the database administrator must execute a command called `rman`. This command can be executed from the command line, a DOS script, or an application such as NetBackup. The RMAN script is used as a parameter to the `rman` command and defines the commands to be performed (for example, backup or restore). The RMAN script also defines other components of the operation such as the database objects to be backed up or restored.

During a backup or restore, the Oracle8 Recovery Manager controls the data streams going into or out of a database. The Oracle8 Recovery Manager can access storage devices when it is integrated with a media management system, such as that provided by NetBackup and its Media Manager.

For more information, read the *Oracle8 Server Backup and Recovery Guide*.

How Does NetBackup for Oracle on Windows NT Work?

Following are prerequisites for performing backups to tape:

- Access to the NetBackup library
- Generating unique file names

NetBackup for Oracle on Windows NT includes a library of functions that enable the Oracle8 Recovery Manager to use NetBackup and its Media Manager. To provide access to this library, the `system32` folder must be on the system PATH.

When using the `backup` command, each resulting backup set contains at least one backup piece (datafile, datafile copy, control file, or archive log) from the target database. You must give each backup piece a unique name using the `format` operand. Several substitution variables are available to aid in generating unique names. You can specify the `format` operand in the `backup` command or in the `allocate channel` command. NetBackup considers the backup piece name as the file being backed up, so this name must be unique in the catalog. When an Oracle 8.0.x RMAN backup uses a file name that already exists in the catalog, the original backup having that name is deleted. In Oracle8i, the RMAN backup will fail with a `file already exists in catalog` error.

Note For performance reasons, NetBackup for Oracle on Windows NT strongly recommends that an RMAN timestamp be placed at the end of each backup piece name. Without this timestamp, there will be performance degradation as the NetBackup catalog grows. To guarantee uniqueness and optimal performance, specify each backup file name as:

tag`_%s_%p_%t` for Oracle 8.0.x
tag`_%U%_%t` for Oracle8i

where
tag is any user-defined string
`%s` specifies the backup set number
`%p` specifies the backup piece number with the backup set
`%t` specifies the backup set timestamp
`%U` specifies a shorthand for `%u_%p_%c` that guarantees uniqueness in generated file names. (Oracle8i).

For more information on generating unique file names, refer to the *Oracle8 Server Backup and Recovery Guide*.

NetBackup users or schedules start database backups or restores by specifying a NetBackup for Oracle script in the file list of the Oracle class. The NetBackup for Oracle script executes the `rman` command with the RMAN script as a parameter.

For a backup:

1. The `rman` command, with the RMAN script as a parameter, starts the requested operation on the databases.

2. When the process requires media to store backup data, RMAN starts a user-directed backup by issuing a backup request.

3. The NetBackup master server connects to NetBackup for Oracle on Windows NT on the client and transfers the database data to secondary storage.

A restore works in essentially the same manner except that RMAN issues a restore request. This causes NetBackup to retrieve the data from secondary storage and send it to NetBackup for Oracle on Windows NT on the client.

Since the Oracle8 Recovery Manager supports parallel operations, a single `rman` execution can start more than one backup or restore on the NetBackup system.

The status for an RMAN operation is stored in the Oracle8 Recovery Manager catalog. This is the only status that a database administrator must check to verify that a backup or restore has been successful.

NetBackup also logs status, but only for its own part of the operation. The database administrator cannot use the NetBackup status to determine whether `rman` was successful. Errors can occur in `rman` that do not affect NetBackup and are not recorded in its logs.

Incremental Backup of Oracle Databases

The Oracle8 Recovery Manager provides true incremental backups. An incremental backup will back up datafiles, which include only the blocks that have been changed since the last incremental.

Refer to the *Oracle8 Server Administrator's Guide* and the *Oracle8 Server Backup and Recovery Guide* for more complete details on the backup and recovery process.

Installation 2

This chapter describes the NetBackup for Oracle on Windows NT installation procedure. It includes sections on installing Oracle7 Enterprise Backup Utility and Oracle8 Recovery Catalog.

To determine which Oracle version levels are supported, refer to the Database Extension Matrix in the *NetBackup Release Notes*.

Install NetBackup

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

1. Install NetBackup server software on the server.
2. Install the NetBackup client software on the client where you will be backing up the databases.

   See the *NetBackup Installation Guide - PC Clients* for installation instructions on Windows NT/2000 clients.

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

Install NetBackup for Oracle on Windows NT

This section describes how to load NetBackup for Oracle on Windows NT from the distribution media.

1. Stop the Oracle Services.
2. Insert the CD-ROM.

   If the AutoPlay feature is enabled, the AutoRun program will allow you to:

   - Browse the contents of the CD-ROM
   - Add/remove programs from your system
   - View the NetBackup Database Extensions for Windows NT readme file
   - Install NetBackup Database Extensions for Windows NT.

   If the Autoplay feature is not enabled, perform the following procedure.

   a. Choose Run from the Start menu.

      The Run dialog box appears.

   b. Type the following:

      CD-ROM`:\AutoRun\AutoRunI.exe`

      where *CD-ROM* is the CD-ROM drive letter.
3. Restart the Oracle services.

Install Oracle8 Recovery Catalog

The recovery catalog is a repository of information that is used and maintained by Oracle8 Recovery Manager. Oracle8 Recovery Catalog uses the information in the recovery catalog to determine how to execute requested backup and restore actions.

The recovery catalog contains information about:

- Datafile and archivelog backup sets and backup pieces
- Datafile copies
- Archived redo logs and their copies
- Tablespaces and datafiles on the target database
- Stored scripts, which are named, user-created sequences of RMAN and SQL commands

Oracle recommends you use Oracle8 Recovery Catalog with a recovery catalog, especially if you have 20 (or more) datafiles. However, you are not required to maintain a recovery catalog with Oracle8 Recovery Catalog.

Because most information in the recovery catalog is also available in the target database's control file, Oracle8 Recovery Catalog supports an operational mode where it uses the target database control file instead of a recovery catalog. This mode is appropriate for small databases where installation and administration of another database for the sole purpose of maintaining the recovery catalog would be burdensome.

If a recovery catalog is not used, the following features are not supported:

- Tablespace point-in-time recovery
- Stored scripts
- Restore and recovery when the control file is lost or damaged

Because recovery catalog installation procedures are version specific, refer to your *Oracle8 Server Backup and Recovery Guide* for details.

Advanced Installation Topics 3

Microsoft Systems Management Server Integration

NetBackup for Oracle on Windows NT can be Microsoft Windows NT 4.0 BackOffice certified. You can integrate this product with Microsoft's Systems Management Server (SMS) for distribution and installation.

A Package Definition File (PDF) is included with the software for import into SMS. The PDF contains predefined Workstation, Sharing, and Inventory property settings. Use the `Import` command from the Package Properties dialog in SMS to create a new SMS package for this product.

This file contains rules to inventory machines for this software. The inventory process looks for the `NBOracle.ini` file to determine if NetBackup for Oracle on Windows NT is installed.

The status of an install or uninstall is reported to SMS by using a status Management Information Format (`.mif`) file. By default, this file is named `NBOracle.mif` and is located in the system Windows folder.

The PDF file `NBOracle.pdf` is located on the install media in the *CDROM*`:\`*Platform* folder.

Where:

CDROM is the CD-ROM drive letter

Platform is the platform: X386 for Intel

This file is directly usable only if your NetBackup installation folder was `C:\Program Files\VERITAS`. If not, folder names in the PDF file will require modification.

Install Command Line Interface

CDROM:*Platform*\Setup.exe *Setup options*

Where:

CDROM is the CD-ROM drive letter

Platform is the platform: X386 for Intel

Setup.exe Command Line Options

-f1*path\ResponseFile*	Specifies the alternate location and name of the response (.iss) file. If this option is used when running in silent mode (-s option), the response file is read from the folder/file specified by *path\ResponseFile*. If this option is used along with the -r option, the response file is written to the folder/file specified by *path\ResponseFile*.
-f2*path\LogFile*	Specifies the alternate location and name of the log file created by a silent mode install. By default, the Setup.log file is created and stored in the same folder as that of Setup.ins.
-m*filename*	Causes Setup.exe to generate a Management Information Format (.mif) file automatically at the end of the installation. Do not include a path--as part of the *filename* specification the .mif (Management Information Format) file is always placed in the system Windows folder. *filename* is optional. If you do not specify a filename, the resulting file will be called Status.mif.
-r	Causes Setup.exe to record a response file (.iss file). Setup.exe will record all your installation choices in Setup.iss and place the file in the system Windows folder.
-s	Causes Setup.exe to execute a silent installation. When running a installation in silent mode, be aware that no messages are displayed. Instead, a log file captures installation information, including whether the installation was successful. Review the log file to determine the result of the installation.
-SMS	Prevents a network connection from closing, and Setup.exe from exiting, before the installation is complete. This option works with installations originating from a Windows NT server over a network. Please note that SMS must be uppercase; this is a case-sensitive switch.

Silent Installation

A normal (non-silent) installation receives the necessary input from the user in the form of responses to dialog boxes. A silent install allows automated electronic software distribution. With a silent installation, there is no need for a user to monitor and provide

input through dialog boxes. The installation runs on its own, without any end user intervention. To launch the installation in silent mode, you must specify the `-s` option on `Setup.exe`.

The silent installation gets its user input at run time from the response file (`.iss` file). The response file is a plain text file consisting of sections containing data entries, similar to an `.ini` file. This file contains information an end user would otherwise enter in dialog boxes when running a normal setup. A response file (`Setup.iss`) for silent installation of this product is in the *CDROM*:*Platform* folder.

Note The `Setup.iss` file supplied with this product will work as is with no need for modification.

Example 1

This is an example of a silent installation using the response file delivered with the product. The CD-ROM drive letter is assumed to be `D:` and your platform is assumed to be Intel.

1. Log on as Administrator.
2. Enter the following command line.

   `D:\x386\Setup.exe -s -f1D:\x386\Setup.iss -f2C:\temp\Setup.log -m`

   - A silent installation will be performed using the response file delivered with the product.
   - An installation log file will be created in `C:\temp\Setup.log`.
   - A Management Information Format file `Status.mif` will be created in the system Windows folder.
3. Verify that the silent installation succeeded.
   a. Open the Windows NT Explorer and find `C:\temp\Setup.log`.
   b. Open `Setup.log` in a text editor.
   c. Look at the ResultCode value in the `[ResponseResult]` section of `Setup.log`. `Setup.exe` writes an appropriate return value after the *`ResultCode`* *key*name.

Example 2

This is an example of a silent installation using a response file generated by the user. The CDROM drive letter is assumed to be `D` and your platform is assumed to be Intel.

1. Type the following command line to generate a response file.

   `D:\x386\Setup.exe -r -f1C:\temp\Setup.iss`

   `Setup.exe` will record all your setup choices in the file `C:\temp\Setup.iss`.

2. Type the following command line to perform a silent installation using the response file generated in step 1.

```
D:\x386\Setup.exe -s -f1C:\temp\Setup.iss -f2C:\temp\Setup.log -mMYMIF.mif
```

   - A silent installation will be performed using the response file created in step 1.
   - An installation log file will be created in `C:\temp\Setup.log`.
   - A Management Information Format file `MYMIF.mif` will be created in the system Windows folder.

3. Verify that the silent installation succeeded.
   a. Open the Windows NT Explorer and find `C:\temp\Setup.log`.
   b. Open `Setup.log` in a text editor.
   c. Look at the ResultCode value in the `[ResponseResult]` section of `Setup.log`. `Setup.exe` writes an appropriate return value after the ResultCode keyname.

Uninstall Command Line Interface

%WINDIR%\IsUninst.exe *options*

Where *%WINDIR%* is the environment variable defining the location of the system Windows folder.

IsUninst.exe Command Line Options

-a	Runs the uninstall in silent mode.
-f"Uninstall log file"	Specifies the location and name of the uninstall log file. During setup, events for the uninstall were recorded in the Uninstall log file. The events recorded in this file are for the creation of: ◆ files ◆ folders ◆ program items ◆ registry entries ◆ self-registration of files ◆ some types of initialization file changes. When launched, unInstallShield undoes the recorded events. By default, the log file was created at installation time and is located and named as follows: *install_path*\UnIsNBOracle.isu
-c"Uninstall custom DLL"	Specifies the full pathname of an uninstall DLL used to perform custom uninstall functions. The uninstall for this product uses a custom uninstall DLL to remove files that were created at run time. The custom .dll was installed at installation time and is located and named as follows: *install_path*\NetBackup\DbExt\Oracle\UnIsNBOracle.dll
-m"Uninstall MIF file"	Creates an uninstall .mif (Management Information Format) file. Do not include a path as part of the *filename* specification. The .mif (Management Information Format) file is always placed in the system Windows folder. *filename* is optional. If you do not specify a filename, the resulting file will be called Uninst.mif.

Silent Uninstall

Silent uninstall suppresses the display of all user interfaces. During a normal uninstall, when a shared file is encountered, the interface would display a dialog box asking the user whether to remove the shared file.

When a shared file is encountered during a silent uninstall, the interface will automatically reduce the reference count to zero and not remove the file. Therefore, running in silent mode is functionally equivalent to an uninstall in which the user selects the No To All option when this dialog box first appears.

Example

This is an example of a silent uninstall.

1. Log on as Administrator.
2. Enter the following command line.

```
ISUNINST.EXE -a -f"install_path\UnIsNBOracle.isu"
     -c"install_path\NetBackup\dbext\Oracle\UnIsNBOracle.dll"
     -mMyUninst.mif
```

   - A silent uninstall will be performed.
   - Events recorded in the Uninstall log file *install_path*\UnIsNBOracle.isu will be undone.
   - The Uninstall custom DLL will be invoked to remove any run-time created files.
   - A Management Information Format file MyUninst.mif file will be created in the system Windows folder.

Configuration 4

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

The following is the configuration procedure.

1. Configure Media Manager.
2. Add Oracle Classes to NetBackup.
3. Configure Run-Time Environment.
4. Create Scripts.
5. Test NetBackup for Oracle on Windows NT Configuration Settings.

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

Configure Media Manager

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

- Refer to the *Media Manager for NetBackup System Administrator's Guide - UNIX* if the NetBackup server is UNIX.
- Refer to the *Media Manager for NetBackup System Administrator's Guide - Windows NT/2000* if the NetBackup server is Windows NT/2000.

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

Add Oracle Classes to NetBackup

This section provides an overview of how to configure NetBackup to perform backup and restore operations.

To use NetBackup for Oracle on Windows NT, you must add at least one Oracle class to NetBackup, then define the appropriate schedules for that class. This section contains the following:

- Issues to remember while configuring a class for NetBackup for Oracle on Windows NT.
- Class configuration procedures for the NetBackup Java Interface and the NetBackup Windows NT/2000 interface

Most requirements for Oracle classes are the same as for file system backups. Refer to the *NetBackup System Administrator's Guide - UNIX* or the *NetBackup System Administrator's Guide - Windows NT/2000* for detailed configuration instructions.

Some issues of importance are:

- Expiration of Backup Files
- Environment Variables Set During an Automatic Backup
- Example Scripts
- Maximum Jobs per Client Global Attribute

Expiration of Backup Files

NetBackup and Oracle keep backup image information in catalogs. Currently, automatic expiration of backup images from both catalogs is not supported.

The following describes how to expire images and synchronize the NetBackup and the Oracle catalogs.

Expiration of Backup Images from the NetBackup Catalog Using Retention Level

NetBackup automatically controls the expiration of the Oracle backup images from its catalog using the retention setting in a *Backup Policy* schedule.

Use the retention setting to specify the length of time before NetBackup expires a backup image. Note that the retention setting has a slightly different meaning for a *Backup Policy* schedule and an automatic backup schedule. Refer to "Class Configuration Procedures" on page 32 for details.

When you use the retention setting to expire backup images, you must perform periodic Oracle catalog maintenance to remove catalog references to expired backup files.

Oracle7 Enterprise Backup Utility Catalog Maintenance

Manually remove references to backup images from the Oracle catalog. Use the `ebutool` utility or the `invalidate` script command to delete successfully completed jobs. Any of these methods deletes Backup File Set information from both the Oracle7 Enterprise Backup Utility catalog and the NetBackup catalogs.

When a request is issued to delete a backup file from the EBU catalog, it sends the request to NetBackup for Oracle on Windows NT to delete the corresponding image from the NetBackup catalog regardless of the retention level.

Oracle8 Recovery Manager Catalog Maintenance

Manually remove references to backup images from the Oracle catalog. Use RMAN catalog maintenance commands to remove references to backup files. You can use these commands to delete backup image information from both the Oracle recovery catalog and the NetBackup catalog. For more information on the catalog maintenance commands, refer to "Maintaining a Recovery Catalog" on page 104.

When a request is issued to delete a backup file from the recovery catalog, RMAN sends the request to NetBackup for Oracle on Windows NT to delete the corresponding image from the NetBackup catalog, regardless of the retention level.

Environment Variables Set During an *Automatic Backup*

When a schedule is executed, NetBackup sets environment variables based on which automatic backup schedule is selected. These environment variables can then be used by Oracle scripts to conditionally start a backup. Refer to "Environment Variables Set Up by NetBackup for Oracle on Windows NT" on page 61.

Example Scripts

The scripts provided with this product are not intended for production. You must modify these scripts to suit your needs.

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

Refer to "Create Scripts" on page 64 for instructions on using the example scripts to create scripts of your own.

Maximum Jobs per Client Global Attribute

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

`Max Jobs per Client =` *Number of Streams* `x` *Number of Classes*

Where:

- *Number of Streams* is the number of backup streams between the database server and NetBackup. Each separate stream starts a new backup job on the client.
- *Number of Classes* is the number of classes that may back up this client at the same time. This number can be greater than one. For example, a client may be in two classes in order to back up two different databases. These backup windows may overlap.

For Oracle backups and restores, the number of jobs is hard to determine, as Oracle internally determines when and how many streams to run in parallel to optimize performance.

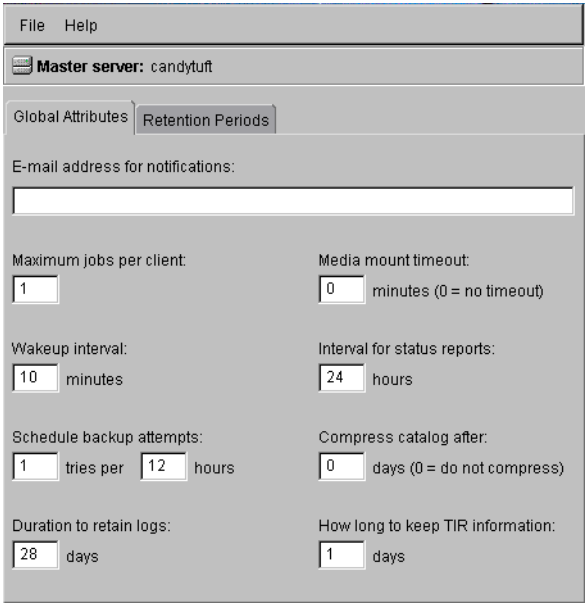
To avoid any problems, we recommend that you enter a value of 99 for the Maximum jobs per client global attribute.

NetBackup Administration - Java Interface

Use this procedure to set the Maximum Jobs per Client global attribute on the NetBackup Administration - Java Interface for HP or Solaris operating systems.

1. On the Configure menu in the NetBackup Administration dialog box, click NetBackup System Configuration. The System Configuration dialog box appears.

2. In the Master Server dialog box, click the Global Attributes tab.



   The default value is 1 for Maximum jobs per client.

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

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

`xbpadm` Interface

Use this procedure to set the Maximum Jobs per Client global attribute on a UNIX NetBackup master server.

1. Log onto the server as root.
2. Start the NetBackup `xbpadm` administrator interface.
   - If the `DISPLAY` variable is set, type:

     ```
     /usr/openv/netbackup/bin/goodies/xbpadm &
     ```

   - If the `DISPLAY` variable is not set, use the `-d` option:

     ```
     /usr/openv/netbackup/bin/goodies/xbpadm -d (your_machine_name):0 &
     ```

   The NetBackup Administration dialog box will open.
3. From the File menu, click Change NetBackup Configuration. The NetBackup Configuration dialog box will appear.

