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S O F T W A R E

# NETVAULT

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APM/plugin user's guide

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*for the*  
Oracle RMAN APM

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*APM/Plugin User's Guide for the Oracle RMAN APM*

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## Using the Oracle RMAN APM

1.0.0 - About the Oracle RMAN APM .....	5
• <b>1.0.1 - Target Audience</b> .....	5
1.1.0 - Installation .....	6
• <b>1.1.1 - Recommended System Set Up</b> .....	6
• <b>1.1.2 - Installation Synopsis</b> .....	7
• <b>1.1.3 - Phase 1: Pre-Installation Requirements</b> .....	7
- <i>1.1.3.a - Step 1: Installing NetVault Software</i> .....	7
- <i>1.1.3.b - Step 2: Setting the Oracle Database to ARCHIVELOG Mode</i> .....	8
- <i>1.1.3.c - Step 3: Adding the Oracle Database Server as a NetVault Client</i> .....	8
- <i>1.1.3.d - Step 4: Additional Pre-Installation Procedures (Windows-based O/S ONLY)</i> .....	9
• <b>1.1.4 - Phase 2: APM Installation Procedure</b> .....	12
• <b>1.1.5 - Phase 3: Post-Installation Requirements</b> .....	13
- <i>1.1.5.a - Linux/Mac OS X/UNIX-based Operating Systems</i> .....	13
- <i>1.1.5.b - Windows-based Operating Systems</i> .....	14
• <b>1.1.6 - Removing the Oracle RMAN APM</b> .....	16
1.2.0 - Configuring the Oracle RMAN APM .....	16
• <b>1.2.1 - Phase 1: Setting Up a Database for Recognition</b> .....	16
- <i>1.2.1.a - Step 1: Acquiring the "SID" for the Oracle Database</i> .....	16
- <i>1.2.1.b - Step 2: Acquiring the Oracle Home Directory</i> .....	17
- <i>1.2.1.c - Step 3: Locating Oracle File Path Information</i> .....	18
- <i>1.2.1.d - Step 4: Adding the Database to the Oracle RMAN APM</i> .....	19
• <b>1.2.2 - Phase 2: Setting Configuration Options</b> .....	19
• <b>1.2.3 - Additional Configuration Procedures</b> .....	21
- <i>1.2.3.a - Editing an Added Database</i> .....	21
- <i>1.2.3.b - Removing a Database</i> .....	23
- <i>1.2.3.c - Configuring for CLI-based Backups/Restores (NetVault ver. 7.0 and Later ONLY)</i> .....	23
1.3.0 - Backing Up Data with the Oracle RMAN APM .....	25
• <b>1.3.1 - Basic Operations in the Backup Window</b> .....	26
- <i>1.3.1.a - Phase 1: Obtaining Valid Account Information</i> .....	26
- <i>1.3.1.b - Phase 2: Selecting Data Items for a Backup</i> .....	26
- <i>1.3.1.c - Phase 3: Finalizing and Submitting the Backup Job</i> .....	32
• <b>1.3.2 - Additional Backup Operations</b> .....	32



- 1.3.2.a - *Updating the Oracle Database Password* ..... 32
- 1.3.2.b - *RMAN Post-Backup Scripts* ..... 33
- 1.3.2.c - *Backing Up Data Using the Command Line Interface* ..... 34
- 1.4.0 - *Restore Operations* ..... 36
  - 1.4.1 - **Restore Pre-Requisites (Mac OS X Restores Only)** ..... 36
  - 1.4.2 - **Restoring with the Oracle RMAN Application** ..... 36
  - 1.4.3 - **Restoring with the NetVault GUI** ..... 37
    - 1.4.3.a - *The Restore Options Tab* ..... 39
- 1.5.0 - *Troubleshooting* ..... 40



## 1.0.0 About the Oracle RMAN APM

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The **Oracle RMAN™ Application Plugin Module (APM™)** for NetVault provides Oracle database administrators with an integral solution for backup of Oracle databases on Windows, Linux, MAC OS X and UNIX-based platforms. With this APM, there is no need to take an Oracle database offline prior to backup. The APM allows database administrators to perform total or incremental archives and incremental backups of databases while leaving the production servers online. When using the NetVault **Oracle RMAN APM** with a running instance of Oracle, administrators can use various features:

- **Hot Backup:** All backups can be performed while the database is online.
- **Multiple Backup Modes:** The Oracle Recovery Manager (RMAN) APM supports full, incremental and cumulative incremental backups.
- **Easy to use Graphical User Interface:** Backup operations are controlled from an easy to use graphical user interface.
- **Selectable Database Backup Operations:** The **Oracle RMAN APM** allows you to backup only what is needed. With the easy to use point and click user interface, administrators can select precisely what needs to be backed up, including individual tablespaces, archive logs and control files.
- **Parallel Backup Support:** Backups can be split into multiple jobs for parallel execution and load balancing.

### 1.0.1 Target Audience

Routine backup operations can be performed with the **Oracle RMAN APM**, without needing Oracle Database Administration skills. However, installation, configuration and restore operations will require this level of experience. Therefore, to minimize problems, it is recommended that someone with at least Oracle Database Administration skills perform all operations with the **Oracle RMAN APM**.

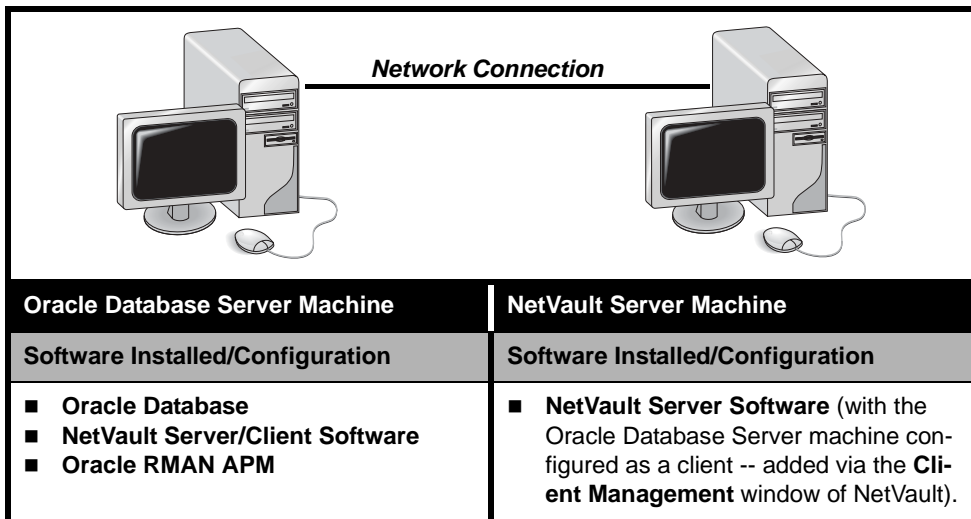
## 1.1.0 Installation

This section offers information on system preparation and the installation of the **Oracle RMAN APM**.

**Important:** NetVault's **Encryption Plugin** can not be used in conjunction with the **Oracle RMAN APM**. Due to the nature of the **Encryption Plugin**, it conflicts with **Oracle RMAN APM** data transfer during backup and restore operations. If the **Encryption Plugin** is used with Oracle RMAN backups, the data will be encrypted as expected, but the restore process **will not** decrypt the data stream and the restore will fail. If the **Encryption Plugin** has already been installed, as a minimum it **must be** disabled (turned off) on the Oracle Database Server to perform backups or restores. However, it is recommended that the NetVault software be removed and re-installed on any system that is to utilize the **Oracle RMAN APM** on which the **Encryption Plugin** is already installed. Prior to doing so, please ensure that the **Encryption Plugin** is not required to restore any previously encrypted backups. If the **Encryption Plugin** is removed, any backup jobs previously performed **will not** be recoverable without the plugin.

## 1.1.1 Recommended System Set Up

The table that follows shows a recommended environment in which the Oracle Database Server and the NetVault Server exist as separate machines in the NetVault domain.



**Important:**

1. For redundancy purposes and to ensure optimal performance, it is highly recommended that the set up outlined in this section be utilized (i.e., NetVault Server and the Oracle Database Server exist as two **separate** machines).

2. All procedures and examples offered in this user guide assume that this separate NetVault Server/Oracle Database Server environment is in place.

## 1.1.2 Installation Synopsis

The set up of a NetVault environment in order to use the Oracle RMAN APM can be broken down into three basic installation phases:

- **Phase 1: Pre-Installation Requirements** - This first phase of environment set up consists of a four step process:
  - ❖ **Step 1: The NetVault Software Installed** - This applies to both the machine that is to serve as the Netvault Server and the machine housing the Oracle database.
  - ❖ **Step 2: The Oracle Database set to ARCHIVELOG Mode** - The database must be placed in this mode on the target system.
  - ❖ **Step 3: Add the Oracle Database Server as a NetVault Client** - The machine housing the Oracle Database must be added to the added to the NetVault Server as a Client.
  - ❖ **Step 4: Additional Pre-Installation Procedures (Windows-based O/S ONLY)** - Additional procedures are required before installing this APM, when the Oracle Database Server is running a Windows-based O/S.
- **Phase 2: APM Installation Procedure** - Installation of the **Oracle RMAN APM** software on the machine acting as the Oracle Database Server.
- **Phase 3: Post Installation Requirements** - Once the APM has been successfully installed on the Oracle Database Server, several additional processes must be completed in order to successfully complete the installation. The processes required also vary, based on the O/S installed on the Oracle Database Server.