   The default value is 1 for Maximum jobs per client.
4. Change the Maximum jobs per client value to a value equal to the maximum number of backups allowed per client.

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

5. Click OK.

NetBackup Administration - Windows NT/2000 Interface

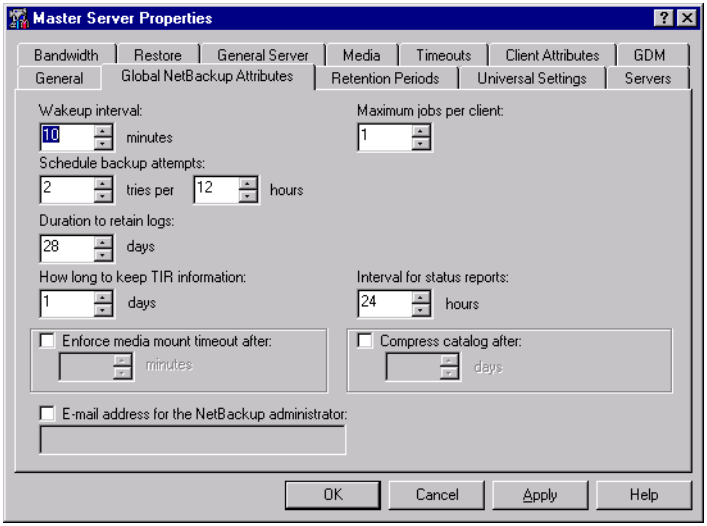
Use this procedure to set the Maximum Jobs per Client global attribute on a Windows NT/2000 server or on the NetBackup Administration Client host.

1. On the Start menu in the NetBackup Administration window, click Configure NetBackup. The Configure-NetBackup dialog box appears.

2. In the left pane, right-click on the server and on the shortcut menu click Properties (Read/Write).

   The Master Server Properties dialog box appears.

3. In the Master Server Properties dialog box, click the Global NetBackup Attributes tab.



   The default value is 1 for Maximum jobs per client.

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

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

Class Configuration Procedures

NetBackup classes define the criteria for the backup. These criteria include:

- clients and the NetBackup for Oracle on Windows NT script files to be executed on the clients
- storage unit and media to use
- backup schedules

Procedures in this section describe how to configure a class for NetBackup for Oracle on Windows NT on a NetBackup server. There are other attributes for a class to consider. Refer to the *NetBackup System Administrator's Guide - UNIX* or the *NetBackup System Administrator's Guide - Windows NT/2000* for details on how to configure all the attributes.

NetBackup Administration - Java Interface

Use this procedure to configure a class on the NetBackup Administration - Java Interface on HP or Solaris operating systems.

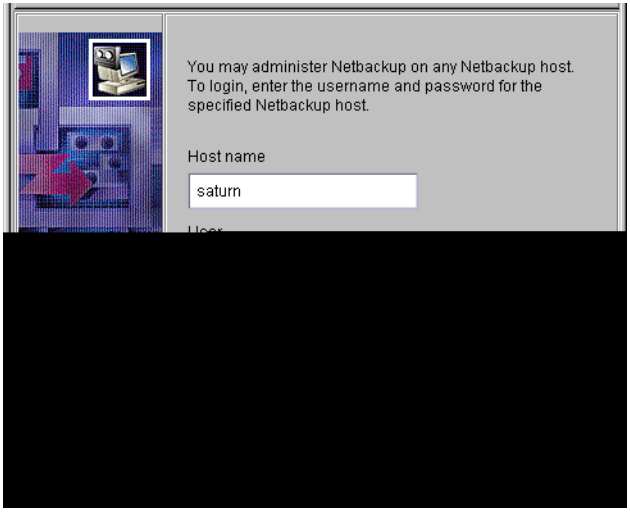
1. Log onto the server as root.
2. Start the NetBackup administrator interface by entering:

   install_path`/netbackup/bin/jnbSA &`

   For additional usage information, enter:

   `jnbSA -h`

   The Login dialog box appears.

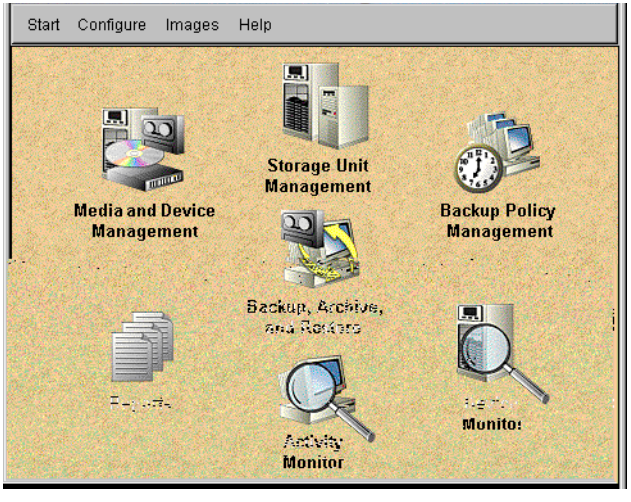


3. Type the password.

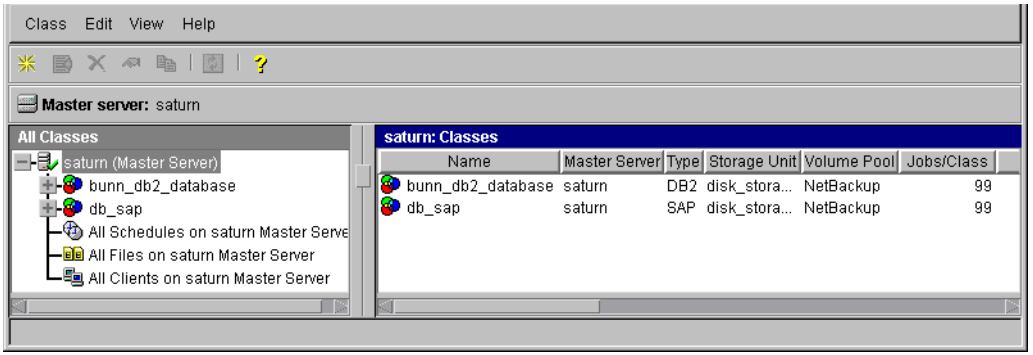
4. Press Login.

   The Login dialog closes and the NetBackup Assistant displays.

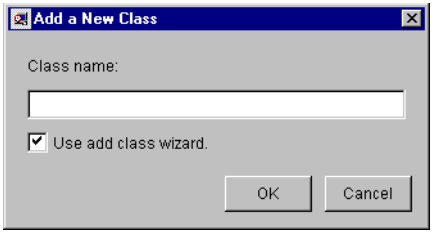
5. Click Close. The launch screen displays.



6. Click the Backup Policy Management icon. The Backup Policy Management (Classes) - NetBackup dialog appears.



7. On the Edit menu click New. The Add a New Class dialog box appears.

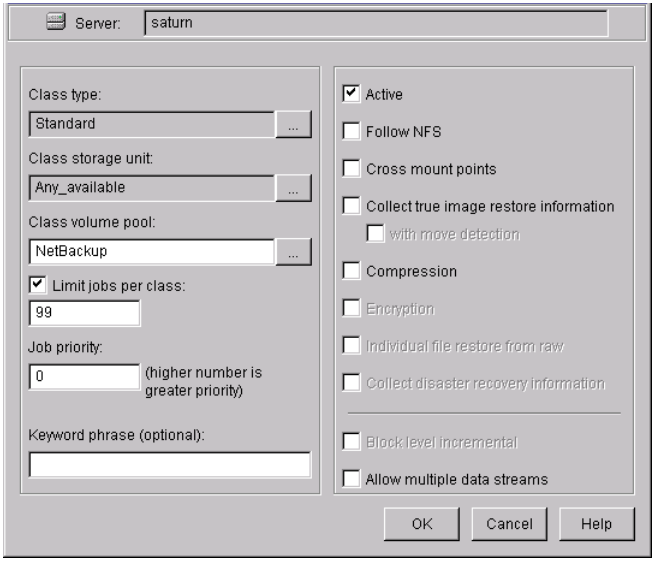


The class wizard automates the class configuration process. To configure classes without using the class wizard, use the following instructions.

8. Clear the Use add class wizard check box.

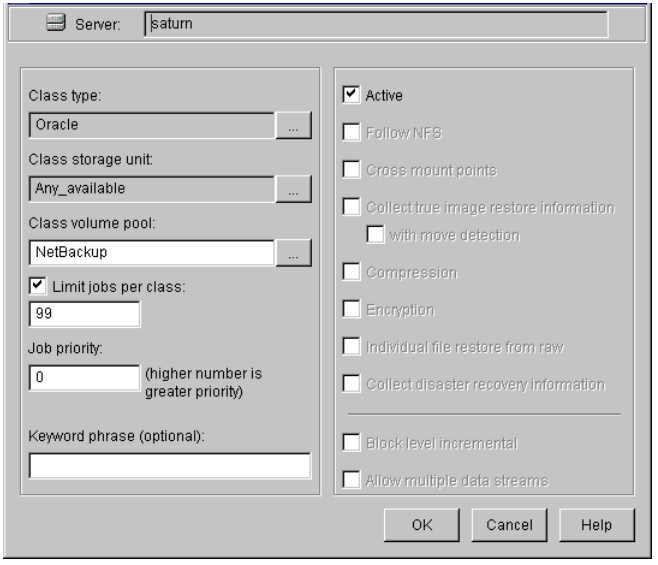
9. Type the new class name in the Class name box.

10. Click OK. The Change Attributes dialog box appears.



a. Select the Oracle class type for Oracle.

b. Click OK. The Change Attributes dialog box will change as follows.



Refer to the following table to configure class attributes.

Class storage unit:
: Select the storage unit for this class. A storage unit is a group of one or more storage devices configured to store information from a backup.

Class volume pool:
: Select the volume pool for this class. A volume pool is a group of volumes (removable media) configured for use by NetBackup only. These volumes are protected from being used by other applications.

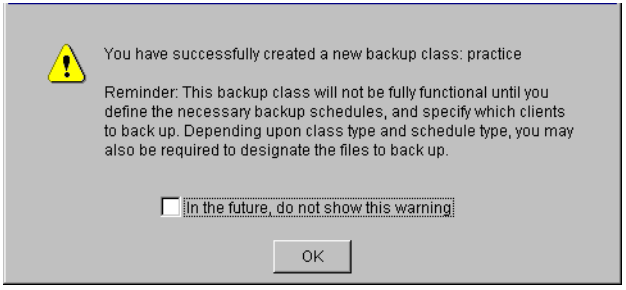
Limit jobs per class:
: Type the maximum number of concurrent jobs for this class. If the Limit jobs per class checkbox is clear, the maximum number of backup and restore jobs that NetBackup will perform concurrently for this class can be up to a limit of 999. To specify a lower limit, select the checkbox and specify a value from 1 to 999 (the default is 99).

Job priority
: Select a value for the job priority NetBackup will assign to automatic backup jobs for this class. When a drive becomes available, NetBackup assigns it to the first client in the highest priority class.

Keyword phrase:
: For NetBackup for Oracle on Windows NT, the keyword phrase entry is ignored.

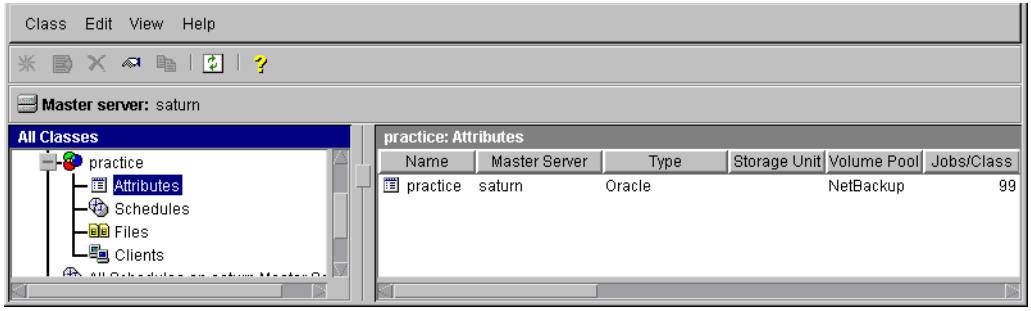
Active
: Select the checkbox to perform scheduled operations defined in this class. The class must be active for NetBackup to execute automatic backup schedules or allow user backups or archives.

c. Click OK to close the Change Attributes dialog box. The following Warning appears.



d. Click OK to close the Warning box.

Notice that the newly created class appears in the All Master Servers pane in the Backup Policy Management (Classes) - NetBackup dialog box.



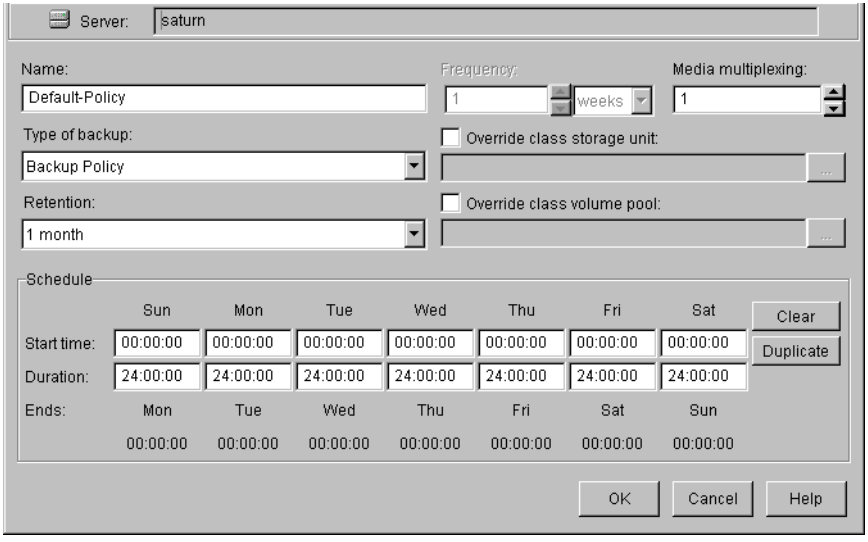
Also notice that the configuration settings you entered in the Change Attributes dialog box are displayed in the *class: Attributes* pane. Use the scroll bar at the bottom of the *class: Attributes* pane to view all settings.

11. Refer to the following instructions to configure schedules for your class.

a. Click Schedules in the All Master Servers pane of the Backup Policy Management (Classes) - NetBackup dialog box.

Notice that a Default-Policy appears in the *class: Attributes* pane.

b. Double-click the Default-Policy schedule in the *class: Attributes* pane. The Change Schedules dialog box appears.



c. Configure a *Backup Policy* schedule.

All Oracle database operations are performed through NetBackup for Oracle on Windows NT using a *Backup Policy* schedule. This includes those backups started automatically.

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

Refer to the following table when configuring *Backup Policy* schedules.

Name:
: Each schedule requires a unique name.

Type of backup:
: A *Backup Policy* schedule enables user-controlled NetBackup operations performed on the client.
At least one *Backup Policy* schedule must be configured in each Oracle class. The Default-Policy schedule is configured as a *Backup Policy* schedule.

Retention:
: The retention period for a *Backup Policy* schedule refers to the length of time that NetBackup keeps backup images. Set the time period to retain at least two full backups of your database. In this way, if one full backup has been lost, you will have another full backup to fall back on. For example, if your database is backed up once every Sunday morning, you should select a retention period of at least 2 weeks.

Note Oracle is not notified when NetBackup expires a backup image. You must use Oracle catalog maintenance commands to periodically delete expired backup sets from the Oracle catalog.

Media Multiplexing
: The media multiplexing box sets the number of jobs from this schedule that NetBackup can multiplex onto any one drive.

Start:
: Specifies the day and time when the backup windows will open.

Duration:
: Specifies the period of time (backup window) during which the backup job can take place.

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

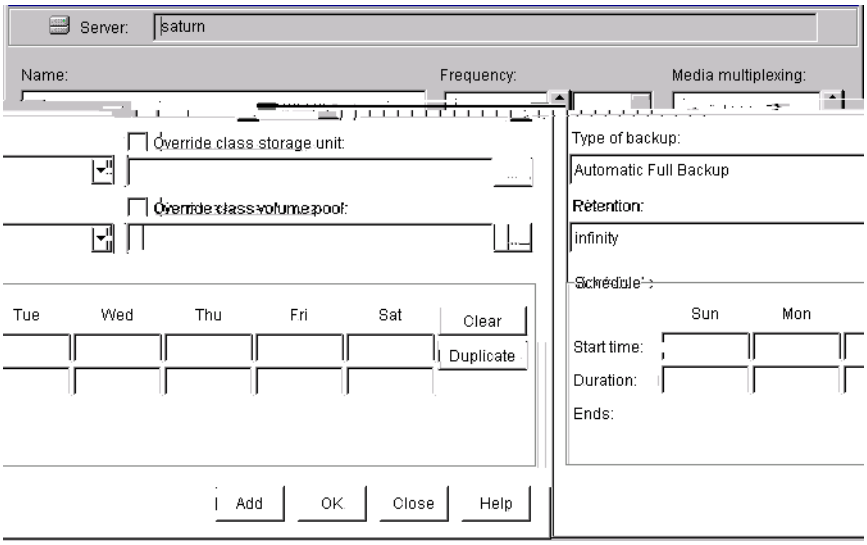
For example, assume that you:
- expect users to perform NetBackup operations during business hours, 0800 to 1300.
- configured automatic backups to start between 1800 and 2200.

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

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

d. Configure an automatic backup.

Double-click on Schedules in the All Master Servers pane of the Backup Policy Management (Classes) - NetBackup dialog box. The Add Schedule - Class *classname* property sheet appears.



Refer to the following table when configuring *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedules.

Name:

Each schedule requires a unique name.

Type of backup:

An *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedule specifies the dates and times when NetBackup will automatically start backups by running the NetBackup for Oracle scripts in the order that they appear in the file list. If there is more than one client in the Oracle class, the NetBackup for Oracle scripts are executed on each client.

Retention:

The retention period for an *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedule controls how long NetBackup keeps records of when scheduled backups have occurred. Note that this is different than with a *Backup Policy* schedule.

The NetBackup scheduler compares the latest record to the frequency to determine whether a backup is due. This means that if you set the retention period to expire the record too early, the scheduled backup

frequency will be unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog will accumulate unnecessary records. Therefore, set a retention period that is *longer* than the frequency setting for the schedule.

For example, if the frequency setting is set to one week, set the retention period to be more than one week.

Frequency

Refers to the time period to wait between backups.

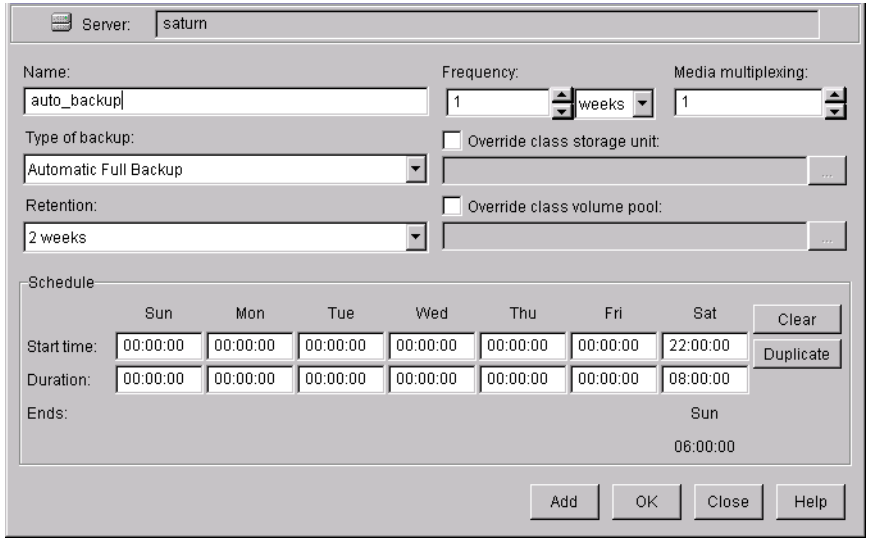
Start:

Specifies the day and time when the backup windows will open.