## 1.1.3 Phase 1: Pre-Installation Requirements

The following sections illustrate the four tasks that must be performed prior to installation of the **Oracle RMAN APM**.

### 1.1.3.a Step 1: Installing NetVault Software

NetVault must be successfully installed on both the machine that is to act as the NetVault Server and the machine serving as the Oracle Database Server.

- **NetVault Server** - The **Server** version of NetVault must be installed. Please see the *NetVault Administrator's Guide* for details on the installation of the Server version, for the O/S in use on this machine.
- **Oracle Database Server** - **At least** the **Client** version of NetVault must be installed on the machine that is serving as the Oracle Database Server. Please see the *NetVault Administrator's Guide* for details on the installation of the Client version, based on the O/S in use on this machine.

**Important:**

1. If the Server version of NetVault is installed on the Oracle Database Server, additional settings will be required in the NetVault Configurator to grant access to this machine (i.e., to add it as a Client to the NetVault Server). Therefore, it is recommended that the Client version be utilized to avoid this additional procedure.
2. Both of these machines must exist in the same TCP/IP network (e.g., via an ethernet connection) in order to allow for access between the two.

## 1.1.3.b Step 2: Setting the Oracle Database to ARCHIVELOG Mode

It is next necessary to locally access the Oracle Database Server and set the Oracle Database to **ARCHIVELOG** mode. Please see the relevant Oracle RMAN documentation for details on placing the database in this state.

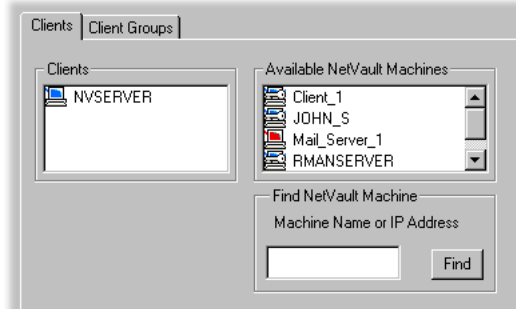
**Important:** Please review the Oracle RMAN documentation to understand what impact placing the Oracle Database in ARCHIVELOG mode may have on accessibility to it, and take any necessary precautions (e.g., to avoid users attempting to access the database if it is unavailable in this mode).

## 1.1.3.c Step 3: Adding the Oracle Database Server as a NetVault Client

Once NetVault is installed on the Oracle Database Server, it must be added as a Client to the NetVault Server. This is required to allow the NetVault Server access to the Oracle database for backup and restore operations. This is accomplished via the **Client Management** window of the NetVault GUI on the Netvault Server:

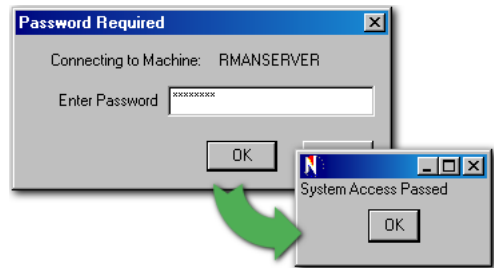
1. Launch the NetVault GUI and access the **Client Management** window by clicking on either of the **Client Management** buttons available, or by selecting the **Client Management** command from the Administration pull-down menu.
2. From the **Client Management** window, various frames will be visible revealing machines available for addition (in the **Available NetVault Machines** frame) and machines already added as Clients (in the **Clients** frame).
3. Locate the desired machine for addition in the **Available NetVault Machines** frame and perform one of the following:

**Figure 1-1:**  
The frames  
available in the  
Client  
Management  
window



**Figure 1-2:**  
Once the password value is successfully input and OK is clicked, the Client machine will be added to the NetVault Server

- Double-click on the available machine
  - Right-click on the available machine and select **Add as Client** from the pop-up menu that appears
4. If the machine **does not appear** in the list, input either the NetVault name for the machine or its IP Address in the field located in the **Find NetVault Machine** frame and click on the **Find** button. Once the machine has been located, the list of machines in the **Available NetVault Machines** frame will be updated to include it. Locate it and perform **Step 3.**, above on it.
  5. A window will launch requesting the NetVault password for the target Client (i.e., the one created for the machine during installation of NetVault). Input the password and click on **OK**.
  6. A dialog box will launch stating that the machine has been successfully added to the NetVault Server and the machine's icon will now appear as added in the **Clients** frame.