Duration:

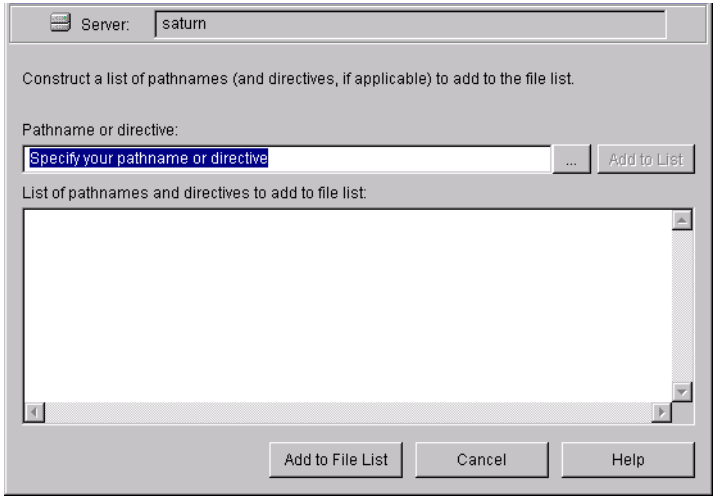
Specifies the period of time (backup window) during which the backup job can take place.

The following illustrates how an automatic backup schedule might be configured.



12. Refer to the following instructions to configure the list of NetBackup for Oracle scripts.

a. Double-click on Files in the All Master Servers pane of the Backup Policy Management (Classes) - NetBackup dialog box. The Add File Class appears.



The File list in a database class has a different meaning than for other classes. Normally, in a Standard class, you would list files and directories to be backed up. But since you are now configuring a database class, you will list NetBackup for Oracle scripts.

Refer to “Create Scripts” on page 64 for more details.

b. Type the NetBackup for Oracle script. Specify the full pathname.

For example:

install_path`\NetBackup\dbext\Oracle\samples\RMAN\cold_database_backup.cmd`

c. Click Add.

Since all NetBackup for Oracle scripts specified in the file list execute during automatic backups, you must make sure that only one type of backup is executed on the same database.

To make sure the correct script gets executed, use the environment variables set up by NetBackup when it initiates an automatic backup schedule. Code in the NetBackup for Oracle script can use the environment variables to determine what RMAN command file to use for the backup.

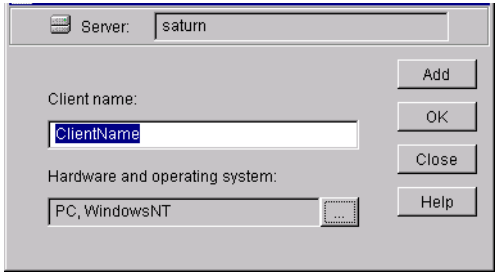
For example:

If an automatic cumulative incremental type of backup is executed, the NetBackup for Oracle script would use an RMAN script containing commands to perform a cumulative incremental backup. Only one NetBackup for Oracle script is necessary to handle different schedules.

For more details on using environmental variables with automatic backup, refer to "Environment Variables Set Up by NetBackup for Oracle on Windows NT" on page 61.

13. Refer to the following instructions to configure the Client list.

a. Double-click on Clients in the All Master Servers pane of the Backup Policy Management (Classes) - NetBackup dialog box. The Add Client Class dialog box appears.



b. Type the name of the client. This client should have:

- the database installed
- NetBackup for Oracle on Windows NT installed
- the backup or restore NetBackup for Oracle script(s)

c. Click Add to add the client to the client list.

d. Click OK.

The Add Client Class dialog box will close. The NetBackup Administration dialog box will remain open.

`xbpadm` Interface

Use this procedure to configure a class on a UNIX NetBackup master server.

1. Log onto the server as root.
2. Start the NetBackup `xbpadm` administrator interface.
   - If the `DISPLAY` variable is set, type:

     `/usr/openv/netbackup/bin/goodies/xbpadm &`
   - If the `DISPLAY` variable is not set, use the `-d` option:

     `/usr/openv/netbackup/bin/goodies/xbpadm -d (`*`your_machine_name`*`):0 &`

   The NetBackup Administration dialog box will open.
3. Create a new class.
   - **a.** On the Actions menu, select New, then Classes. The Creating a Class dialog box will open.
   - **b.** In the Class Name box, type the new class name.

     When you configure the Oracle class on your NetBackup installation, you will use a unique class name. For this procedure, we are going to use the word ***practice*** as the class name.
   - **c.** Under Select one of, select New Class. The Class Type list box will enable.
   - **d.** Select the Oracle class from the list box.
   - **e.** Click OK. The Changing Class dialog box will open.
4. Check the Class Attribute settings.

   Refer to the following table to configure class attributes.

   Class storage unit:
   : Select the storage unit for this class. A storage unit is a group of one or more storage devices configured to store information from a backup.

Class volume pool:
: Select the volume pool for this class. A volume pool is a group of volumes (removable media) configured for use by NetBackup only. These volumes are protected from being used by other applications.

Limit jobs per class:
: Type the maximum number of concurrent jobs for this class. If the Limit jobs per class checkbox is clear, the maximum number of backup and restore jobs that NetBackup will perform concurrently for this class can be up to a limit of 999. To specify a lower limit, select the checkbox and specify a value from 1 to 999 (the default is 99).

Job priority
: Select a value for the job priority NetBackup will assign to automatic backup jobs for this class. When a drive becomes available, NetBackup assigns it to the first client in the highest priority class.

Keyword phrase:
: For NetBackup for Oracle on Windows NT, the keyword phrase entry is ignored.

Active
: Select the checkbox to perform scheduled operations defined in this class. The class must be active for NetBackup to execute automatic backup schedules or allow user backups or archives.

5. Refer to the following instructions to configure the schedules for your class.

a. Click Schedules to change the display.

b. Click New to open the Creating a Schedule dialog box.

c. In the Name of Schedule box, type the new schedule name.

d. Click OK. The Creating a Schedule dialog box will open.

e. Configure a *Backup Policy* schedule.

All Oracle database operations are performed through NetBackup for Oracle on Windows NT using a *Backup Policy* schedule. This includes those backups started automatically.

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

Refer to the following table when configuring *Backup Policy* schedules.

Name:

Each schedule requires a unique name.

Type of backup:

A *Backup Policy* schedule enables user-controlled NetBackup operations performed on the client.
At least one *Backup Policy* schedule must be configured in each Oracle class. The Default-Policy schedule is configured as a *Backup Policy* schedule.

Retention:

The retention period for a *Backup Policy* schedule refers to the length of time that NetBackup keeps backup images. Set the time period to retain at least two full backups of your database. In this way, if one full backup has been lost, you will have another full backup to fall back on. For example, if your database is backed up once every Sunday morning, you should select a retention period of at least 2 weeks. Oracle is not notified when NetBackup expires a backup image. You must use Oracle catalog maintenance commands to periodically delete expired backup sets from the Oracle catalog.

Note Oracle is not notified when NetBackup expires a backup image. You must use Oracle catalog maintenance commands to periodically delete expired backup sets from the Oracle catalog.

Media Multiplexing

The media multiplexing box sets the number of jobs from this schedule that NetBackup can multiplex onto any one drive.

Start:

Specifies the day and time when the backup windows will open.

Duration:

Specifies the period of time (backup window) during which the backup job can take place.

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

For example, assume that you:
- expect users to perform NetBackup operations during business hours, 0800 to 1300.
- configured automatic backups to start between 1800 and 2200.

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

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

f. Configure an automatic backup.

Refer to the following table when configuring *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedules.

Name:
: Each schedule requires a unique name.

Type of backup:
: An *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedule specifies the dates and times when NetBackup will automatically start backups by running the NetBackup for Oracle scripts in the order that they appear in the file list. If there is more than one client in the Oracle class, the NetBackup for Oracle scripts are executed on each client.

Retention:
: The retention period for an *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedule controls how long NetBackup keeps records of when scheduled backups have occurred. Note that this is different than with a *Backup Policy* schedule.

  The NetBackup scheduler compares the latest record to the frequency to determine whether a backup is due. This means that if you set the retention period to expire the record too early, the scheduled backup frequency will be unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog will accumulate unnecessary records. Therefore, set a retention period that is *longer* than the frequency setting for the schedule.

  For example, if the frequency setting is set to one week, set the retention period to be more than one week.

Frequency
: Refers to the time period to wait between backups.

Start:
: Specifies the day and time when the backup windows will open.

Duration:
: Specifies the period of time (backup window) during which the backup job can take place.

6. Refer to the following instructions to configure the Files list for your class.

   Perform this procedure if unattended schedule backups are going to be performed. Otherwise this step can be skipped.

   a. Click Files.

      The File list in a database class has a different meaning than for other classes. Normally, in a Standard class, you would list files and directories to be backed up. But since you are now configuring a database class, you will list NetBackup for Oracle scripts.

      Refer to "Create Scripts" on page 64 for more details on scripts.

   b. Specify the full path name for a NetBackup for Oracle script in the file list. For example:

install_path`\NetBackup\dbext\Oracle\samples\RMAN\cold_database_backup.cmd`

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

   Since all NetBackup for Oracle scripts specified in the file list execute during automatic backups, you must make sure that only one type of backup is executed on the same database.

   To make sure the correct script gets executed, use the environment variables set up by NetBackup when it initiates an automatic backup schedule. Code in the NetBackup for Oracle script can use the environment variables to determine what RMAN command file to use for the backup.

   For example:

   If an automatic cumulative incremental type of backup is executed, the NetBackup for Oracle script would use an RMAN script containing commands to perform a cumulative incremental backup. Only one NetBackup for Oracle script is necessary to handle different schedules.

   For more details on using environmental variables with automatic backup, refer to "Environment Variables Set Up by NetBackup for Oracle on Windows NT" on page 61.

7. Refer to the following instructions to configure the Clients list for your class.

   a. Click Clients to change the display.

   b. Click New to open the Adding Clients dialog box.

   c. Select the hardware and operating system from the Hardware and Operating System: scroll box.

d. Type the name of the client. This client should have:

- the database installed
- NetBackup for Oracle on Windows NT installed
- the backup or restore NetBackup for Oracle script(s)

Note The Install NetBackup Client Software checkbox will install NetBackup client software on a remote client. There is no option to install NetBackup for Oracle on Windows NT software. Refer to the installation instructions in this guide to install NetBackup for Oracle on Windows NT.

e. Click OK.

8. Click OK.

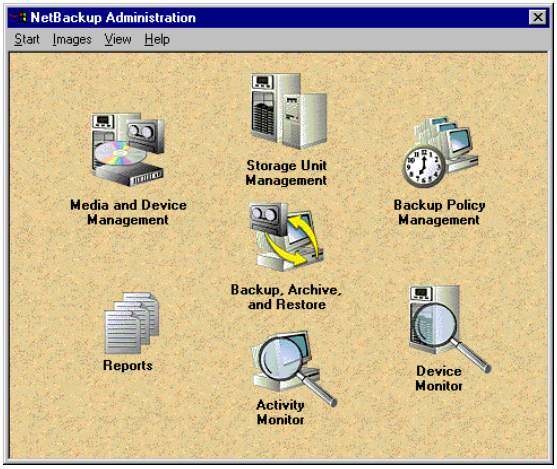
The Changing Class dialog box will close. The NetBackup Administration dialog box will remain open.

NetBackup Administration - Windows NT/2000 Interface

Use this procedure when configuring a class from a Windows NT/2000 server or from the NetBackup Administration Client host.

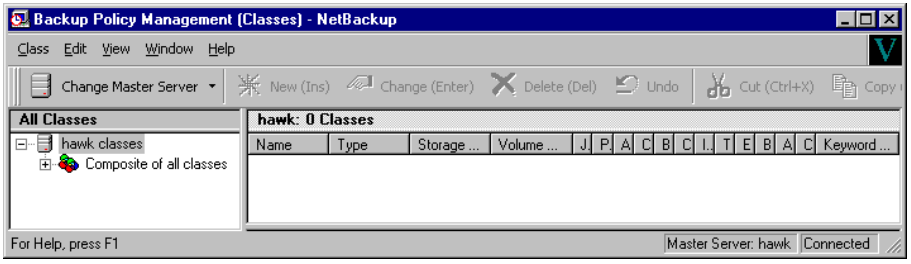
1. Log onto the server as Administrator.

2. From the Start menu, select Programs, VERITAS NetBackup, NetBackup Administration. The NetBackup Administration interface appears.



3. Click the Backup Policy Management icon.

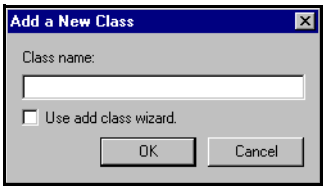
   The Backup Policy Management (Classes) - NetBackup dialog appears.



4. Perform the following steps to add a new class.

The class wizard automates the class configuration process. To configure classes without using the class wizard, perform the following steps.

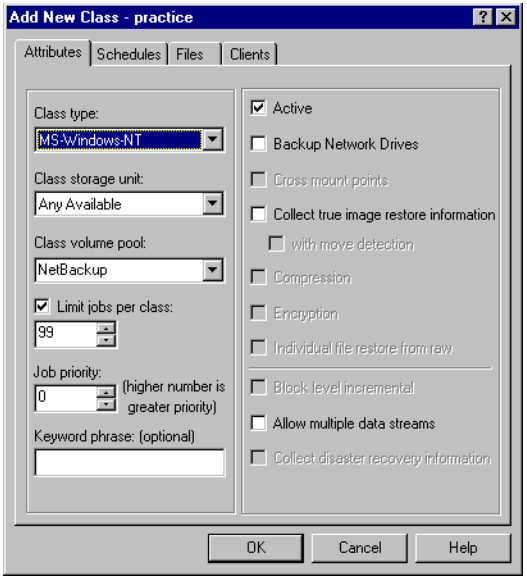
a. On the Class menu click New. The Add a New Class dialog box appears.



b. Confirm that the Use add class wizard check box is not checked.

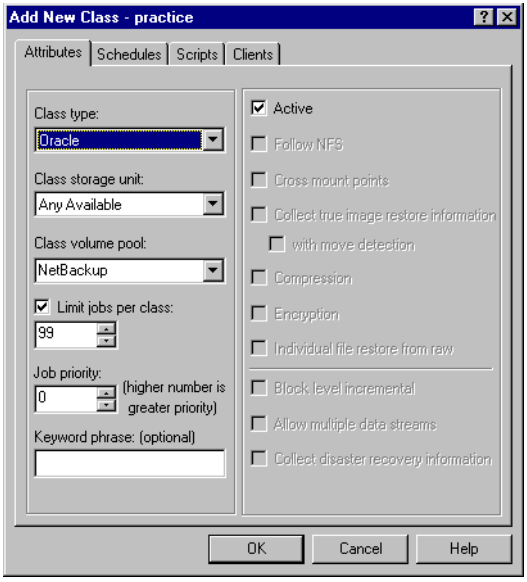
c. Type the new class name in the Class name box.

d. Click OK. The Add New Class dialog box appears. The class name you specified appears in the title bar.



5. Use the following instructions to configure the general attributes for the class.

a. Select the Oracle class type.



Refer to the following table to configure class attributes.

Class storage unit:
: Select the storage unit for this class. A storage unit is a group of one or more storage devices configured to store information from a backup.

Class volume pool:
: Select the volume pool for this class. A volume pool is a group of volumes (removable media) configured for use by NetBackup only. These volumes are protected from being used by other applications.

Limit jobs per class:
: Type the maximum number of concurrent jobs for this class. If the Limit jobs per class checkbox is clear, the maximum number of backup and restore jobs that NetBackup will perform concurrently for this class can be up to a limit of 999. To specify a lower limit, select the checkbox and specify a value from 1 to 999 (the default is 99).

Job priority
: Select a value for the job priority NetBackup will assign to automatic backup jobs for this class. When a drive becomes available, NetBackup assigns it to the first client in the highest priority class.

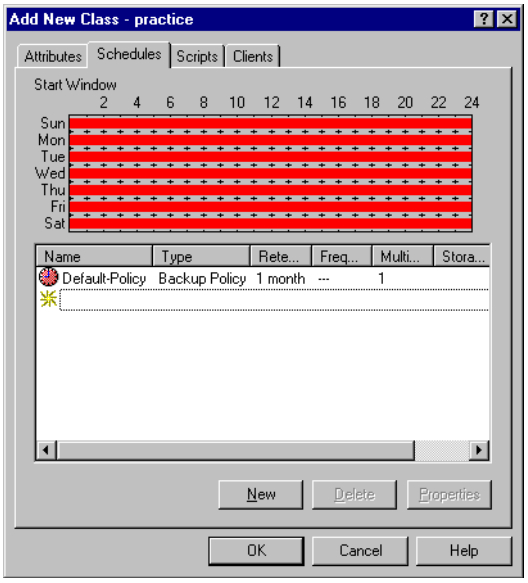
Keyword phrase:
: For NetBackup for Oracle on Windows NT, the keyword phrase entry is ignored.

Active

Select the checkbox to perform scheduled operations defined in this class. The class must be active for NetBackup to execute automatic backup schedules or allow user backups or archives.

6. Use the following instructions to configure the class schedules.

a. Click Schedules tab. The Schedules property sheet appears.



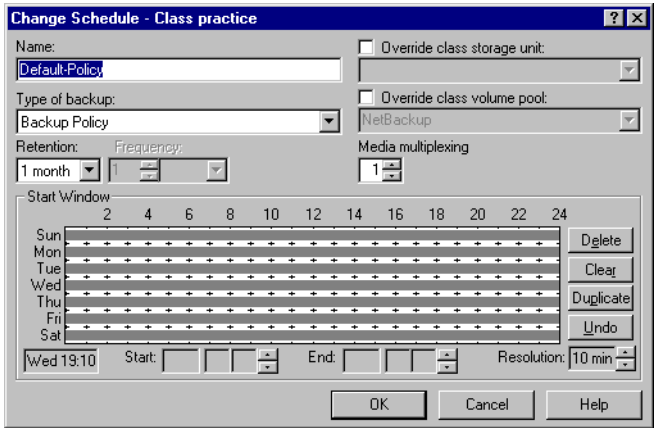
b. Configure a *Backup Policy* schedule.

All Oracle database operations are performed through NetBackup for Oracle on Windows NT using a *Backup Policy* schedule. This includes those backups started automatically.

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

c. Double-click on Backup Schedule in the Add New Class dialog box.

The Change Schedules dialog box appears.



Refer to the following table when configuring *Backup Policy* schedules.

Name:

Each schedule requires a unique name.

Type of backup:

A *Backup Policy* schedule enables user-controlled NetBackup operations performed on the client.

At least one *Backup Policy* schedule must be configured in each Oracle class. The Default-Policy schedule is configured as a *Backup Policy* schedule.

Retention:

The retention period for a *Backup Policy* schedule refers to the length of time that NetBackup keeps backup images. Set the time period to retain at least two full backups of your database. In this way, if one full backup has been lost, you will have another full backup to fall back on. For example, if your database is backed up once every Sunday morning, you should select a retention period of at least 2 weeks.

Note Oracle is not notified when NetBackup expires a backup image. You must use Oracle catalog maintenance commands to periodically delete expired backup sets from the Oracle catalog.

Media Multiplexing

The media multiplexing box sets the number of jobs from this schedule that NetBackup can multiplex onto any one drive.

Start:

Specifies the day and time when the backup windows will open.

End:

Specifies the day and time when the backup windows will close.

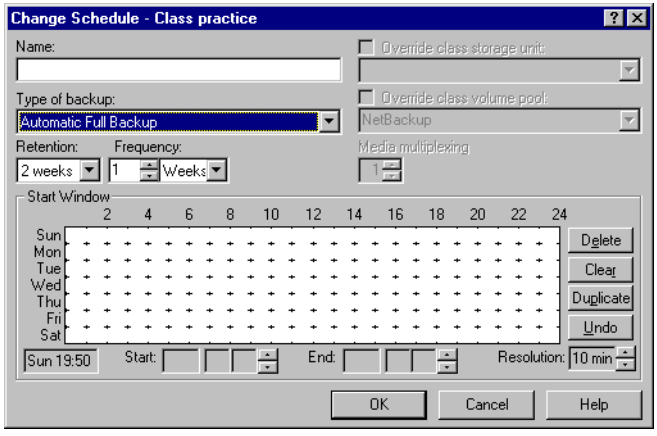
The backup window for a *Backup Policy* schedule must encompass the time period during which all NetBackup jobs, scheduled and unscheduled, will occur. This is necessary because the *Backup Policy* schedule starts processes that are required for all NetBackup for Oracle on Windows NT backups, including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

For example, assume that you:
- expect users to perform NetBackup operations during business hours, 0800 to 1300.
- configured automatic backups to start between 1800 and 2200.