#### 1.1.3.d Step 4: Additional Pre-Installation Procedures (Windows-based O/S ONLY)

Before installing the **Oracle RMAN APM**, two operations must be performed when running a Windows-based O/S on the Oracle Database Server.

#### Important:

1. If the Oracle Database Server is running a non-Windows operating system, this procedure can be skipped, and it is necessary to continue on to the section, *Phase 2: APM Installation Procedure* on page 12.
2. If the Oracle Database Server is running a Windows-based O/S, these procedures **must be** followed **before** installing the **Oracle RMAN APM**. This applies to both a fresh installation of this APM **as well as** an upgrade from an earlier version. Failure to perform these processes will result in a failed installation/upgrade and it will not be possible to use the APM.

#### **Step A: Stopping the OracleService<SID>**

The process required to successfully stop the **OracleService<SID>** on a Windows-based O/S varies based on the version of Windows in use on the Oracle Database Server:

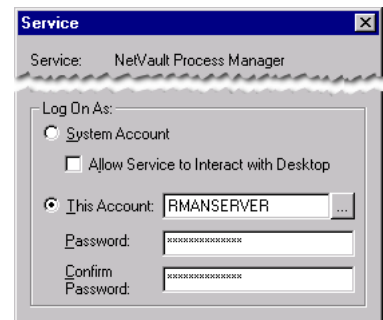
- **Windows NT** - If the Oracle Database Server is running **Windows NT 4.0**, follow the steps below to accomplish this:

1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**).
  2. Double-click on the **Services** icon to access the **Services** window.
  3. In the **Services** window, select the **OracleService<SID>** item from the list displayed and click on the **Stop** button.
  4. Click on the **Close** button to complete the process and exit from the **Services** window. All other subsequent windows can be closed as well.
- **Windows 2000/2003** - If the Oracle Database Server is running **Windows 2000** or **Windows 2003**, follow the steps below to accomplish this:
    1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**) and locate the **Administrative Tools** icon. Double-click on it to access the **Administrative Services** window.
    2. In the **Administrative Services** window, locate the **Services** item and double-click on it.
    3. In the list of items displayed in the **Services** window, select the **OracleService<SID>** item, and click the **Stop** button.
    4. Click on the **Close** button to complete the process and exit from the **Services** window. All other subsequent windows can be closed as well.

### **Step B: Setting Up the NetVault Process Manager**

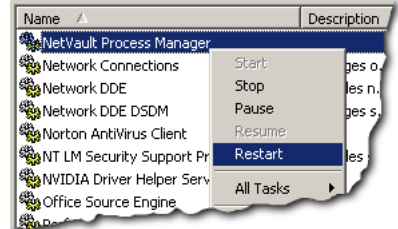
The **NetVault Process Manager** service must be properly configured on the machine acting as the Oracle Database Server, prior to installing the APM. In the same manner as *Step A: Stopping the OracleService<SID>*, this process varies, based on the version of Windows in use:

- **Windows NT** - If the Oracle Database Server is running **Windows NT 4.0**, follow the steps below to accomplish this:
  1. Access the **Control Panel** window (**Start>Settings>Control Panel**).
  2. Double-click on the **Services** icon to access the **Services** window and display the list of services running on the machine. Double-click on the **NetVault Process Manager** item to open its **Service** window.
  3. Select the **This Account** radial button and input either the account name associated with the **Administrator** login for the target machine, or a member account of the **"ORA\_DBA"** group.



**Figure 1-3:**  
The Service window for the NetVault Process Manager service as seen in Windows NT

4. In the **Password** field (and **Confirm Password** field), input the password associated with the account name input in the **This Account** field.
5. Click **OK** to apply the change and close this window.
6. Back in the **Services** window, locate the **NetVault Process Manager** item and right-click on it to access its associated pop-up menu. Select the **Restart** command in order to restart this service.
7. Close this and all subsequent windows to complete this procedure.

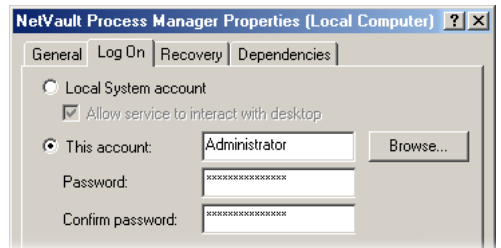


**Figure 1-4:**  
Restarting the  
NetVault  
Process  
Manager  
Service

■ **Windows 2000/2003** - If the Oracle Database Server is running **Windows 2000** or **Windows 2003**, follow the steps below to accomplish this

1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**).
2. Locate the **Administrative Tools** icon and double-click on it. In the window that launches, locate the **Services** icon and double-click on it to launch this utility.

3. Locate the **NetVault Process Manager** service in the right-hand frame of this window and double click on it to access its associated window.

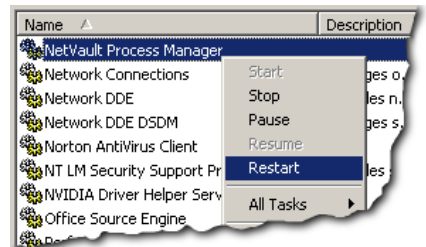


**Figure 1-5:**  
The NetVault  
Process  
Manager  
Properties  
window as  
seen in  
Windows  
2000/2003

4. Select the **Log On** tab.
5. Select the **This Account** radial button and input either the account name associated with the **Administrator** login for the target machine, or a member account of the "ORA\_DBA" group.

6. In the **Password** field (and **Confirm Password** field), input the password associated with the account name input in the **This Account** field.
7. Click **OK** to apply the change and close this window.

8. Back in the **Services** window, locate the **NetVault Process Manager** item and right-click on it to access its associated pop-up menu. Select the **Restart** command in order to restart this service.



**Figure 1-6:**  
Restarting the  
NetVault  
Process  
Manager  
Service

9. Close this and all subsequent windows to complete this procedure.

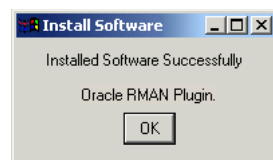
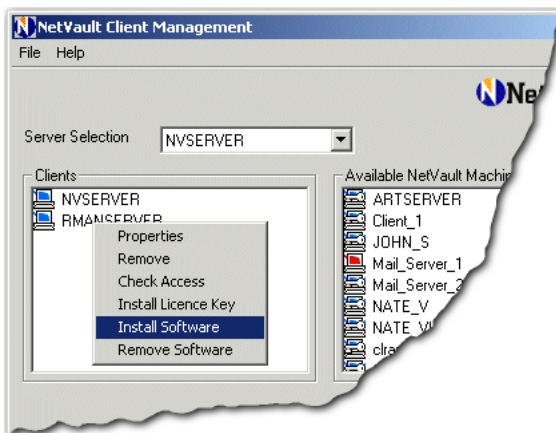
### 1.1.4 Phase 2: APM Installation Procedure

#### Important:

1. This APM **must be** installed on the machine containing the Oracle Database (i.e., the Oracle Database Server).
2. The directory path for the required installation file may vary, based on the O/S in use. However, the file required should be entitled “**orrxxx.npk**” (where “**xxx**” represents various software platforms and version numbers).
3. **Windows NT/2000/2003 Users Only:** NetVault installs the **ORASBT.DLL** in the directory **...\$Winnt\system32**. This dynamic link library file functions as the link between Oracle and NetVault’s Media Management software. This file **must be** successfully installed upon completion of this procedure and prior to conducting an initial backup.

**Figure 1-7:**  
Selecting the  
Install  
Software  
command to  
begin  
installation of  
the APM on  
the Oracle  
Database  
Server

1. From the machine acting as the NetVault Server, open the NetVault **Client Management** window by clicking on either of the **Client Management** buttons available, or by selecting the **Client Management** command from the **Administration** pull-down menu.
2. Right-click on the NetVault Client serving as the Oracle Database Server in the **Clients** frame and select the **Install Software** command from the pop-up menu.
3. Navigate to the location of the “**.npk**” installation file (e.g., the NetVault APM Installation CD or the directory to which the installation binary file was downloaded from BakBone Software’s web site).
4. Click on the file to highlight it (e.g., **orrxxx.npk**) and click on the **Open** button to proceed.
5. The installation process will occur automatically and once it has completed, a successful installation message will appear in the **Install Software** dialog box.
6. The **Oracle RMAN APM** is now installed. Certain post-installation requirements may be necessary,



**Figure 1-8:**  
The dialog box  
that appears  
upon  
successful  
installation of  
the Oracle  
RMAN APM

based on the operating system in use. Please see the section *Phase 3: Post-Installation Requirements* on page 13 for complete details.

### 1.1.5 Phase 3: Post-Installation Requirements

As noted earlier, post-installation requirements vary based on the operating system in use on the Oracle Database Server. The sub-sections that follow illustrate the required steps .

#### 1.1.5.a Linux/Mac OS X/UNIX-based Operating Systems

**Important:** In addition to the post installation instructions covered in this section, it may be necessary to perform an additional task which involves the linking of the NetVault library files to files used by Oracle. If (and only if) the processes covered here do not fully complete the installation (i.e., the Oracle Database is not accessible to NetVault after complete configuration), please refer to *Appendix A: Linking to the NetVault SBT Library* on page 43 of this guide for instructions on this additional process.