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

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

d. Click New to configure an automatic backup schedule. The Change Schedules dialog box appears.



Refer to the following table when configuring *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedules.

Name:

Each schedule requires a unique name.

Type of backup:

An *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedule specifies the dates and times when NetBackup will automatically start backups by running the NetBackup for Oracle scripts in the order that they appear in the file list. If there is more than one client in the Oracle class, the NetBackup for Oracle scripts are executed on each client.

Retention:

The retention period for an *Automatic Full Backup, Automatic Differential Incremental Backup,* or *Automatic Cumulative Incremental Backup* schedule controls how long NetBackup keeps records of when scheduled backups have occurred. Note that this is different than with a *Backup Policy* schedule.

The NetBackup scheduler compares the latest record to the frequency to determine whether a backup is due. This means that if you set the retention period to expire the record too early, the scheduled backup frequency will be unpredictable. However, if you set the retention period to be longer than necessary, the NetBackup catalog will accumulate unnecessary records. Therefore, set a retention period that is *longer* than the frequency setting for the schedule.

For example, if the frequency setting is set to one week, set the retention period to be more than one week.

Frequency

Refers to the time period to wait between backups.

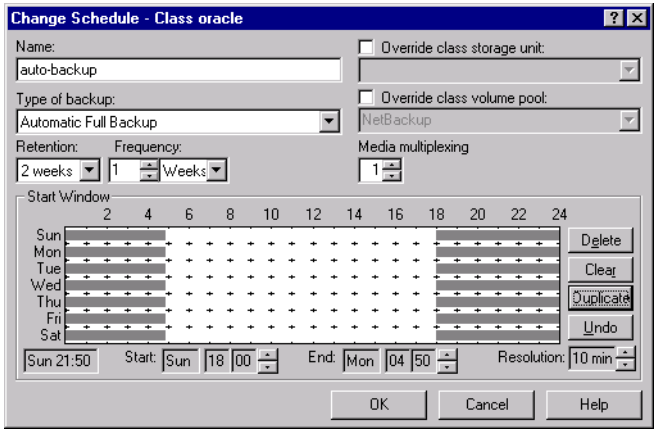
Start:

Specifies the day and time when the backup windows will open.

End:

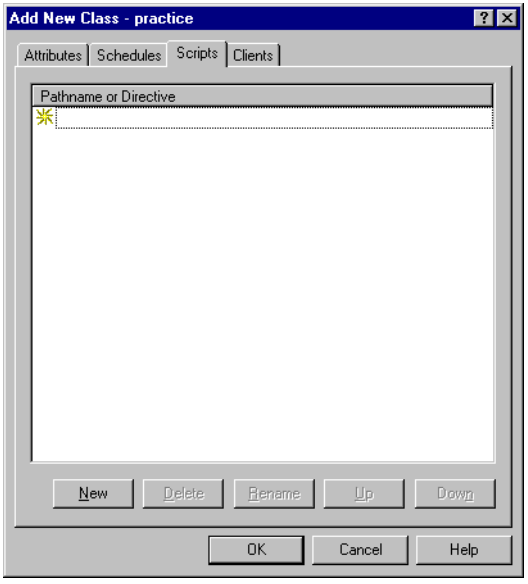
Specifies the day and time when the backup windows will close. These settings define the backup window, which is the time period during which backups can occur for this schedule. The start time defines the times and days of the week when the window opens. The duration defines how long the window stays open.

The following is an example of an automatic backup schedule.



7. Refer to the following instructions to configure the list of scripts.

a. Click Scripts tab. The Scripts property sheet appears.



The File list in a database class has a different meaning than for other classes. Normally, in a Standard class, you would list files and directories to be backed up. But since you are now configuring a database class, you will list NetBackup for Oracle scripts.

Refer to “Create Scripts” on page 64 for more details on scripts.

b. Click New.

c. Type the NetBackup for Oracle script. Specify the full pathname for the NetBackup for Oracle script in the file list.

For example:

install_path`\NetBackup\dbext\Oracle\samples\RMAN\cold_database_backup.cmd`

d. Click Enter.

Since all NetBackup for Oracle scripts specified in the file list execute during automatic backups, you must make sure that only one type of backup is executed on the same database.

To make sure the correct script gets executed, use the environment variables set up by NetBackup when it initiates an automatic backup schedule. Code in the NetBackup for Oracle script can use the environment variables to determine what RMAN command file to use for the backup.

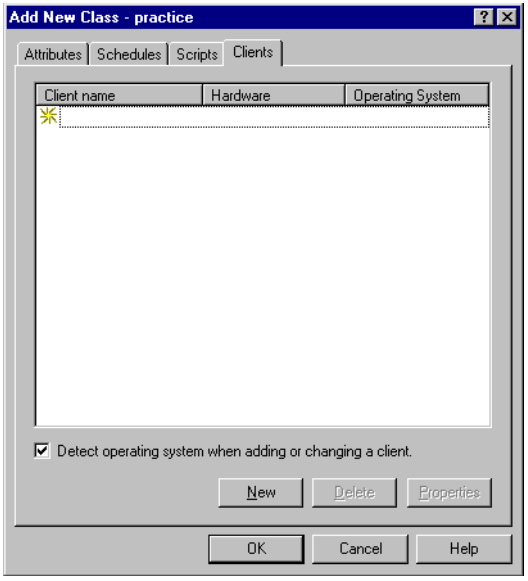
For example:

If an automatic cumulative incremental type of backup is executed, the NetBackup for Oracle script would use an RMAN script containing commands to perform a cumulative incremental backup. Only one NetBackup for Oracle script is necessary to handle different schedules.

For more details on using environmental variables with automatic backup, refer to “Environment Variables Set Up by NetBackup for Oracle on Windows NT” on page 61.

8. Refer to the following instructions to configure the Client list.

   a. Click Clients tab. The Clients property sheet appears.



   b. Click New.

   c. Type the name of the client that has:

      - the database installed
      - NetBackup for Oracle on Windows NT installed
      - the backup or restore NetBackup for Oracle script

   d. Click OK.

      The Client Hardware and Operating System dialog box appears.

   e. Select the hardware and operating system for the client.

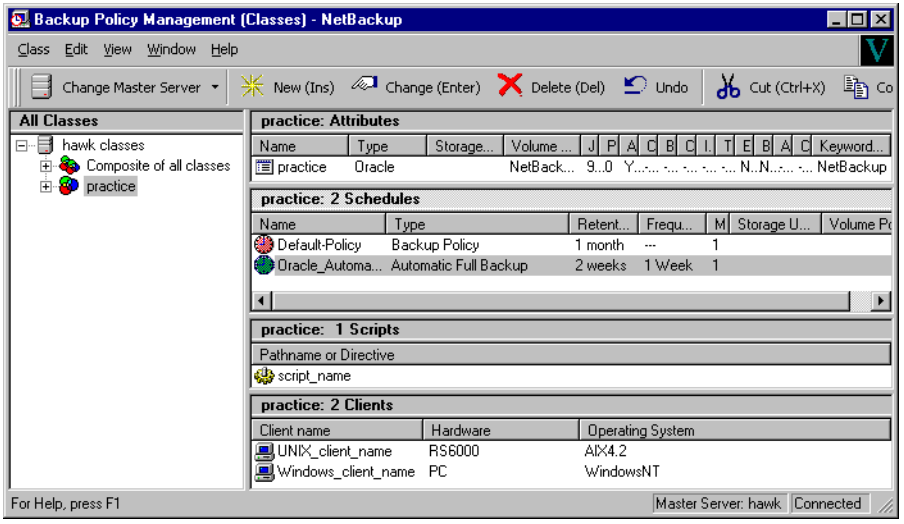
   f. Click OK.

      The Client Hardware and Operating System dialog box closes.

9. Click OK.

   The Changing Class dialog box will close. The Backup Policy Management (Classes) - NetBackup dialog box will remain open.

Example Oracle Class on a NetBackup for Windows NT/2000 Server



Configure Run-Time Environment

The following is the order of precedence for the run-time configuration variable settings (when applicable).

1. vendor-specific string with `send` command

   Refer to "Oracle 8.1.x" on page 62 for details.

2. `parms` operand

   Refer to "Oracle 8.0.x and Oracle 8.1.x" on page 63 for details.

3. environment variables

   Refer to "Environment Variables Set Up by a User" on page 62 or "Environment Variables Set Up by NetBackup for Oracle on Windows NT" on page 61 for details.

Environment Variables Set Up by NetBackup for Oracle on Windows NT

When a schedule executes, NetBackup sets environment variables for the local Oracle scripts to use when performing a NetBackup operation. These variables can be used to perform conditional operations inside the script. These variables are set only if the backup is started from the server (either automatically by the NetBackup scheduler or manually through the administrator interface).

NB_ORA_SERV
: Name of the NetBackup Server.

NB_ORA_CLASS
: Name of the Oracle class.

NB_ORA_FULL
: Set to 1 if this is an *Automatic Full Backup*.

NB_ORA_INCR
: Set to 1 if this is an *Automatic Differential Incremental Backup*.

NB_ORA_CINC
: Set to 1 if this is an *Automatic Cumulative Incremental Backup*.

NB_ORA_SCHEDULED
: Set to 1 if a scheduled backup (*Automatic Full Backup*, *Automatic Differential Incremental Backup*, or *Automatic Cumulative Incremental Backup*).

NB_ORA_USER_INITIATED
: Set to 1 if this is a user-initiated backup (*Backup Policy Backup*) initiated from the user interface.

- "Example 1, cold_database_backup.cmd" on page 66
- "Example 2, hot_database_backup.cmd" on page 72

◆ "Example 3, cold_duplex_database_backup_full.cmd" on page 76

Environment Variables Set Up by a User

The NetBackup for Oracle on Windows NT variables that follow can be set for use in the Oracle user environment.

NB_ORA_SERV
: Specifies the name of NetBackup master server.

NB_ORA_CLIENT
: Specifies the name of the Oracle client. It is especially useful for an alternate client restore operation.

NB_ORA_CLASS
: Specifies the name of the class to use for the Oracle backup.

NB_ORA_SCHED
: Specifies the name of the *Backup Policy* schedule to use for the Oracle backup.

Oracle7 EBU Environment

You can set any of the environment variables from within the NetBackup for Oracle script.

For example, in the NetBackup for Oracle script, the following will specify what class and server to use for a database backup in your Oracle environment.

```
set NB_ORA_CLASS your_class
set NB_ORA_SERV your_server
```

Oracle8 RMAN Environment

Because components of Oracle8 run as Services on Windows NT, special attention should be given to environment variables. The environment that a Service runs in is established when the service is started, usually when the system is booted. Typically, a Service will run under the SYSTEM account so it will take on the System level environment settings. Because a Service provides RMAN functionality, an environment variable set at runtime in an Oracle8 script will not be visible during a backup or restore.

There are two ways to specify NetBackup for Oracle on Windows NT environment variables for use during a backup or restore.

Oracle 8.1.x

You can use the `send` command to send a vender-specific quoted string to NetBackup for Oracle on Windows NT. This section describes the different ways to specify any of the variables.

- Specify the variables in the string in the RMAN script after all channels have been allocated and before the `backup` command.

```
run {
   allocate channel t1 type 'sbt_tape';
   allocate channel t2 type 'sbt_tape';
   send 'NB_ORA_CLASS=your_class, NB_ORA_SERV=your_server';
   backup
   (database format 'bk_%U_%t');
}
```

- Use the `send device type` command to send the variables to all channels of the specified type.
- Use the `send channel` command to send the variables to specific channels.

Oracle 8.0.x and Oracle 8.1.x

Use the RMAN command operand, `parms`, with each `allocate channel` command in the RMAN script to specify any of the variables.

The following example uses the `parms` operand to specify what class and server to use for a database backup. The `parms` are set per allocated channel.

```
run {
    allocate channel t1 type 'sbt_tape'
    parms="ENV=(NB_ORA_CLASS=your_class, NB_ORA_SERV=your_server)";
    allocate channel t2 type 'sbt_tape'
    parms="ENV=(NB_ORA_CLASS=your_class, NB_ORA_SERV=your_server)";
    backup
    (database format 'bk_%s_%p_%t');
}
```

For more information on the `send` command and `parms` operand of an `rman` command, see the *Oracle8 Server Backup and Recovery Guide*.

Create Scripts

Script files must be created on the client before NetBackup for Oracle on Windows NT backups can be performed automatically. This section describes the following types of scripts.

- NetBackup for Oracle script is necessary when an unattended scheduled backup is performed. These scripts are specified in the Oracle class File List. Refer to "Create NetBackup for Oracle Scripts Manually" on page 64.
- EBU script is necessary for an Oracle7 database. This script is specified as a parameter to the `ebu` command. The database administrator must create this script if it does not already exist. This must be done before using the Oracle7 Enterprise Backup Utility's `ebu` command. Refer to "EBU Scripts" on page 81.
- RMAN script is necessary for an Oracle8 database. This script is specified as a parameter to the `rman` command. The database administrator must create this script if it does not already exist. Create this script *before* using the Oracle8 Recovery Manager's `rman` command. Refer to "RMAN Script" on page 82.

For more information on scripts, see the *Oracle7 Enterprise Backup Utility Administrator's Guide* or the *Oracle8 Server Backup and Recovery Guide*.

Create NetBackup for Oracle Scripts Manually

This section describes how to manually create a NetBackup for Oracle script for:

- Enterprise Backup Utility
- Recovery Manager

Create NetBackup for Oracle Script for Enterprise Backup Utility

NetBackup for Oracle on Windows NT starts a scheduled job by executing an Oracle script file. For this example, the script file is named `db_full_bk.cmd` and contains the following:

```
set ORACLE_HOME=C:\oracle7
set ORACLE_SID=orcl
set EBU_HOME=%ORACLE_HOME%\obackup\
set NB_ORA_CLASS=obk
%EBU_HOME%\ebu %ORACLE_HOME%\obackup\scripts\db.full.bk.rcv
```

Things to note in the script above are:

1. Lines 1 - 3 are the environment variables that should be set for every `ebu` execution.

2. Line 4 is used to explicitly set the class used for this backup. We could have explicitly set other NetBackup for Oracle on Windows NT variables.

3. Line 5 executes EBU with the full path name of the EBU script as a parameter, which contains the commands that ebu will execute to perform a full backup. See "EBU Scripts" on page 81.

Create NetBackup for Oracle Script for Recovery Manager

When NetBackup for Oracle on Windows NT was initially installed, example scripts were placed in the following directory:

install_path`\NetBackup\dbext\Oracle\samples\rman`

The Oracle example scripts installed are:

```
pit_database_restore.cmd
hot_tablespace_backup.cmd
hot_database_backup.cmd
database_restore.cmd
cold_duplex_database_backup_full.cmd
cold_database_backup.cmd
pit_database_restore.rcv
hot_tablespace_backup_level1_differential.rcv
hot_tablespace_backup_level1_cumulative.rcv
hot_tablespace_backup_level0.rcv
hot_database_backup_level1_differential.rcv
hot_database_backup_level1_cumulative.rcv
hot_database_backup_level0.rcv
database_restore.rcv
cold_duplex_database_backup_full.rcv
cold_database_backup_level1_differential.rcv
cold_database_backup_level1_cumulative.rcv
cold_database_backup_level0.rcv
```

1. Copy the example scripts to a different directory on your client. Oracle scripts can be located anywhere on the client.

2. Modify each script for your environment.

Example 1, `cold_database_backup.cmd`

This example sets the environment and calls `rman` with the appropriate command file, to perform a whole database backup. It is used for both full backups and incremental backups. When a schedule executes, NetBackup sets environment variables that the script uses to perform the backup.

The following is an Oracle script file named `cold_database_backup.cmd`, located in the *install_path*`\NetBackup\dbext\Oracle\samples\rman` folder.

```
@REM $Header: cold_database_backup.cmd,v 1.3 99/04/26 16:49:16 fma Exp $

@REM bcpyrght
@REM ***************************************************************************
@REM * Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved*
@REM ***************************************************************************
@REM ecpyrght

@REM ---------------------------------------------------------------------------
@REM        cold_database_backup.cmd
@REM ---------------------------------------------------------------------------
@REM This script uses Recovery Manager to take a cold (consistent) database
@REM backup. A cold backup is one where the database is shutdown cleanly before
@REM performing the backup.
@REM ---------------------------------------------------------------------------

@setlocal ENABLEEXTENSIONS

@REM ---------------------------------------------------------------------------
@REM No need to echo the commands.
@REM ---------------------------------------------------------------------------

@echo off

@REM ---------------------------------------------------------------------------
@REM Put output in the same filename, different extension.
@REM ---------------------------------------------------------------------------

@set OUTF=%~dpn0.out

@REM ---------------------------------------------------------------------------
@REM You may want to delete the previous output file so that backup information
@REM does not accumulate.  If not, delete the following lines.
@REM ---------------------------------------------------------------------------

@if exist %OUTF% del %OUTF%

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

```
@REM Put temporary data in the same filename, different extension.
@REM ------------------------------------------------------------------------

@set TMPF=%~dpn0.tmp

@REM ------------------------------------------------------------------------
@REM - Get date and time.
@REM ------------------------------------------------------------------------

@for /F "tokens=1*" %%p in ('date /T') do @set DATE=%%p %%q
@for /F %%p in ('time /T') do @set DATE=%DATE% %%p

@echo %DATE% ----------------Beginning of Script------------ >> %OUTF%
@echo Script name: %0 >> %OUTF%

@REM ------------------------------------------------------------------------
@REM Replace H:\oracle\ora81, below, with the Oracle home path.
@REM ------------------------------------------------------------------------

@set ORACLE_HOME=H:\oracle\ora81

@REM ------------------------------------------------------------------------
@REM Replace PROD, below, with the Oracle SID of the target database.
@REM ------------------------------------------------------------------------

@set ORACLE_SID=PROD

@REM ------------------------------------------------------------------------
@REM Replace %ORACLE_HOME%\scripts, below, with the NetBackup Oracle script
@REM path. Since subsequent installs or deinstalls will remove this file, you
@REM will want to move this script from its installed location before making
@REM updates.
@REM ------------------------------------------------------------------------

@set NB_ORA_SCRIPTS=%ORACLE_HOME%\scripts

@REM ------------------------------------------------------------------------
@REM Several RMAN commands use time parameters that require NLS_LANG and
@REM NLS_DATE_FORMAT to be set. This example uses the standard date format.
@REM Replace below with the desired language values.
@REM ------------------------------------------------------------------------

@set NLS_LANG=american
@set NLS_DATE_FORMAT=YYYY-MM-DD:hh24:mi:ss

@REM ------------------------------------------------------------------------
@REM Oracle Server Manager name.
```

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

@set SVRMGR=svrmgrl

@REM ------------------------------------------------------------------------
@REM Oracle Recovery Manager name.
@REM ------------------------------------------------------------------------

@set RMAN=rman

@REM ------------------------------------------------------------------------
@REM Print out the value of the variables set by this script.
@REM ------------------------------------------------------------------------

@echo #                                          >> %OUTF%
@echo   RMAN:  %RMAN%                            >> %OUTF%
@echo   SVRMGR:  %SVRMGR%                        >> %OUTF%
@echo   NLS_LANG  :  %NLS_LANG%                  >> %OUTF%
@echo   ORACLE_SID  :  %ORACLE_SID%              >> %OUTF%
@echo   ORACLE_HOME:  %ORACLE_HOME%              >> %OUTF%
@echo   NB_ORA_SCRIPTS:  %NB_ORA_SCRIPTS%        >> %OUTF%
@echo   NLS_DATE_FORMAT  :  %NLS_DATE_FORMAT% >> %OUTF%

@REM ------------------------------------------------------------------------
@REM Print out the value of the variables set by bphdb.
@REM ------------------------------------------------------------------------

@echo   NB_ORA_FULL:  %NB_ORA_FULL% >> %OUTF%
@echo   NB_ORA_INCR:  %NB_ORA_INCR% >> %OUTF%
@echo   NB_ORA_CINC:  %NB_ORA_CINC% >> %OUTF%
@echo   NB_ORA_SERV:  %NB_ORA_SERV% >> %OUTF%
@echo   NB_ORA_CLASS:  %NB_ORA_CLASS% >> %OUTF%
@echo   NB_ORA_PC_SCHED:  %NB_ORA_PC_SCHED% >> %OUTF%
@echo   NB_ORA_SCHEDULED:  %NB_ORA_SCHEDULED% >> %OUTF%
@echo   NB_ORA_USER_INITIATED :  %NB_ORA_USER_INITIATED% >> %OUTF%

@REM ------------------------------------------------------------------------
@REM Call Server Manager to shutdown the target database in immediate priority.
@REM This lets current calls to the database complete, but prevents further
@REM logons or calls.
@REM
@REM The shutdown-startup logic of this script can be commented out if you know
@REM that the database will always be mounted and in a consistent state before
@REM this script is executed.
@REM ------------------------------------------------------------------------

@echo connect internal > %TMPF%
```

```
@echo shutdown immediate >> %TMPF%
@echo exit >> %TMPF%

@echo # >> %OUTF%
@echo %ORACLE_HOME%\bin\%SVRMGR% >> %OUTF%
@type %TMPF% >> %OUTF%
%ORACLE_HOME%\bin\%SVRMGR% < %TMPF% >> %OUTF%

@REM ----------------------------------------------------------------------
@REM Startup the database in case it had crashed or was not shutdown cleanly
@REM prior to starting this script.  This will perform a crash recover if
@REM it is needed. Use the RESTRICT option because we are going to shutdown
@REM again right away and we don't want to let users in during the short
@REM interval. The default init<SID>.ora file will be used by startup. If it
@REM was moved, the name was changed, or ORACLE_HOME and ORACLE_SID are not
@REM set, use the pfile= option on the startup command.
@REM ----------------------------------------------------------------------

@echo connect internal > %TMPF%
@echo startup restrict open >> %TMPF%
@echo shutdown immediate >> %TMPF%
@echo exit >> %TMPF%

@echo # >> %OUTF%
@echo %ORACLE_HOME%\bin\%SVRMGR% >> %OUTF%
@type %TMPF% >> %OUTF%
%ORACLE_HOME%\bin\%SVRMGR% < %TMPF% >> %OUTF%

@REM ----------------------------------------------------------------------
@REM Now we know that the database is cleanly closed and is ready for a
@REM cold backup. RMAN requires that the database be started and mounted
@REM to perform a backup.
@REM ----------------------------------------------------------------------

@echo connect internal > %TMPF%
@echo startup mount >> %TMPF%
@echo exit >> %TMPF%

@echo # >> %OUTF%
@echo %ORACLE_HOME%\bin\%SVRMGR% >> %OUTF%
@type %TMPF% >> %OUTF%
%ORACLE_HOME%\bin\%SVRMGR% < %TMPF% >> %OUTF%

@REM ----------------------------------------------------------------------
@REM Temporary file no longer needed.
@REM ----------------------------------------------------------------------
```

```
@if exist %TMPF% del %TMPF%

@REM ------------------------------------------------------------------------
@REM What kind of backup will we perform.
@REM ------------------------------------------------------------------------

@if "%NB_ORA_INCR%" == "1" goto differential

@if "%NB_ORA_CINC%" == "1" goto cumulative

@REM ------------------------------------------------------------------------
@REM Default to level0.
@REM ------------------------------------------------------------------------

goto level0

:differential

@echo # >> %OUTF%
@echo cold database differential incremental backup requested >> %OUTF%
@set CMDFILE=%NB_ORA_SCRIPTS%\cold_database_backup_level1_differential.rcv

@goto startbackup

:cumulative

@echo # >> %OUTF%
@echo cold database cumulative incremental backup requested >> %OUTF%
@set CMDFILE=%NB_ORA_SCRIPTS%\cold_database_backup_level1_cumulative.rcv

@goto startbackup

:level0

@echo # >> %OUTF%
@echo cold database backup requested (incremental level 0) >> %OUTF%
@set CMDFILE=%NB_ORA_SCRIPTS%\cold_database_backup_level0.rcv

@goto startbackup

:startbackup

@REM ------------------------------------------------------------------------
@REM Call Recovery Manager to initiate the backup. This example does not use a
@REM Recovery Catalog. If you choose to use one, remove the option, nocatalog,
@REM from the rman command line below and add a 'connect rcvcat' statement to
@REM the corresponding command file ($CMDFILE). An alternative to putting the
```

```
@REM connect statements in the command file would be to add them to the rman
@REM command line.
@REM ----------------------------------------------------------------------

@echo #  >> %OUTF%
@echo %ORACLE_HOME%\bin\%RMAN% nocatalog cmdfile '%CMDFILE%' >> %OUTF%

%ORACLE_HOME%\bin\%RMAN% nocatalog cmdfile '%CMDFILE%' >> %OUTF%

@REM ----------------------------------------------------------------------
@REM NetBackup (bphdb) stores the name of a file in an environment variable,
@REM called STATUS_FILE. This file is used by an automatic schedule to
@REM communicate status information with NetBackup's job monitor. It is up to
@REM the script to write a 0 (passed) or 1 (failure) to the status file.
@REM ----------------------------------------------------------------------

@if errorlevel 1 goto errormsg
@if "%STATUS_FILE%" == "" goto end
@if exist %STATUS_FILE% echo 0 > %STATUS_FILE%
@set EMSG=success
goto end

:errormsg
@if "%STATUS_FILE%" == "" goto end
@if exist %STATUS_FILE% echo 1 > %STATUS_FILE%
@set EMSG=failed

:end

@REM ----------------------------------------------------------------------
@REM Get date and time.
@REM ----------------------------------------------------------------------

@for /F "tokens=1*" %%p in ('date /T') do @set DATE=%%p %%q
@for /F %%p in ('time /T') do @set DATE=%DATE% %%p

@echo #  >> %OUTF%
@echo %DATE% ----------End of Script (%EMSG%)------------ >> %OUTF%
@endlocal
@REM - End of Main Program ------------------------------------------------
```

Example 2, `hot_database_backup.cmd`

This example sets up the environment and calls `rman` with the appropriate command file, to perform a whole database backup. It is used for both full backups and incremental backups. When a schedule executes, NetBackup sets environment variables that the script uses to perform the backup.

With the proper schedules this script could be used to automatically execute a backup every week on Friday night and a incremental backup each night for the rest of the week. See "Add Oracle Classes to NetBackup" on page 26 for more details.

The following is an Oracle script file named `hot_database_backup.cmd`, located in the *install_path*`\NetBackup\dbext\Oracle\samples\rman` folder.

```
@REM bcpyrght
@REM ************************************************************************
@REM * Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved*
@REM ************************************************************************
@REM ecpyrght
@REM
@REM ------------------------------------------------------------------------
@REM         hot_database_backup.cmd
@REM ------------------------------------------------------------------------
@REM This script uses Recovery Manager to take a hot (inconsistent) database
@REM backup. A hot backup is inconsistent because portions of the database are
@REM being modified and written to the disk while the backup is progressing.
@REM You must run your database in ARCHIVELOG mode to make hot backups.
@REM ------------------------------------------------------------------------

@setlocal ENABLEEXTENSIONS

@REM ------------------------------------------------------------------------
@REM No need to echo the commands.
@REM ------------------------------------------------------------------------

@echo off

@REM ------------------------------------------------------------------------
@REM Put output in the same filename, different extension.
@REM ------------------------------------------------------------------------

@set OUTF=%~dpn0.out

@REM ------------------------------------------------------------------------
@REM You may want to delete the output file so that backup information does
@REM not accumulate.  If not, delete the following lines.
@REM ------------------------------------------------------------------------
```

```
@if exist %OUTF% del %OUTF%

@REM ------------------------------------------------------------------------
@REM Get date and time.
@REM ------------------------------------------------------------------------

@for /F "tokens=1*" %%p in ('date /T') do @set DATE=%%p %%q
@for /F %%p in ('time /T') do @set DATE=%DATE% %%p

@echo %DATE% ----------------Beginning of Script------------ >> %OUTF%
@echo Script name: %0 >> %OUTF%

@REM ------------------------------------------------------------------------
@REM Replace H:\oracle\ora81, below, with the Oracle home path.
@REM ------------------------------------------------------------------------

@set ORACLE_HOME=H:\oracle\ora81

@REM ------------------------------------------------------------------------
@REM Replace %ORACLE_HOME%\scripts, below, with the NetBackup Oracle script
@REM path. Since subsequent installs or deinstalls will remove this file, you
@REM will want to move this script from its installed location before making
@REM updates.
@REM ------------------------------------------------------------------------

@set NB_ORA_SCRIPTS=%ORACLE_HOME%\scripts

@REM ------------------------------------------------------------------------
@REM Several RMAN commands use time parameters that require NLS_LANG and
@REM NLS_DATE_FORMAT to be set. This example uses the standard date format.
@REM Replace below with the desired language values.
@REM ------------------------------------------------------------------------

@set NLS_LANG=american
@set NLS_DATE_FORMAT=YYYY-MM-DD:hh24:mi:ss

@REM ------------------------------------------------------------------------
@REM Set the Oracle Recovery Manager name.
@REM ------------------------------------------------------------------------

@set RMAN=rman

@REM ------------------------------------------------------------------------
@REM Print out environment variables set in this script.
@REM ------------------------------------------------------------------------

@echo #                                          >> %OUTF%
```

```
@echo   RMAN  :  %RMAN%                          >> %OUTF%
@echo   NLS_LANG  :  %NLS_LANG%                  >> %OUTF%
@echo   ORACLE_HOME  :  %ORACLE_HOME%            >> %OUTF%
@echo   NB_ORA_SCRIPTS  :  %NB_ORA_SCRIPTS%      >> %OUTF%
@echo   NLS_DATE_FORMAT  :  %NLS_DATE_FORMAT% >> %OUTF%

@REM ------------------------------------------------------------------------
@REM Print out environment variables set in bphdb.
@REM ------------------------------------------------------------------------

@echo   NB_ORA_SERV  :  %NB_ORA_SERV%                      >> %OUTF%
@echo   NB_ORA_FULL  :  %NB_ORA_FULL%                      >> %OUTF%
@echo   NB_ORA_INCR  :  %NB_ORA_INCR%                      >> %OUTF%
@echo   NB_ORA_CINC  :  %NB_ORA_CINC%                      >> %OUTF%
@echo   NB_ORA_CLASS  :  %NB_ORA_CLASS%                    >> %OUTF%
@echo   NB_ORA_PC_SCHED  :  %NB_ORA_PC_SCHED%              >> %OUTF%
@echo   NB_ORA_SCHEDULED  :  %NB_ORA_SCHEDULED%            >> %OUTF%
@echo   NB_ORA_USER_INITIATED  :  %NB_ORA_USER_INITIATED% >> %OUTF%

@REM ------------------------------------------------------------------------
@REM We assume that the database is properly opened. If desired, this would
@REM be the place to verify that.
@REM ------------------------------------------------------------------------

@REM ------------------------------------------------------------------------
@REM What kind of backup will we perform.
@REM ------------------------------------------------------------------------

@if "%NB_ORA_INCR%" == "1" goto differential

@if "%NB_ORA_CINC%" == "1" goto cumulative

@REM ------------------------------------------------------------------------
@REM Default to level0.
@REM ------------------------------------------------------------------------

goto level0

:differential

@echo # >> %OUTF%
@echo hot database differential incremental backup requested >> %OUTF%
@set CMDFILE=%NB_ORA_SCRIPTS%\hot_database_backup_level1_differential.rcv

@goto startbackup

:cumulative
```

```
@echo # >> %OUTF%
@echo hot database cumulative incremental backup requested >> %OUTF%
@set CMDFILE=%NB_ORA_SCRIPTS%\hot_database_backup_level1_cumulative.rcv

@goto startbackup

:level0

@echo # >> %OUTF%
@echo hot database backup requested (incremental level 0) >> %OUTF%
@set CMDFILE=%NB_ORA_SCRIPTS%\hot_database_backup_level0.rcv

@goto startbackup

:startbackup

@REM ------------------------------------------------------------------------
@REM Call Recovery Manager to initiate the backup. This example does not use a
@REM Recovery Catalog. If you choose to use one, remove the option, nocatalog,
@REM from the rman command line below and add a 'connect rcvcat' statement to
@REM the corresponding command file ($CMDFILE). An alternative to putting the
@REM connect statements in the command file would be to add them to the rman
@REM command line.
@REM ------------------------------------------------------------------------

@echo #  >> %OUTF%
@echo %ORACLE_HOME%\bin\%RMAN% nocatalog cmdfile %CMDFILE% >> %OUTF%

%ORACLE_HOME%\bin\%RMAN% nocatalog cmdfile '%CMDFILE%' >> %OUTF%

@REM ------------------------------------------------------------------------
@REM NetBackup (bphdb) stores the name of a file in an environment variable,
@REM called STATUS_FILE. This file is used by an automatic schedule to
@REM communicate status information with NetBackup's job monitor. It is up to
@REM the script to write a 0 (passed) or 1 (failure) to the status file.
@REM ------------------------------------------------------------------------

@if errorlevel 1 goto errormsg
@if "%STATUS_FILE%" == "" goto end
@if exist %STATUS_FILE% echo 0 > %STATUS_FILE%
@set EMSG=success
goto end

:errormsg
@if "%STATUS_FILE%" == "" goto end
@if exist %STATUS_FILE% echo 1 > %STATUS_FILE%
```

```
@set EMSG=failed

:end

@REM ----------------------------------------------------------------------
@REM Get date and time.
@REM ----------------------------------------------------------------------

@for /F "tokens=1*" %%p in ('date /T') do @set DATE=%%p %%q
@for /F %%p in ('time /T') do @set DATE=%DATE% %%p

@echo #  >> %OUTF%
@echo %DATE% ----------End of Script (%EMSG%)------------ >> %OUTF%
@endlocal
@REM - End of Main Program ------------------------------------------------
```

Example 3, `cold_duplex_database_backup_full.cmd`

This example sets up the environment and calls `rman` to execute a command file that will make identical copies of a cold (consistent) database backup.

The following is an Oracle script file named `cold_duplex_database_backup_full.cmd` in the *install_path*`\NetBackup\dbext\Oracle\samples\rman` folder.

```
@REM $Header: cold_duplex_database_backup_full.cmd,v 1.1 99/04/26 16:50:19 fma
Exp $

@REM bcpyrght
@REM ***********************************************************************
@REM * Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved*
@REM ***********************************************************************
@REM ecpyrght
@REM
@REM ----------------------------------------------------------------------
@REM     cold_duplex_database_backup_full.cmd
@REM ----------------------------------------------------------------------
@REM This script uses Recovery Manager to make identical copies of a cold
@REM (consistent) database backup. A cold backup is one where the database
@REM is shutdown cleanly before performing the backup.
@REM
@REM You must enable (set to TRUE in the init.ora file) the
@REM BACKUP_TAPE_IO_SLAVES initialization parameter to perform duplexed
@REM backups. RMAN will configure as many slaves as needed for the number
@REM of backup copies you request. For more information on
@REM BACKUP_TAPE_IO_SLAVES, see the Oracle8 Reference.
```

```
@REM
@REM Note: the rman script (CMDFILE) used in this Oracle script contains
@REM commands that are only valid with Oracle release 8.1.x or greater.
@REM ------------------------------------------------------------------------

@setlocal ENABLEEXTENSIONS

@REM ------------------------------------------------------------------------
@REM No need to echo the commands.
@REM ------------------------------------------------------------------------

@echo off

@REM ------------------------------------------------------------------------
@REM Put output in the same filename, different extension.
@REM ------------------------------------------------------------------------

@set OUTF=%~dpn0.out

@REM ------------------------------------------------------------------------
@REM You may want to delete the output file so that backup information does
@REM not accumulate.  If not, delete the following lines.
@REM ------------------------------------------------------------------------

@if exist %OUTF% del %OUTF%

@REM ------------------------------------------------------------------------
@REM Get date and time.
@REM ------------------------------------------------------------------------

@for /F "tokens=1*" %%p in ('date /T') do @set DATE=%%p %%q
@for /F %%p in ('time /T') do @set DATE=%DATE% %%p

@echo %DATE% ----------------Beginning of Script------------ >> %OUTF%
@echo Script name: %0 >> %OUTF%

@REM ------------------------------------------------------------------------
@REM Replace H:\oracle\ora81, below, with the Oracle home path.
@REM ------------------------------------------------------------------------

@set ORACLE_HOME=H:\oracle\ora81

@REM ------------------------------------------------------------------------
@REM Replace %ORACLE_HOME%\scripts, below, with the NetBackup Oracle script
@REM path. Since subsequent installs or deinstalls will remove this file, you
@REM will want to move this script from its installed location before making
@REM updates.
```

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

@set NB_ORA_SCRIPTS=%ORACLE_HOME%\scripts

@REM ------------------------------------------------------------------------
@REM Replace productionDB, below, with the target database TNS alias (service)
@REM name from the tnsnames.ora file.
@REM ------------------------------------------------------------------------

@set TARGET_TNS=productionDB

@REM ------------------------------------------------------------------------
@REM Replace rcvcatDB, below, with the recovery catalog database TNS alias
@REM (service) name from the tnsnames.ora file.
@REM ------------------------------------------------------------------------

@set RCVCAT_TNS=rcvcatDB

@REM ------------------------------------------------------------------------
@REM Several RMAN commands use time parameters that require NLS_LANG and
@REM NLS_DATE_FORMAT to be set. This example uses the standard date format.
@REM Replace below with the desired language values.
@REM ------------------------------------------------------------------------

@set NLS_LANG=american
@set NLS_DATE_FORMAT=YYYY-MM-DD:hh24:mi:ss

@REM ------------------------------------------------------------------------
@REM Set the Oracle Recovery Manager name.
@REM ------------------------------------------------------------------------

@set RMAN=rman

@REM ------------------------------------------------------------------------
@REM Print out the value of the variables set by this script. Won't be needing
@REM any of the variables set in bphdb.
@REM ------------------------------------------------------------------------

@echo #                                        >> %OUTF%
@echo   RMAN  :  %RMAN%                        >> %OUTF%
@echo   NLS_LANG  :  %NLS_LANG%                >> %OUTF%
@echo   TARGET_TNS  :  %TARGET_TNS%            >> %OUTF%
@echo   RCVCAT_TNS  :  %RCVCAT_TNS%            >> %OUTF%
@echo   ORACLE_HOME  :  %ORACLE_HOME%          >> %OUTF%
@echo   NB_ORA_SCRIPTS  :  %NB_ORA_SCRIPTS%    >> %OUTF%
@echo   NLS_DATE_FORMAT  :  %NLS_DATE_FORMAT% >> %OUTF%
```

```
@echo # >> %OUTF%
@echo cold duplexed full database backup requested >> %OUTF%
@REM ------------------------------------------------------------------------
@REM Note: the CMDFILE contains commands that are only valid with Oracle
@REM release 8.1.x or greater.
@REM ------------------------------------------------------------------------

@set CMDFILE=%NB_ORA_SCRIPTS%\cold_duplex_database_backup_full.rcv

@REM ------------------------------------------------------------------------
@REM Call Recovery Manager to initiate the backup. This example uses a
@REM Recovery Catalog. If you choose not to use one, replace the option
@REM 'rcvcat <userid>/<passwd>@<tns alias>' with the 'nocatalog' option.
@REM An alternative to using the 'target' and 'rcvcat' command line options
@REM is to connect to the target and catalog databases from within the
@REM $CMDFILE script, using the 'connect' command.
@REM
@REM Change user ids and passwords accordingly.
@REM ------------------------------------------------------------------------

@echo #  >> %OUTF%
@echo %ORACLE_HOME%\bin\%RMAN% target internal/oracle@%TARGET_TNS% rcvcat
rman/rman@%RCVCAT_TNS% cmdfile %CMDFILE% >> %OUTF%