#### ***Verify NetVault's Temporary Directory is Correctly Established (Oracle RMAN 8.0.x Users ONLY)***

NetVault utilizes a temporary directory on a Client for the purpose of backup and restore of the Oracle Database. At default, the directory “**.../netvault/tmp**” is used (i.e., where “...” pertains to the complete path to the installation of NetVault). If a directory other than this default is to be used, the following points must be taken into consideration, in order to be compatible with an Oracle 8.0.x environment:

- **It Must Be Named Using All Lower Case Letters** - For example, a directory entitled, “**/usr/tmp**”. This can be an existing directory, or a new one can be created for this purpose.
- **It Must Exist on the Oracle Database Server Before Backup/Restore Operations Can Be Performed** - and be properly called out for use.

To ensure that both of these points are accounted for, the following procedure can be followed:

1. From the Oracle Database Server machine, initiate a terminal session, and do **either** of the following:
  - **Create a New Directory** - Navigate to the desired directory and create a new directory, ensuring that its title is comprised of all lower case letters. Make note of this directory (including the full path to it).
  - **Use an Existing Directory** - Locate a target directory to use for this purpose, ensure that its name is comprised of all lower case letters, and make note of this name (including the full path to it).

2. Launch the **NetVault Configurator** software (e.g., type “**nvconfigurator&**” from the terminal session prompt).
3. With the **Configurator** open, locate and select the **General** tab.
4. In the **Temporary Directory** field, enter the exact path to the directory to be used (e.g., “**/usr/tmp**”).
5. Click the **OK** button to complete this process and exit the **Configurator**.

### **Verify the Proper RMAN Executable is in Use (Linux-based O/S ONLY)**

Various installations of Linux utilize an application that is launched by issuing the command “**rman**” from a terminal session prompt. Unfortunately, this same command is how the Oracle RMAN application is launched as well. Therefore, it is necessary to verify that the desired application will launch when the “**rman**” command is issued. This can be accomplished in one of two ways:

- **Method 1: Navigate to the Oracle RMAN Installation Directory and Issue the “rman” Command - *Each time*** it is necessary to run the Oracle RMAN application, navigate to the specific installation directory via a terminal session prompt and issue the “**rman**” command.

**Important:** If this is the desired method of use, it will be necessary to perform this operation **each time** the Oracle RMAN application is to be run (i.e., this operation will not correct the issue after it is followed a single time).

- **Method 2: Verify that the “PATH” Environmental Variable Lists the Correct Path to the Installation of Oracle RMAN *First* (Recommended)** - It is possible to edit the **PATH** environmental variable, and list the installation path to Oracle RMAN first, so that the O/S will look to this value first, when the “**rman**” command is issued. Ensure that the following value appears, before any other instances of “**rman**”:

**\$ORACLE\_HOME/bin**

**Important:** Please see the relevant Linux O/S documentation for information on the **PATH** environmental variable and how to edit this file.

#### 1.1.5.b Windows-based Operating Systems

Prior to running the **Oracle RMAN APM** for the first time from a Windows-based Oracle Database Server, it is necessary to perform two post-installation procedures.

### ***Step 1: Re-starting the OracleService<SID>***

To **re-start** the Windows' service entitled, "**OracleService<SID>**", that was stopped during pre-installation procedures, perform the following steps (based on the version of Windows installed on the Oracle Database Server).

- **Windows NT** - If the Oracle Database Server is running **Windows NT 4.0**, follow the steps below to accomplish this:
  1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**).
  2. Double-click on the **Services** icon to access the **Services** window.
  3. In the **Services** window, select the **OracleService<SID>** item from the list displayed and click on the **Start** button.
  4. Click on the **Close** button to complete the process and exit from the **Services** window. All other subsequent windows can be closed as well.
- **Windows 2000/2003** - If the Oracle Database Server is running **Windows 2000** or **Windows 2003**, follow the steps below to accomplish this:
  1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**) and locate the **Administrative Tools** icon. Double-click on it to access the **Administrative Services** window.
  2. In the **Administrative Services** window, locate the **Services** item and double-click on it.
  3. In the list of items displayed in the **Services** window, select the **OracleService<SID>** item, and click the **Start** button.
  4. Click on the **Close** button to complete the process and exit from the **Services** window. All other subsequent windows can be closed as well.