%ORACLE_HOME%\bin\%RMAN% target internal/oracle@%TARGET_TNS% rcvcat
rman/rman@%RCVCAT_TNS% cmdfile '%CMDFILE%' >> %OUTF%

@REM ------------------------------------------------------------------------
@REM NetBackup (bphdb) stores the name of a file in an environment variable,
@REM called STATUS_FILE. This file is used by an automatic schedule to
@REM communicate status information with NetBackup's job monitor. It is up to
@REM the script to write a 0 (passed) or 1 (failure) to the status file.
@REM ------------------------------------------------------------------------

@if errorlevel 1 goto errormsg
@if "%STATUS_FILE%" == "" goto end
@if exist %STATUS_FILE% echo 0 > %STATUS_FILE%
@set EMSG=success
goto end

:errormsg
@if "%STATUS_FILE%" == "" goto end
@if exist %STATUS_FILE% echo 1 > %STATUS_FILE%
@set EMSG=failed
```

```
:end

@REM ------------------------------------------------------------------------
@REM Get date and time.
@REM ------------------------------------------------------------------------

@for /F "tokens=1*" %%p in ('date /T') do @set DATE=%%p %%q
@for /F %%p in ('time /T') do @set DATE=%DATE% %%p

@echo #  >> %OUTF%
@echo %DATE% ----------End of Script (%EMSG%)------------ >> %OUTF%
@endlocal
@REM - End of Main Program ---------------------------------------------------
```

Create NetBackup for Oracle Scripts Automatically

The following is required before Oracle RMAN scripts can be generated:

- Oracle8 software must be installed
- One or more databases must exist
- NetBackup client software must be installed
- NetBackup for Oracle on Windows NT must be installed

The Windows NT NetBackup client can generate RMAN scripts for use with NetBackup for Oracle on Windows NT.

Use the Backup, Archive, and Restore - NetBackup client GUI to identify Oracle objects to backup and restore. A backup or restore request will activate the RMAN Script Generation Wizard. The wizard will guide you through the RMAN script generation process. The resulting script can be immediately executed from the RMAN Script Generation Wizard as a user-directed operation. The generated script can also be used to perform a scheduled backup.

The wizard does not provide for all of the RMAN functionality. The intent is to provide

- a level of functionality that will support most backup and restore requirements
- a working template that can be edited according to individual needs.

Refer to “Create NetBackup for Oracle Scripts Manually” on page 64 for details on modifying scripts.

EBU Scripts

The *Oracle7 Enterprise Backup Utility Administrator's Guide* explains the ebu command and command script files. Refer to that guide for details on command syntax and for parameters for performance. Here are some examples.

Example 1, Register the target database

```
register
   db_name = "PRODB"
   oracle_home = "c:\oracle7"
   pfile = "c:\oracle7\dbs\initPROD.orm"
   log = "c:\oracle7\obackup\log\obkPROD.log"
```

Example 2, Back up an offline database

```
backup offline database
   db_name = "PRODB"
   oracle_home = "c:\oracle7"
   log = "c:\oracle7\obackup\log\obkPROD.log"
```

Example 3, Perform an online backup of tablespace A and datafiles `b1.dbf` and `b2.dbf`

```
backup online
   db_name = "PRODB"

   dbfile = "c:\oracle7\dbs\b1.dbf", "c:\oracle7\dbs\b2.dbf"
   tablespace = "A"
   log = "c:\oracle7\obackup\log\obkPROD.log”
```

Example 4, Restore a database

```
restore database
   db_name = "PRODB"
   log = "c:\oracle7\obackup\log\obkPROD.log"
```

Example 5, Invalidate or delete a completed job

```
invalidate
   job_id = 4467
   log = "c:\oracle7\obackup\log\obkPROD.log"
```

Example 6, Cancel a job with log information dumped to standard output

```
cancel
   job_id = 4489
```

RMAN Script

While the Oracle Enterprise Backup Utility only provides for full backups, Oracle8 Recovery Manager (RMAN) supports the following different types of backups:

- Full Backup
- Level 0 Backup (Level 0 Incremental)
- Level n Backup (Differential Incremental Backup)
- Level n Backup (Cumulative Incremental Backup)

When generating a datafile backup set, you can make either an incremental backup or a full backup. An incremental backup is a backup of one or more datafiles that contain only those blocks that have been modified since a previous backup. A full backup is a non-incremental backup of one or more datafiles that contain all blocks of the datafiles.

Example 1, `cold_database_backup_level1_cumulative.rcv`

```
# $Header: cold_database_backup_level1_cumulative.rcv,v 1.4 99/05/07 16:56:19
fma Stab $
#
#bcpyrght
#***************************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***************************************************************************
#ecpyrght
#
# ---------------------------------------------------------------------------
#     cold_database_backup_level1_cumulative.rcv
# ---------------------------------------------------------------------------
#
#  Backs up only the blocks which have been modified since the last
#  level 0 backup was performed. (note, the controlfile is always backed
#  up in it's entirety i.e. control file backups are never compressed).
#
#  Typically, a level 1 backup would be done at least once in between
#  level 0 backups.
#
#  The scenario assumes:
#     o you want to perform a level 1 cumulative incremental backup
#     o you are backing your database up to two tape drives
#     o you want each backup set to include a maximum of 5 files
```

```
#     o you wish to include offline datafiles, and read-only tablespaces,
#       in the backup
#     o you want the backup to terminate if any files are not
#       accessible
#     o you want to open the database after the backup completes
#     o you are not using a Recovery Catalog
#     o you are using a TNS alias name for the target database
#
#  Note that the format string is constructed to guarantee uniqueness and
#  to enhance NetBackup for Oracle backup and restore performance.
#
#  The connect statements could be part of the rman command line in the
#  Oracle script file that calls this script.
#
#  Add the following connect statement if using a Recovery Catalog.
#      connect rcvcat '<user>/<passwd>@<TNS alias>'
#
#  Modify the target connect statement according to the following syntax:
#      connect target '<user>/<passwd>@<TNS alias>'
#
#  Script run by:
#      rman nocatalog cmdfile cold_database_backup_level1_cumulative.rcv
#
# ------------------------------------------------------------------------

connect target 'internal/oracle@productionDB'

run {
# Cold database level 1 cumulative incremental backup
allocate channel t1 type 'SBT_TAPE';
allocate channel t2 type 'SBT_TAPE';
backup
  incremental level 1
  cumulative
  tag cold_db_bk_level1_cumulative
  filesperset 5
  # recommended format
  format 'bk_%s_%p_%t'
    (database);

# now that the backup is complete, open the db.
sql 'alter database open';
}
```

Example 2, hot_database_backup_level0.rcv

```
# $Header: hot_database_backup_level0.rcv,v 1.3 99/04/26 16:52:14 fma Exp $
#
#bcpyrght
#***************************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***************************************************************************
#ecpyrght
#
# ---------------------------------------------------------------------------
#        hot_database_backup_level0.rcv
# ---------------------------------------------------------------------------
#
#  Backs up the whole database.  This backup is part of the incremental
#  strategy (this means it can have incremental backups of levels > 0
#  applied to it).
#
#  We do not need to explicitly request the control file to be included
#  in this backup, as it is automatically included each time file 1 of
#  the system tablespace is backed up (the inference: as it is a whole
#  database backup, file 1 of the system tablespace will be backed up,
#  hence the controlfile will also be included automatically).
#
#  Typically, a level 0 backup would be done at least once a week.
#
#  The scenario assumes:
#     o you want to perform a level 0 backup
#     o you are backing your database up to two tape drives
#     o you want each backup set to include a maximum of 5 files
#     o you wish to include offline datafiles, and read-only tablespaces,
#       in the backup
#     o you want the backup to continue if any files are inaccessible
#     o you are not using a Recovery Catalog
#     o you want to archive the current log and then back up all the
#       archive logs, putting a maximum of 20 logs in a backup set and
#       deleting them once the backup is complete
#     o you are using a TNS alias name for the target database
#
#  Note that the format string is constructed to guarantee uniqueness and
#  to enhance NetBackup for Oracle backup and restore performance.
#
#  The connect statements could be part of the rman command line in the
#  Oracle script file that calls this script.
#
#  Add the following connect statement if using a Recovery Catalog.
#      connect rcvcat '<user>/<passwd>@<TNS alias>'
```

```
#
#  Modify the target connect statement according to the following syntax:
#      connect target '<user>/<passwd>@<TNS alias>'
#
#  Script run by:
#      rman nocatalog cmdfile hot_database_backup_level0.rcv
#
# ----------------------------------------------------------------------

connect target 'internal/oracle@productionDB'

run {
# Hot database level 0 whole backup
allocate channel t1 type 'SBT_TAPE';
allocate channel t2 type 'SBT_TAPE';
backup
  incremental level 0
  skip inaccessible
  tag hot_db_bk_level0
  filesperset 5
  # recommended format
  format 'bk_%s_%p_%t'
    (database);
  sql 'alter system archive log current';
  # backup all archive logs
  backup
   filesperset 20
   format 'al_%s_%p_%t'
   (archivelog all
    delete input);
}
```

Example 3, `hot_database_backup_level1_differential.rcv`

```
# $Header: hot_database_backup_level1_differential.rcv,v 1.3 99/04/26 16:52:36
fma Exp $
#
#bcpyrght
#***********************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***********************************************************************
#ecpyrght
#
# ----------------------------------------------------------------------
#     hot_database_backup_level1_differential.rcv
# ----------------------------------------------------------------------
```

```
#
#  Backs up only the blocks which have been modified since the last
#  level 0 backup was performed. (note, the controlfile is always backed
#  up in it's entirety i.e. control file backups are never compressed).
#
#  Typically, a level 1 backup would be done at least once in between
#  level 0 backups.
#
#  The scenario assumes:
#     o you want to perform a differential level 1 backup
#     o you are backing your database up to two tape drives
#     o you want each backup set to include a maximum of 5 files
#     o you already have valid backups of read-only tablespaces, and
#       offline datafiles so we skip backing up these files
#     o you want the backup to continue if any files are inaccessible
#     o you are not using a Recovery Catalog
#     o you want to archive the current log and then back up all the
#       archive logs, putting a maximum of 20 logs in a backup set and
#       deleting them once the backup is complete
#     o you are using a TNS alias name for the target database
#
#  Note that the format string is constructed to guarantee uniqueness and
#  to enhance NetBackup for Oracle backup and restore performance.
#
#  The connect statements could be part of the rman command line in the
#  Oracle script file that calls this script.
#
#  Add the following connect statement if using a Recovery Catalog.
#      connect rcvcat '<user>/<passwd>@<TNS alias>'
#
#  Modify the target connect statement according to the following syntax:
#      connect target '<user>/<passwd>@<TNS alias>'
#
#  Script run by:
#      rman nocatalog cmdfile hot_database_backup_level1_differential.rcv
#
# ------------------------------------------------------------------------

connect target 'internal/oracle@productionDB'

run {
# Hot database level 1 differential incremental backup
allocate channel t1 type 'SBT_TAPE';
allocate channel t2 type 'SBT_TAPE';
backup
  incremental level 1
  skip offline
```

```
  skip readonly
  skip inaccessible
  tag hot_db_bk_level1_cum
  filesperset 5
  # recommended format
  format 'bk_%s_%p_%t'
    (database);
  sql 'alter system archive log current';
  # backup all archive logs
  backup
   filesperset 20
   format 'al_%s_%p_%t'
   (archivelog all
    delete input);
}
```

Example 4, hot_tablespace_backup_level1_differential.rcv

```
# $Header: hot_tablespace_backup_level1_differential.rcv,v 1.3 99/04/26
16:52:55 fma Exp $
#
#bcpyrght
#***************************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***************************************************************************
#ecpyrght
#
# ---------------------------------------------------------------------------
#     hot_tablespace_backup_level1_differential.rcv
# ---------------------------------------------------------------------------
#
#  This script backs up the system tablespace to tape and archives the
#  current log. This backup is part of the incremental strategy, it
#  backs up only the blocks which have been modified since the last
#  level 0 backup was performed. (note, the controlfile is always backed
#  up in it's entirety i.e. control file backups are never compressed).
#
#  Typically, a level 1 backup would be done at least once in between
#  level 0 backups.
#
#  Oracle recommends that the current log be archived immediately after
#  performing any open (i.e. hot) backup to ensure that the backup is
#  immediately usable, even if the online log is lost.
#
#  We do not need to explicitly request the control file to be included
#  in this backup, as it is automatically included each time file 1 of
```

```
#  the system tablespace is backed up.
#
#  The scenario assumes:
#     o you want to perform a level 1 differential incremental backup
#     o you are backing your tablespace up to one tape drive
#     o you wish to include offline datafiles
#     o you want the backup to continue if any files are inaccessible
#     o you are using a Recovery Catalog
#     o you want to archive the current log
#     o you are using TNS alias names for target and catalog databases
#
#  Note that the format string is constructed to guarantee uniqueness and
#  to enhance NetBackup for Oracle backup and restore performance.
#
#  The connect statements could be part of the rman command line in the
#  Oracle script file that calls this script.
#
#  Modify the rcvcat connect statement according to the following syntax:
#      connect rcvcat '<user>/<passwd>@<TNS alias>'
#
#  Modify the target connect statement according to the following syntax:
#      connect target '<user>/<passwd>@<TNS alias>'
#
#  Script run by:
#      rman cmdfile hot_tablespace_backup_level1_differential.rcv
#
# ------------------------------------------------------------------------

connect target 'internal/oracle@productionDB'
connect rcvcat 'rman/rman@rcvcatDB'

run {
allocate channel t1 type 'SBT_TAPE';
backup
  incremental level 1
  skip inaccessible
  tag hot_tbs_bk_level1_dif
  # recommended format
  format 'df_%s_%p_%t'
    (tablespace system);
sql 'alter system archive log current';
}
```

Example 5, database_restore.rcv

```
# $Header: database_restore.rcv,v 1.2 99/04/20 14:01:03 fma Stab $
#
#bcpyrght
#***************************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***************************************************************************
#ecpyrght
#
# ---------------------------------------------------------------------------
#     database_restore.rcv
# ---------------------------------------------------------------------------
#
#  The script below restores all datafiles, and recovers them completely.
#  All data files are restored to their current locations, from their most
#  recent backups.  It does not restore the control file. If you wish to
#  omit restoring one or more tablespaces, use the skip tablespace clause
#  on the restore command.
#
#  Note recovery manager automatically:
#    o determines whether the controlfile is a backup, and will perform the
#      correct type of recovery.
#    o restores any archived redo logs that are currently not on disk,
#      which are required for recovery.
#
#  If there are incremental backups, it will apply these first, then
#  apply any redo required to fully recover.
#
#  The connect statements could be part of the rman command line in the
#  Oracle script file that calls this script. They were put here so that
#  the passwords could be protected by setting file permissions to only
#  allow the Oracle dba access.
#
#  Add the following connect statement if using a Recovery Catalog.
#      connect rcvcat '<user>/<passwd>@<TNS alias>'
#
#  Modify the target connect statement according to the following syntax:
#      connect target '<user>/<passwd>@<TNS alias>'
#
#  Script run by:
#      rman nocatalog cmdfile database_restore.rcv
#
# ---------------------------------------------------------------------------

connect target 'internal/oracle@productionDB'
```

```
run {
# Restore all datafiles, and recovers them completely.
allocate channel t1 type 'SBT_TAPE';
allocate channel t2 type 'SBT_TAPE';
  restore
    (database);
  recover
    database;
}
```

Example 6, `pit_database_restore.rcv`

```
# $Header: pit_database_restore.rcv,v 1.2 99/04/20 14:01:46 fma Stab $
#
#bcpyrght
#***************************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***************************************************************************
#ecpyrght
#
# ---------------------------------------------------------------------------
#        pit_database_restore.rcv
# ---------------------------------------------------------------------------
#  The following scenario assumes:
#    o you wish to do an incomplete recovery due to an
#      application error which was made at a specific time
#    o the database is in the mount state
#    o there are 2 tape drives
#    o the NLS_LANG and NLS_DATE_FORMAT environment variables are set
#    o you are using a recovery catalog
#
#  Note: It is highly advisable to backup the database immediately after
#        opening the database resetlogs.
#
#  The following script restores and recovers the database to the time
#  immediately before the user error occurred.
#
#    o restores the database files (to the original locations)
#    o recovers the datafiles by either using a combination
#      of incremental backups and redo, or just redo.
#    o Recovery Manager will complete the recovery when it
#      reaches the time specified.
#    o Opens the database resetlogs.
#    o Oracle recommends you backup your database after the
#      resetlogs (this is not shown in the example).
#
```

```
#
#  Ensure you set your NLS_LANG and NLS_DATE_FORMAT environment variables.
#  You can set these to whatever you wish - the example below keeps the date
#  format to the standard date format used for recovery.
#
#  Ensure that the target database is in the mount state. To mount the
#  database you can start up Server Manager, and:
#
#  SVRMGR> connect internal
#  Connected.
#  SVRMGR> startup mount restrict
#
#  Script run by:
#      rman target <userid>/<passwd>@<tns alias> \
#           rcvcat <userid>/<passwd>@<tns alias> \
#           cmdfile pit_database_restore.rcv
#  Or if not using a recovery catalog:
#      rman target <userid>/<passwd>@<tns alias> nocatalog \
#           cmdfile pit_database_restore.rcv
# ---------------------------------------------------------------------------

run {

#  The 'set until time' command is in effect for all commands executed
#  between the { and } braces.  This means both the restore and recover
#  will both be relative to that point-in-time.
#  Note that Recovery Manager is able to query the Recovery Catalog,
#  determine what the structure of the database was at that time, and
#  restore it.


set until time '1997-05-09:14:30:00';

allocate channel t1 type 'SBT_TAPE';
allocate channel t2 type 'SBT_TAPE';

restore
  (database);

#  There is no need to manually catalog any archivelogs before the recovery,
#  as Recovery Manager does an implicit catalog resync from the current
#  control file.

    recover
      database;
```

```
sql 'alter database open resetlogs';
}
```

Example 7, `cold_duplex_database_backup_full.rcv`

```
# $Header: cold_duplex_database_backup_full.rcv,v 1.1 99/04/23 17:09:03 fma Exp
$
#
#bcpyrght
#***************************************************************************
#* Copyright 1993 - 1999 VERITAS Software Corporation, All Rights Reserved *
#***************************************************************************
#ecpyrght
#
# ---------------------------------------------------------------------------
#     cold_duplex_database_backup_full.rcv
# ---------------------------------------------------------------------------
#
#  NOTE: THIS SCRIPT CONTAINS ORACLE 8.1.X COMMANDS THAT
#        WILL NOT WORK WITH ORACLE 8.0.X
#
#  This script performs a full database backup, creating two identical
#  copies. A full backup is a non-incremental backup that contain all blocks
#  of the datafiles. Since it is a non-incremental backup it can not have
#  incremental backups applied to it.
#
#  We do not need to explicitly request the control file to be included
#  in this backup, as it is automatically included each time file 1 of
#  the system tablespace is backed up (the inference: as it is a full
#  database backup, file 1 of the system tablespace will be backed up,
#  hence the controlfile will also be included automatically).
#
#  The scenario assumes:
#     o you are using Oracle RMAN version 8.1.x.
#     o you want to perform a non-incremental consistent (cold) full backup
#     o you want to use shutdown and startup commands to guarantee
#       that the target database is in a consistent state
#     o you want to use the set duplex command to create two (2)
#       copies of the backup set
#     o you have enabled (set to TRUE) the BACKUP_TAPE_IO_SLAVES
#       initialization parameter in the init.ora file.
#     o you are backing up your database to two tape drives (one for
#       each copy, as identified by a backup policy schedule)
#     o you want each backup set to include a maximum of 5 files
#     o you wish to include offline datafiles, and read-only tablespaces,
```

```
#       in the backup
#     o you want the backup to terminate if any files are not
#       accessible
#     o you have already set the ORACLE_SID environment variable to the
#       target database for use by the startup command (not necessary if
#       the pfile= option is used with startup)
#     o you want to open the database after the backup completes
#
#  Note that the format string is constructed to guarantee uniqueness and
#  to enhance NetBackup for Oracle backup and restore performance.
#
#  Script run by:
#      rman target <userid>/<passwd>@<tns alias> \
#           rcvcat <userid>/<passwd>@<tns alias> \
#           cmdfile cold_duplex_database_backup.rcv
#
#  or if not using a recovery catalog:
#
#      rman target <userid>/<passwd>@<tns alias> nocatalog \
#           cmdfile cold_duplex_database_backup.rcv
#
# The shutdown-startup logic of this script can be commented out if you know
# that the database will always be mounted and in a consistent state before
# this script is executed.
# ----------------------------------------------------------------------------

# Shutdown the target database in immediate priority. This lets current
# calls to the database complete, but prevents further logons or calls.

shutdown immediate;

# Startup the database in case it had crashed or was not shutdown cleanly
# prior to starting this script. This will perform a crash recover if
# it is needed. Use the DBA option because we are going to shutdown
# again right away and we don't want to let users in during the short
# interval. The default init<SID>.ora file will be used by the startup
# command (requires the environment variable, ORACLE_SID, to be set for
# the target database). If ORACLE_SID is not properly set, or the init file
# was moved or renamed, use the 'pfile=' option on the startup command.

startup dba open;
shutdown immediate;

# Now we know that the database is cleanly closed and is ready for a
# cold backup. RMAN requires that the database be started and mounted
# to perform a backup.
```

```
startup mount;

run {
# two identical copies of a cold full database backup
set duplex=ON;
allocate channel t1 type 'SBT_TAPE';
allocate channel t2 type 'SBT_TAPE';
# two separate backup policy schedules specify distinct tape drives
# change to your CLASS and BACKUP POLICY SCHEDULE
send 'CPF1_BK_CLASS=ColdDbFullBk_duplex, CPF1_BK_POLICY=user_cp1';
send 'CPF2_BK_CLASS=ColdDbFullBk_duplex, CPF2_BK_POLICY=user_cp2';
backup
  full
  tag cold_db_bk_full
  filesperset 5
  # Recommended format for uniqueness and performance.
  format 'bk_%U_%t'
    (database);

# now that the backup is complete, open the db.
alter database open;
}
```

As shown in Example 7, cold_duplex_database_backup_full.rcv, Oracle8i RMAN provides an API that allows you to make up to four backup sets simultaneously, each an exact duplicate of the others. Using NetBackup for Oracle on Windows NT, you can back up each copy to a different tape to protect against disaster, media damage, or human error. You must use the `set duplex` and the `send` commands to take advantage of this feature.

The `set duplex` command specifies the number of copies of each backup piece that the channels should create. The `set duplex` command affects all channels allocated after issuing the command and is in effect until explicitly disabled or changed during the session. You cannot issue the `set duplex` command after allocating a channel.

The command syntax is:

```
set duplex = {ON | OFF | 1 | 2 | 3 | 4}
```

By default, duplex is `OFF` (a single backup set is produced). If you specify `ON`, two identical backup sets are produced.

Each output file must have a unique name. You should use the `%U` format specifier to satisfy this restriction. `%U` is equivalent to `%u_%p_%c` and it guarantees the uniqueness of the backup set name in all circumstances.

Note that you must enable the BACKUP_TAPE_IO_SLAVES initialization parameter to perform duplexed backups. RMAN will configure as many media as needed for the number of backup copies you request. For more information on

BACKUP_TAPE_IO_SLAVES, see the Oracle8 Reference. For improved NetBackup for Oracle on Windows NT performance, also use the `%t` format specifier at the end of the format string. For example: `%U_%t`.

Use the `send` command to specify the class and/or schedule to use with each backup. Because NetBackup for Oracle on Windows NT uses the class or schedule to determine what media to use, this information is required for each copy, or an error will occur.

The command syntax is:

```
send 'keyword=value [, keyword=value,...]';
```

The keywords to specify class are: CPF1_BK_CLASS, CPF2_BK_CLASS, CPF3_BK_CLASS, and CPF4_BK_CLASS, which specify the backup class for duplexed file 1 through duplexed file 4.

The keywords used to specify schedule are: CPF1_BK_POLICY, CPF2_BK_POLICY, CPF3_BK_POLICY, and CPF4_BK_POLICY, which specify the Backup Policy schedule for duplexed file 1 through duplexed file 4.

Database User Authentication

Because the NetBackup Client Service is, by default, started under the SYSTEM account, special attention must also be given to database user authentication. You will not have permission to connect to the target database if you are using OS Authentication instead of passwords. If you are using OS Authentication, you must run the NetBackup Client Service under an account that has SYSDBA privilege. To do this:

1. From the Control Panel, select Services.
2. Highlight NetBackup Client Service and click Stop.
3. Click Startup and in the Log On As: pane, select This Account:.
4. Type the account name with SYSDBA privilege.
5. Type the password.
6. Click OK.

For more information on OS Authentication, see your Oracle documentation.

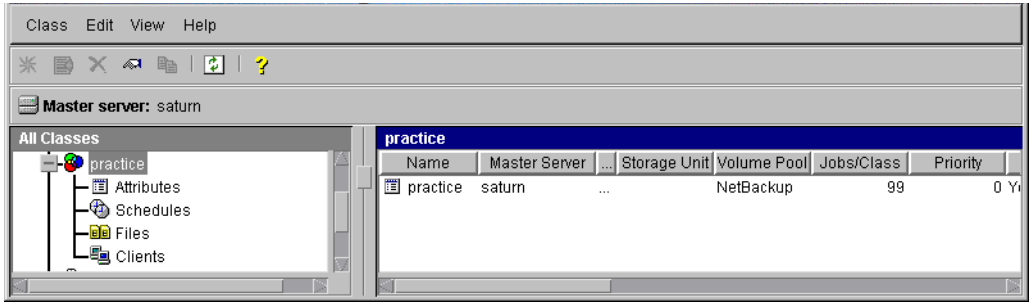
Test NetBackup for Oracle on Windows NT Configuration Settings

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

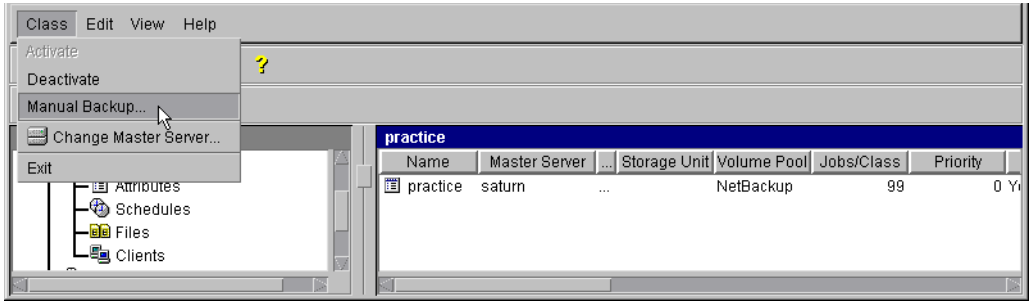
NetBackup Administration - Java Interface

Use this procedure to test a class configuration on the NetBackup Administration - Java Interface for HP or Solaris operating systems.

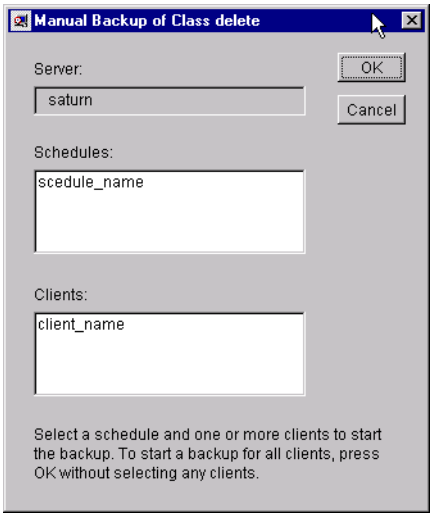
1. Log onto the server as root.
2. Start the NetBackup administrator interface.
3. Click the Backup Policy Management icon. The Backup Policy Management (Classes) - NetBackup dialog appears.
4. Select a class to back up.



5. On the Class menu, click Manual Backup.



The Manual Backup dialog box appears.



The Schedule pane contains the name of a schedule configured for the class you are going to test. The Client pane contains the name of the client(s) listed in the class you are going to test.

6. Follow the instructions on the dialog box.

7. Click Activity Monitor on the NetBackup Administration interface to open the Activity Monitor dialog box.

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

`xbpadm` Interface

Use this procedure to test a class configuration on a UNIX NetBackup master server.

1. Log onto the server as root.
2. Start the NetBackup `xbpadm` administrator interface.
   - If the `DISPLAY` variable is set, type:

     `/usr/openv/netbackup/bin/goodies/xbpadm &`
   - If the `DISPLAY` variable is not set, use the `-d` option:

`/usr/openv/netbackup/bin/goodies/xbpadm -d (`*your_machine_name*`):0 &`

   The NetBackup Administration dialog box will open.
3. Under Classes, select the Oracle class you configured.
4. Under Actions, select Manual Backup. The Manual Backup dialog box will appear.
   a. Select a schedule in the Schedules pane.
   b. Select a client in the Clients pane.
   c. Click OK. The Manual Backup dialog box will close.
5. Under File, select Job Monitor. The Job Monitor dialog box will appear. A status code will display in the Status column.

Note The jobs listed in the Job Monitor dialog box include one job for the overall database backup and multiple default-policy jobs which depended on the need of drives have been specified.

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

NetBackup Administration - Windows NT/2000 Interface

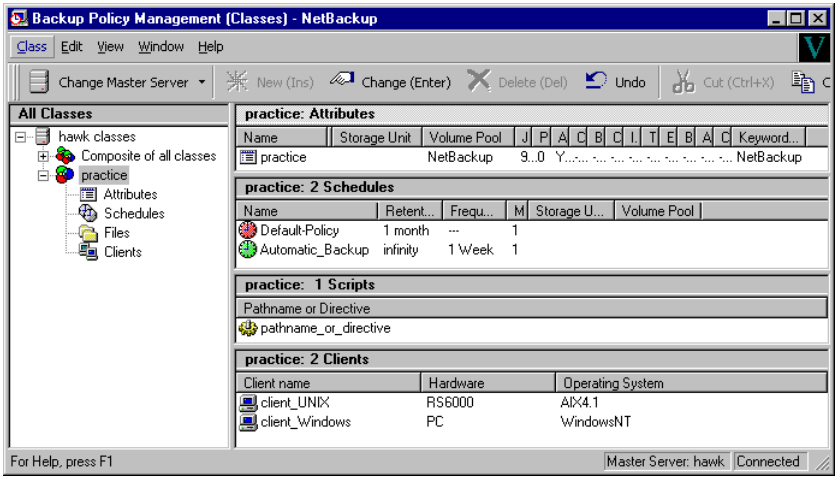
Use this procedure to test a class configuration from a Windows NT/2000 server or from the NetBackup Administration Client host.

1. Log onto the server as Administrator.

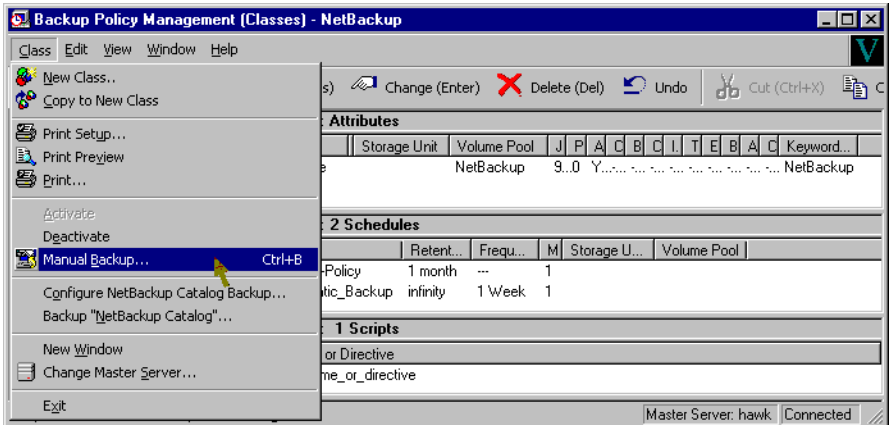
2. Start the NetBackup administrator interface.

3. Click the Backup Policy Management icon. The Backup Policy Management (Classes) - NetBackup dialog appears.

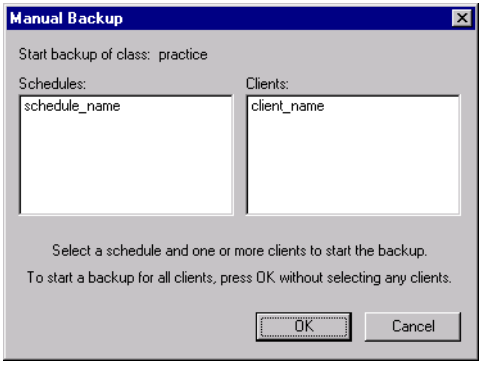
4. Select a class to back up.



5. On the Class menu, click Manual Backup.



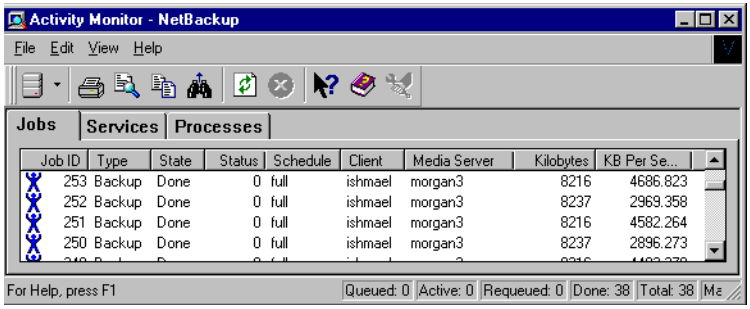
The Manual Backup dialog box appears.



The Schedule pane contains the name of a schedule configured for the class you are going to test. The Client pane contains the name of the client(s) listed in the class you are going to test.

6. Follow the instructions on the dialog box.

7. Click Activity Monitor on the NetBackup Administration interface to open the Activity Monitor dialog box.



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

Using NetBackup for Oracle on Windows NT 5

When installation and configuration is complete, you can use the NetBackup interfaces, the Oracle Enterprise Manager, or the command line interface to start Oracle backups and restores, and to maintain the recovery catalog.

This chapter contains the following sections:

- Maintaining a Recovery Catalog
- Querying the Recovery Catalog
- Performing a Backup
- Browsing Backups
- Performing a Restore
- Performing Other ebu or rman Actions

Maintaining a Recovery Catalog

Oracle Enterprise Manager (RMAN) provides recovery catalog maintenance commands to allow the following functions. Refer to your *Oracle Server Backup and Recovery Guide* for more details on recovery catalog maintenance.

Function	Description
Registering a database with the recovery catalog	Before using RMAN, you must register the target database in the recovery catalog. To do this, start and mount the target database but do not open it. At the RMAN prompt, issue a `register database` command.
Resetting the information in the recovery catalog	The `reset database` command directs RMAN to create a new database incarnation record in the recovery catalog.

Cross-checking the information in the recovery catalog (Oracle 8.1.x only)	Because the Media Manager can mark tapes as expired, the recovery catalog can contain outdated information about archived material. To ensure that data in the recovery catalog is in sync with data in the media management catalog, perform a cross-check. Use the cross-check feature to:
	◆ Determine whether a backup set is available or expired.
	◆ Delete any expired backup sets found in the recovery catalog.
	◆ Call the media manager about the status of a backup piece and then mark it as available or expired.
	The `crosscheck backupset` command will operate on available and expired backup pieces found in the recovery catalog. RMAN will update their status with the result (available or expired).
	To crosscheck a database, start RMAN and connect to the target and recovery catalog databases. At the `rman` command prompt, issue the following commands:
	`allocate channel for maintenance type 'sbt_tape';`
	`crosscheck backupset of database;`

Function	Description

	The `delete expired backupset` command will operate only on expired backup pieces found in the recovery catalog. RMAN will remove them from the recovery catalog.
	
	To delete expired backupsets of a database from the recovery catalog, start RMAN and connect to the target and recovery catalog databases. At the RMAN command prompt, issue the following commands:
	
	`allocate channel for maintenance type 'sbt_tape';`
	
	`delete expired backupset of database;`
	
	The crosscheck and delete backupset commands allow you to restrict the list of objects operated on to the specified device type (i.e., disk or tape), object type (i.e., archived logs or database files), and date range.
	
	The `change ... crosscheck` command will query the media manager to determine if a backup piece is available. If a backup piece is unavailable, RMAN will mark the backup piece as expired. If it was expired but is now available, RMAN will mark the backup piece as available. The command syntax is:
	
	`change backuppiece {`*primary-key-list*`|`*filename-list*`|`*tag*`} crosscheck;`
	
	`change backupset {`*primary-key-list*`} crosscheck;`

Resynchronizing the recovery catalog	RMAN compares the recovery catalog to either the current control file of the target database or a backup control file and updates it with information that is missing or changed. If you are running in ARCHIVELOG mode, resynchronize the recovery catalog regularly since the recovery catalog is not updated automatically when a log switch occurs or when a redo log is archived. You must also resynchronize the recovery catalog after making any change to the physical structure of the target database. As with log archive operations, the recovery catalog is not automatically updated when a physical schema change is made. The RMAN `backup`, `copy`, `restore`, and `switch` commands update the recovery catalog automatically when the target database control file is available and the recovery catalog database is available when any of these commands are executed. If the recovery catalog is unavailable when you issue `backup` or `copy` commands, you should resynchronize it manually.

Function	Description
	To resynchronized the recovery catalog, start RMAN and issue the `resync catalog` command.
Changing the availability of a backup set or file copy	You may periodically need to notify RMAN that the status of a backup set, backup piece, datafile copy, or archived redo log has changed. The RMAN `change` command enables you to make a variety of useful record changes.
	The `change ... uncatalog` command removes references to a backup piece, datafile copy, or archivelog from the recovery catalog. This command works only with a recovery catalog.
	The `change ... delete` command removes references to a backup piece, datafile copy, or archivelog from the control file and recovery catalog. It physically deletes the file. This command works with or without a recovery catalog.
	The `change ... crosscheck` command removes references to a backup piece, datafile copy, or archivelog from the control and recovery catalog when that file no longer exists. This command works with or without a recovery catalog.
	The `change ... unavailable` command marks a backup piece, datafile copy, or archivelog as unavailable. This command works only with a recovery catalog.
Cataloging O/S backups	Cataloging O/S backups will make RMAN aware of the existence of file copies that are created through means other than RMAN.
Recovering a lost or damaged recovery catalog	If the recovery catalog is lost or damaged and recovery of the recovery catalog database through normal Oracle recovery mechanisms is not possible, catalog maintenance commands can be used to partially re-create its contents.

Querying the Recovery Catalog

RMAN allows you to generate a number of reports relevant for backup and recovery using the `report` and `list` commands. The `list` command lists the contents of the recovery catalog, while the `report` command performs a more detailed analyses.

You can use the `report` command to answer questions, such as:

- Which files need a backup?
- Which files have not had a backup in a while?
- Which files are not recoverable due to unrecoverable operations?
- Which backup files can be deleted?
- What was the physical schema of the database at some previous point in time?

The `list` command queries the recovery catalog and produces a listing of its contents. You can list:

- Backup sets containing a backup of a specified list of datafiles.
- Copies of a specified list of datafiles.
- Backup sets containing a backup of any datafile that is a member of a specified list of tablespaces.
- Copies of any datafile that is a member of a specified list of tablespaces.
- All backup sets or copies of all datafiles in the database.
- Backup sets containing a backup of any archivelogs with a specified name and/or within a specified range.
- Copies of any archivelog with a specified name and/or within a specified range.
- Incarnations of a specified database or of all databases known to the recovery catalog.

Refer to your *Oracle Server Backup and Recovery Guide* for more details on querying the recovery catalog.

Performing a Backup

Backups can be performed by using:

- Automatic Backup of an Oracle Class
- Manual Backup of an Oracle Class
- User-Directed Backup From the Client

Automatic Backup of an Oracle Class

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

- In the same order as they appear in the file list
- On all clients that have them (that is, matching pathnames)

The NetBackup for Oracle scripts will start the database backup by executing ebu (or rman if using Oracle8 Recovery Manager).

When the backup is started through NetBackup, NetBackup for Oracle on Windows NT leaves script error checking for EBU or RMAN. The `ebu` or `rman` command generates an error if it considers a command invalid, but allows any of the commands it normally considers valid to proceed. This means that by specifying the wrong script file name you could start an unintended operation.

Manual Backup of an Oracle Class

The administrator can use the NetBackup server software to manually execute an automatic backup schedule for the Oracle class. See the *NetBackup System Administrator's Guide - UNIX* or the *NetBackup System Administrator's Guide - Windows NT/2000* for detailed instructions.

Refer to "Test NetBackup for Oracle on Windows NT Configuration Settings" on page 97 for instructions on initiating a manual backup of an Oracle class.

User-Directed Backup From the Client

This section describes two ways to perform a User-Directed Backup.

Executing the NetBackup for Oracle Script on the Client

If you know the pathname of the NetBackup for Oracle script that initiates the backup or restore, you can execute the NetBackup for Oracle script from the DOS command line.

For example, to perform a database backup, at the DOS command line you might enter:

```
N:\oracle\scripts\cold_database_backup.cmd
```

The DOS shell starts the database backup by executing the Oracle script file. The Oracle script file contains commands to execute `ebu` or `rman`.

Executing `ebu` or `rman` on the Client

As an oracle user you can also execute the `ebu` or `rman` command from the DOS command line with the EBU or RMAN script file as a parameter.

The following describes how to set the master server to windows and the Oracle Class to obk before starting the backup.

ebu

At the command prompt, enter:

```
set NB_ORA_SERV=windows
set NB_ORA_CLASS=obk
ebu N:\Oracle7\scripts\bd_full_backup.rcv
```

where `db_full_backup.rcv` contains the EBU commands.

rman

Since RMAN functionality executes as a service, we must use the `parms` operand to set up the runtime environment. To start a backup using the `rman` command from the command prompt, type:

```
rman target internal/oracle@ORCL rcvcat rman/rman@RCAT cmdfile
"N:\oracle8\scripts\db_full_backup.rcv"
```

In this example `db_full_backup.rcv` would contain the command `parms = "ENV = (NB_ORA_SERV = windows, NB_ORA_CLASS = obk)"` to set the server to windows and the class to obk. See “Oracle8 RMAN Environment” on page 62 for more details.

Browsing Backups

You can browse the Oracle backups for your client by using either Recovery Catalog or the `bplist` command.

See "Maintaining a Recovery Catalog" on page 104 for more details.

Using the Recovery Catalog to Browse Backups

If you use a Recovery Catalog, you can use the RMAN report and list commands to browse Oracle backups.

Using `bplist` to Browse Backups

You can use the `bplist` command to browse Oracle backups. The result is the list of backup file names. The following example uses `bplist` to search all Oracle backups for a client named jupiter.