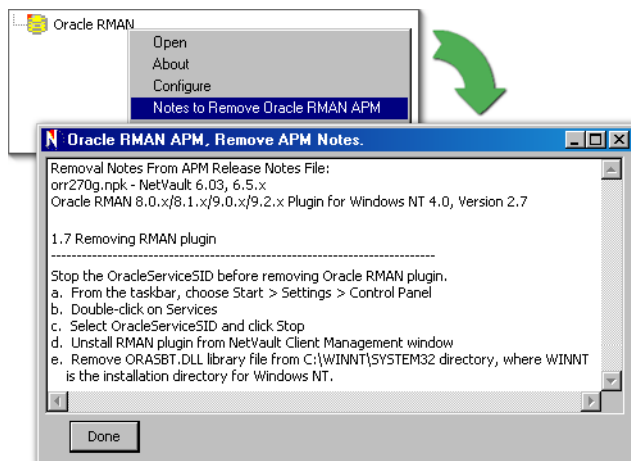
### ***Step 2: Verifying the Installation of the ORASBT.DLL Library File***

The dynamic link library file **ORASBT.DLL** is the link between Oracle and the media management utilities used by NetVault. This file is installed to the "**...\$WINNT\system32**" directory when an installation of this APM is performed. This file **must be** successfully installed and remain in this directory for the APM to function properly. It is recommended that the directory named above be browsed to ensure this file was successfully installed.

## 1.1.6 Removing the Oracle RMAN APM

**Figure 1-9:**  
The Remove  
APM Notes  
window as it  
appears for a  
Windows 2000  
installation of  
the Oracle  
RMAN APM

The procedure for the removal of the **Oracle RMAN APM** and all of its components varies based on the operating system in use. Some versions of the APM offer a built-in utility which prompts a window giving detailed information for this process. To access this window, follow the steps below:



1. Access the **Backup** window of NetVault and open the client containing the APM to be removed by double-clicking on it (or right-click on it and select **Open** from the pop-up menu).
2. Locate the **Oracle RMAN APM** and right-click on it. From the pop-up menu that appears, select the **Notes to Remove Oracle RMAN APM** command. A window will launch giving complete details on the removal procedure for the APM, based on the operating system currently in use.

## 1.2.0 Configuring the Oracle RMAN APM

Prior to initiating a backup, various configuration operations must be performed. The overall configuration process for use of the Oracle RMAN APM can be broken down into two phases:

- **Phase 1: Setting Up a Database for Recognition**
- **Phase 2: Setting Configuration Options**

The sections that follow offer step-by-step instructions for each phase of the configuration process.

## 1.2.1 Phase 1: Setting Up a Database for Recognition

The first phase of configuration is setting up the database for recognition in NetVault. To accomplish this review the sections that follow in the order they are presented.

## 1.2.1.a Step 1: Acquiring the "SID" for the Oracle Database

The "**SID**" is the unique name for the Oracle Database instance in place on the Oracle Database Server. This name can be up to four alphanumeric characters in length. To determine this value, follow one of the procedures below (based on the O/S in use).

### ***Acquiring the SID for a Linux/Mac OS X/UNIX-based O/S***

To find the **SID** in a Linux/Mac OS X/UNIX-based installation, perform the following:

1. The SID value can be obtained by issuing a command that is typically used to determine the number of Oracle instances running on the Oracle Database Server:
2. Once this command is executed, a result will be returned similar to the following (where “<SIDname>” represents the desired “SID” value):

```
oracle8 350 1 0 10:05:25 ? 0:00 ora_pmon_<SIDname>
```

### ***Acquiring the SID for a Windows NT 4.0 O/S***

To find the SID on an Oracle Database Server running Windows NT 4.0, perform the following:

1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**).
2. Double-click on the **Services** icon to access the **Services** window.
3. In the **Services** window, scroll down the list of available services until the one entitled “**OracleService<SID>**” is located. “<SID>” pertains to the v

### ***Acquiring the SID for a Windows 2000/2003 O/S***

1. Access the **Control Panel** window (e.g., **Start>Settings>Control Panel**) and locate the **Administrative Tools** icon. Double-click on it to access the **Administrative Services** window.
2. In the **Administrative Services** window, locate the **Services** item and double-click on it.
3. In the **Services** window, scroll down the list of available services until the one entitled “**OracleService<SID>**” is located. “<SID>” pertains to the value that is required. Make note of this value.

#### 1.2.1.b Step 2: Acquiring the Oracle Home Directory

The home directory refers to the top level directory of the Oracle software installation. The exact path to this specific directory is required for proper configuration of the **Oracle RMAN APM**. Based on O/S in place on the Oracle Database Server, this directory may be similar to the following examples:

Linux/Mac OS X/UNIX-based	Windows-based
/space/u01/app/oracle/product8.1.6	D:\ORACLE

**Acquiring Home Directory Information on a Linux/Mac OS X/UNIX-based O/S**

1. Connect to the ORACLE instance via the Server Manager utility and issue the following command:

```
host echo $ORACLE_HOME
```

2. A result will be returned, similar to the following:

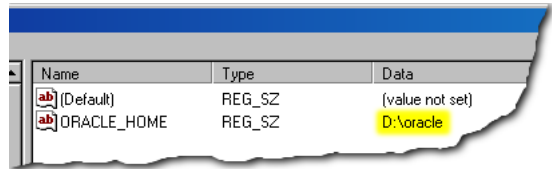
```
/space/u01/app/oracle/product8.1.6
```

3. Make note of this **exact path** for future use.

**Acquiring Home Directory Information on a Windows-based O/S**

1. Launch the “**regedit**” application (**Start>Run**, followed by typing “**regedit**” in the field offered in the **Run** window that appears. Click on the **OK** button to execute the command and close this window).