```
install_path\NetBackup\bin\bplist -C jupiter -t 4 -R \
\exb_n2bm5bco_1_1392342936
\exb_mabm02ko_1_1392170136
\exb_lqbltds6_1_1392083334
```

The `-t 4` on this command specifies the Oracle backups. The `-R` specifies the default number of directory levels to search, 999. Refer to `bplist(1M)` man page for more information on this command.

Performing a Restore

Make sure a backup has been successfully completed before attempting a restore. If a backup history does not exist, an error will occur during the execution of a restore.

This section describes the following procedures for performing user-directed restores:

- Oracle Script on the Client
- ebu or rman Command
- Alternate Client Restore

Oracle Script on the Client

If you know the pathname of the Oracle script that initiates the restore, you can start it from the DOS command prompt. For example, to perform a database restore at the DOS prompt you might enter:

```
H:\oracle8\scripts\database_restore.cmd
```

The DOS shell starts the database restore by executing the Oracle script file. The Oracle script file contains commands to execute `ebu` or `rman`.

`ebu` or `rman` Command

Execute the `ebu` or `rman` command from the DOS prompt on the client, by using the appropriate EBUor RMAN command script file as a parameter.

```
rman target 'internal/oracle@ORCL' rcvcat 'rman/rman@RCAT'
  cmdfile 'H:\oracle8\scripts\database_restore.rcv'
```

Alternate Client Restore

With NetBackup for Oracle on Windows NT you have the option to restore a database to a client other than the one that originally performed the backup. The process of restoring data to another client is called alternate client restore.

The following describes how to restore backups to an alternate client using EBU and RMAN.

Server Configuration

Ensure that the NetBackup server is configured to allow alternate client restore. The administrator can remove restrictions for all clients by creating the following file on the Netbackup master sever:

install_path`\netbackup\db\altnames\No.Restrictions`

Or the administrator can restrict clients to restore only from certain other clients by creating and then adding client names to the file:

install_path\netbackup\db\altnames*client_name*

Where *client_name* is the name of the client allowed to do the alternate client restore.

See the *NetBackup System Administrator's Guide - UNIX* for details.

Oracle7 EBU Alternate Client Restore

Perform the following on the alternate client host if you want to restore EBU backups that are owned by another client.

1. Enable a network connection to the EBU catalog database, which was used by the original client.
2. Set ORACLE_SID to the same value as the original database.
3. Set the environment variable, NB_ORA_CLIENT, to the original client.
4. Create the folder where the datafiles will be restored.
5. Specify `backup_host=`*original_client* in the EBU restore script.
6. Run the EBU restore script.

Example

In this example assume:

- Original client is camel
- Alternate client is giraffe
- Server is lion
- ORACLE_SID is test

1. Create the file, *install_path*`\netbackup\db\altnames\giraffe`, on server lion.
2. Set lion as the current server, using the NetBackup client GUI on giraffe.
3. Modify the network `tnsnames.ora` file to enable EBU catalog connection.
4. Set the environment variables ORACLE_SID to test and NB_ORA_CLIENT to camel.
5. Make sure a restore folder exists.

The datafiles will be restored to a folder path with the same name they had when backed up.

6. Run the restore script:

```
restore database
DB_NAME= "test"
backup_host= "camel"
log=C:\temp\rest_alt.log
```

Oracle8 RMAN Alternate Client Restore

Perform the following on the alternate client host if you want to restore RMAN backups that are owned by another client.

1. Enable a network connection to the RMAN catalog database, which was used by the original client.
2. Set ORACLE_SID to the same value as the original database.
3. Use the rman parms option to set the environment variable, NB_ORA_CLIENT, to the original client.
4. Create an `init`*`SID`*`.ora` file for the previously set ORACLE_SID.
5. Create and start an Oracle Service for the previously set ORACLE_SID.
6. Create the folder where the datafiles will be restored.
7. Start up the database in the nomount state.
8. Start `rman`, connecting to the catalog and the target database.
9. Run an RMAN restore script.

Example

In this example assume:

- Original client is camel
- Alternate client is giraffe
- Server is lion
- ORACLE_SID is test

1. Create the file, *install_path*\netbackup\db\altnames\No.Restrictions, on server lion.

2. Modify the network tnsnames.ora file to enable RMAN catalog connection.

3. Create inittest.ora.

4. Use ORADMIN80 to create and start ORACLESERVICETEST.

5. Set the environment variables ORACLE_SID to test.

6. Make sure the folder exists and has appropriate access permissions.

   The datafiles will be restored to a folder path with the same name they had when backed up.

7. Start up the database.

```
$svrmgr30
SVRMGR> connect internal/oracle
SVRMGR> startup nomount
...
SVRMGR> exit
$
```

8. Run rman.

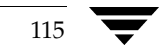
```
$rman rcvcat rman/rman@rcat
Recovery Manager: Release 8.0.5.0.0 - Production
RMAN> @restore_database.rcv
```

   Where restore_database.rcv is:

```
run
 {
#  Allocates tape channel and sets RMAN environment variable
allocate channel t1 type 'SBT_TAPE'
parms="ENV=(NB_ORA_CLIENT=camel,NB_ORA_SERV=lion)";
restore
    (database);
restore
    controlfile to 'D:\orant805\database\ctl1TEST.ora';
release channel t1;
}
```

Performing Other ebu or rman Actions

- To execute script files for database operations other than backups or restores, it is recommended that you execute the ebu or rman command directly rather than using NetBackup. For the ebu command script syntax and examples, see Appendix B in the *Oracle7 Enterprise Backup Utility Administrator's Guide*.
- For the rman command script syntax and examples, see the *Oracle8 Server Backup and Recovery Guide*.



Troubleshooting 6

NetBackup, NetBackup for Oracle on Windows NT, and the Oracle8 Recovery Manager all provide reports on database operations. These reports are useful for finding errors associated with those applications.

This chapter contains the following sections.

- NetBackup and NetBackup for Oracle on Windows NT
- Troubleshooting Procedure
- Backup or Restore Errors
- Poor Backup Performance Using Oracle7 Enterprise Backup Utility
- Excessive Tape Remounts

NetBackup and NetBackup for Oracle on Windows NT

The following describes troubleshooting logs and reports generated by NetBackup products.

NetBackup for Oracle on Windows NT Logs

The NetBackup server and client software allow you to set up detailed activity logs for troubleshooting problems that occur outside of either NetBackup for Oracle on Windows NT or the Oracle8 Recovery Manager. See the *NetBackup Troubleshooting Guide - UNIX* or the *NetBackup Troubleshooting Guide - Windows NT/2000* for a complete description of activity logs. Also see the *install_path*`\NetBackup\logs\README.debug` file.

Note These logs do not reveal errors that occur during the execution of the Oracle8 Recovery Manager, unless those errors also affect NetBackup for Oracle on Windows NT. Your best sources for Oracle error information are the logs provided by the Oracle.

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

1. Create the following folders on the client:

   install_path`\NetBackup\logs\bphdb`
   install_path`\NetBackup\logs\dbclient`

2. Make sure there is share access to the log folders.

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

`bphdb` Folder on the Client

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

`obk_stdout.`*mmddyy.hhmmss*`.txt`

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

`obk_stderr.`*mmddyy.hhmmss*`.txt`

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

mmddyy`.log`

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

`dbclient` Folder on the Client

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

mmddyy`.log`

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

Setting the Debug Level

You can control the amount of information that the database extension writes to its log in the *install_path*`\NetBackup\logs\dbclient` folder by changing the Verbose debug level. The higher the value, the more information is logged. In everyday normal operations, the default value of 0 is sufficient. However, VERITAS technical support may ask you to set it to 9 when a problem is being analyzed.

To change the Debug Database Level:

1. From the Start button, choose Programs, then VERITAS NetBackup, then NetBackup Client.

   The Backup, Archive, and Restore - NetBackup window appears.

2. On the Actions menu, select: Configure...

3. From the NetBackup Configuration dialog box, select the Troubleshooting tab.

4. In the Database pane, set the debug level.

5. Stop and start the Oracle Database Services. This is necessary for `orasbt.dll` to pickup the new debug level.

NetBackup Server Reports

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

Oracle7 Enterprise Backup Utility Logs

The Oracle7 Enterprise Backup Utility performs its own error logging and tracing in the file specified by the `log` and `trace` qualifier in the EBU script. Ensure that the EBU script specifies at least a log qualifier. Database administrators should refer to these files to determine what has happened during an `ebu` execution.

Oracle8 Recovery Manager Utility Logs

The Oracle8 Recovery Manager uses a command language interpreter, and can be executed in interactive or batch mode. You can specify a log file on the command line to record significant RMAN actions. The syntax is:

`msglog '<`*logfile name*`>'`

Troubleshooting Procedure

Note For brevity, this chapter refers to the `orasbt.dll` as API.

To perform this procedure, the following conditions must exist.

If using the Oracle7 Enterprise Backup Utility (EBU), the following products are properly installed and configured:

- NetBackup 3.4
- Oracle7 RDBMS
- Oracle7 Enterprise Backup Utility
- NetBackup for Oracle on Windows NT 3.4

If using the Oracle8 Recovery Manager (`RMAN`), the following products are properly installed and configured:

- NetBackup 3.4
- Oracle RDBMS 8.0.4 or later
- NetBackup for Oracle on Windows NT 3.4

1. When verifying your installation, ensure that the following two NetBackup for Oracle on Windows NT binaries exist:
   - `bphdb.exe` resides on the client and is used by both the NetBackup scheduler and the graphical interface to start backups and restores. The main purpose of `bphdb` is to execute an Oracle script file that in turn calls `ebu` or `rman`. Only the EBU or RMAN script is required when `ebu` or `rman` is executed from the command line.
   - `orasbt.dll` provides functions callable by the Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager.
2. Check that both the NetBackup server and client software are working properly. That is, check that normal operating system files can be backed up and restored from the client. The NetBackup client must be running the same version of software as the NetBackup server.

Note Oracle7 Enterprise Backup Utility does not have remote backup capability and must run on the same client as the Oracle database that is being backed up.

The following NetBackup logs are turned on in `VERBOSE` mode:

- On the client: `dbclient`, `bphdb`, `bplist`, and `bpcd`.
- On the master server: `bprd`, `bpsched`, and `bpdbm`.

- On the host with the storage unit: `bpbrm`, and `bptm`.

Note These logs may become very large, especially `bpsched` and `bpdbm`. Ensure that enough free disk space exists in the log folder disk partition.

Backup or Restore Errors

An Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager backup error can originate:

- On the NetBackup side

  An error can be from the API, the NetBackup server or client, or Media Manager.

- On the Oracle side

  The error can be from the Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager, or the target database.

VERITAS suggests that you use the following steps when troubleshooting a failed operation:

1. Check the logs to determine the source of the error.
2. Troubleshoot each stage of the backup or restore.

The following sections describe these steps in detail.

Check the Logs to Determine the Source of the Error

Determine whether the error is from NetBackup or the Oracle8 Recovery Manager.

If the error came from NetBackup, go to "Troubleshoot Each Stage of the Backup or Restore" on page 124.

Otherwise, have the Oracle database administrator or the NetBackup administrator look at the problem.

1. Check the Oracle log.

   Messages are sent to the file name specified by

   `log=`

   in the EBU script or to the screen if `log=` is not specified.

   Some common problems on the Oracle7 side are:

- The Oracle7 Enterprise Backup Utility did not locate and load the correct API library.
- The Oracle7 Enterprise Backup Utility was unable to connect to its Backup Catalog Instance or the target database.
- The target database is not in the appropriate mode: online, shutdown, or archivelog.
- An Oracle7 Enterprise Backup Utility Catalog error occurred. This can be due to an abnormal job termination that occurred earlier in the operation.

For Oracle8

Unless redirected, messages from RMAN are, by default, sent to `obk_stdout.`*`mmddyy`*`.`*`hhmmss`*`.txt` in the `bphdb` log directory. You can redirect this output to another location by specifying `msglog` *filename* on the rman command line.

Some common problems on the Oracle8 side are:

- Oracle did not load the correct API
- Oracle Services are down
- `tnsnames.ora` is not properly configured
- RMAN was unable to connect to the database.
- The target database is not in the appropriate mode: online, mounted, or archivelog

The above errors are usually due to incorrect installation or configuration. Generally, after a failed operation, Oracle can clean up, but some user intervention may be required.

2. Check the NetBackup logs.

The first NetBackup log to check is *install_path*`\NetBackup\logs\dbclient\mmddyy.log`. This is the most important log. Examine it closely. It contains messages that will provide the best way to determine the source of an error. This log is written by the API and contains:

- Requests from `ebu` or `rman`
- Activities between the API and NetBackup processes

If *install_path*`\NetBackup\logs\dbclient\mmddyy.log` does not contain any messages, the possible errors are:

- The Oracle7 Enterprise Backup Utility or the Oracle8 Recovery Manager did not load the correct API. This is an Oracle8 API or Oracle7 Enterprise Backup Utility installation problem.

On Windows NT this can be determined by looking in the *system_root*\System32 folder for the file orasbt_link.log. This file will be created whenever the Oracle service is started and links with the NetBackup for Oracle on Windows NT library. Check the timestamp to verify that it has the same time as when the server started.

Refer to the "Installation" on page 15 for more details

- ebu or rman terminated due to some Oracle problem, before requesting service from NetBackup.

  If this is an automatic or manual backup, check the bphdb log to see if the Oracle script file was successfully started. If not, try to execute the Oracle script file from the command line to determine the problem. Usually, the error is due to:

  - A file permission problem for bphdb itself or the Oracle script file.
  - The user does not have permission to run Oracle.
  - Syntax errors or invalid command.
  - The file cannot be found. Make sure the full Oracle script file name is entered correctly in the file list of the class configuration.
  - rman or ebu failed to execute
  - The necessary environment variables are not set.

Troubleshoot Each Stage of the Backup or Restore

The following explains the sequence of events for an Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager initiated action and suggests solutions for problems that can occur at each point in the sequence.

1. ebu or rman starts.

A backup or restore can be started in any of the following ways:

- Command line from the system prompt such as:

  For Oracle7 Enterprise Backup Utility Backup or Restore:

  ```
  % ebu EBU script file name
  ```

  For Oracle8 Recovery Manager Backup or Restore:

  ```
  % rman target user/pwd[@TNS alias] \
     rcvcat user/pwd[@TNS alias]\
     cmdfile RMAN script file name
  ```

  where *RMAN script file name* is fully qualified.

- Manually from the administrator interface on the master server.
- Automatically by an automatic backup schedule.

If an error occurs at this point, check the Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager log.

2. Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager verifies its environment, then issues requests to the API.

   Some information such as the NetBackup version, API versions, and trace filename, are registered with the Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager.

   An error at this point is usually due to a problem with client and server communication. Check the messages in the `bprd`, `bpsched`, and `bpcd` logs for clues.

3. Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager issues a backup or restore request.

   The API gathers necessary parameters, and then sends the `backup` or `restore` request to the NetBackup server. The API waits until both the server and client are ready to transfer data before returning.

   Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager requests a backup or restore by passing the following to the API:

   - Filename it wants NetBackup to use
   - Mode (backup or restore)
   - Actual name of the Oracle data file
   - Information about the target database

   The API gathers information from the following:

   - Environment
   - Server configuration parameters
   - Information file from `bphdb` to be used as parameters to the `bprd` process

   The API then sends this information to the master server's `bprd` process.

   To troubleshoot a problem in this part of the first sequence, examine the *install_path*`\NetBackup\logs\dbclient\`*mmddyy*`.log`.

   - If the `bprd` process failed, check the logs for `bprd`, `bpbrm`, and `bpsched`.

     A failure at this point is frequently due to bad NetBackup server or Oracle class configuration parameters:

NetBackup can usually select the correct Oracle class and schedules but not always when there are several Oracle classes in its database. Try setting the `SERVER` and `CLASS` values in the client environment.

4. Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager issues read or write requests to the API, which then transfers data to or from the NetBackup server.

   A failure here is probably due to NetBackup media, network, or timeout errors.

5. Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager tells the API to close the session.

   The API waits for the server to complete its necessary actions (backup image verification and so on) and then exits.

   An error can originate from either NetBackup, Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager.

   - Oracle7 Enterprise Backup Utility or Oracle8 Recovery Manager will abort if they encounter an error while reading a data file during the backup (for example, if Oracle blocks are out of sequence). It also aborts if NetBackup sends a bad backup image during the restore.
   - NetBackup may return an error code to the API if for some reason it could not complete the backup successfully.

Poor Backup Performance Using Oracle7 Enterprise Backup Utility

If you find backups are slow, verify that performance is better when performing a non-database backup. If performance does not improve, troubleshoot NetBackup.

If performance is better, try tuning Oracle7 Enterprise Backup Utility by setting DISK_IO_SIZE or BUFFER_SIZE in an Oracle7 Enterprise Backup Utility parameter file or within your Oracle7 Enterprise Backup Utility scripts. For more tuning parameters, see the *Oracle7 Enterprise Backup Utility Administration Guide.*

Excessive Tape Remounts

Each backup set initiates a new NetBackup job. If you are using a robotic device that supports automatic volume recognition, tape mounts are not normally an issue. However, if you do not use such a device, you may notice a mount request prior to each job executing. This can become labor intensive. NetBackup provides parameters, MEDIA_UNMOUNT_DELAY, which will prevent unmounting a tape after it is used. This will keep the required tape on-line until Media Manager is manually instructed to dismount it. See the *NetBackup System Administrator's Guide - UNIX* or the *NetBackup System Adminstrator's Guide - Windows NT/2000* for more information.

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