2. The **Registry Editor** window will launch. Access this window’s **Find** utility (**Ctrl + F**) and input **ORACLE\_HOME** in the window that appears. Press the **Enter** key to begin the search.



3. A value similar to the following will appear in the right frame of the window for the **ORACLE\_HOME** registry entry:

**ORACLE\_HOME “D:\oracle”**

**Figure 1-10:**  
The path entry  
for the  
ORACLE\_  
HOME registry  
entry

### 1.2.1.c Step 3: Locating Oracle File Path Information

With the Oracle Home Directory noted, it is now necessary to note path information for various Oracle-related files, including the following:

- **The Full Path to the RMAN Executable** - from a terminal session on the Oracle Database Server, navigate to the Oracle Home directory and locate this file. It is normally located in the sub-directory entitled “**/bin**”. Once located, make note of the full path to it.
- **The Full Path to the INIT File** - In order to start an instance, Oracle must read a specific parameter file. This is a text file which contains a list of instance configuration parameters. Usually this file is entitled either **INIT.ORA** or **INIT<XXXX>.ORA** (i.e., where “**<XXXX>**” represents various O/S-specific information). While still in the Oracle Home directory, search for this file and make note of the complete path to it.

**Important:** In addition to using the manual method outlined above, it is possible to use an Find/Search functionality available for use with the O/S installed on the Oracle Database Server. Please see the relevant O/S documentation for complete instructions on using these tools.

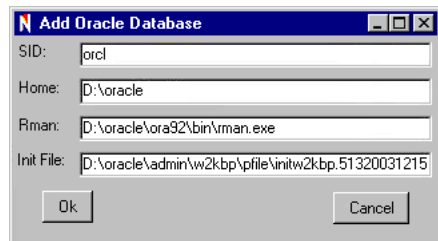
### 1.2.1.d Step 4: Adding the Database to the Oracle RMAN APM

The final step of this phase of the configuration process requires that the Oracle Database be added to the **Oracle RMAN APM** in NetVault. To accomplish this, follow the steps outlined below.

1. From the NetVault Server, access the **Backup** window of the NetVault GUI. From the default **Selections** tab, double-click on the client machine containing the **Oracle RMAN APM** to open it.
2. With the list of available plugins/APMs displayed, locate the **Oracle RMAN APM** and right-click on it. From the pop-up menu that appears, select the **Add Database** command to access the **Add Oracle Database** window.
3. It is necessary to enter Oracle database-related information in this window. Enter the appropriate information in each field as described below:

**Figure 1-11:**  
The Add Oracle Database window as seen in a Windows installation of the APM

- **SID** - This is the unique name for the Oracle database instance on the Oracle Database Server. Instructions for obtaining this value are outlined in the section, *Step 1: Acquiring the "SID" for the Oracle Database* on page 16.
- **Home** - Input the exact path value obtained via the process outlined in the section, *Step 2: Acquiring the Oracle Home Directory* on page 17 in this field.
- **RMAN** - The full path name to the **RMAN** executable must be input in this field. This is normally located under the directory **"/bin"** in the Oracle installation.
- **Init File** - The full path name to the **INIT.ORA/INIT<XXXX>.ORA** file as noted earlier (i.e., in the section, *Step 3: Locating Oracle File Path Information* on page 18).



### 1.2.2 Phase 2: Setting Configuration Options

Once properly installed, it is possible to set various configuration options for the APM. To accomplish this, perform the following steps.

1. From an instance of the NetVault GUI on the NetVault Server, launch the **Backup** window (e.g., via the command toolbar buttons or the **Backup** command located in the **Operations** pull-down menu).

2. From the list of displayed Clients, open the one serving as the Oracle Database Server (i.e., the Client on which the **Oracle RMAN APM** is installed) by either double-clicking on it or right-clicking on it and selecting **Open** from the pop-up menu.
3. A list of APMs/plugins currently installed for use on the Client will be revealed. Right-click on the **Oracle RMAN APM** and select **Configure** from the pop-up menu. The **Configure** window will launch which is comprised of the **Oracle RMAN APM** tab. This tab offers the following options:

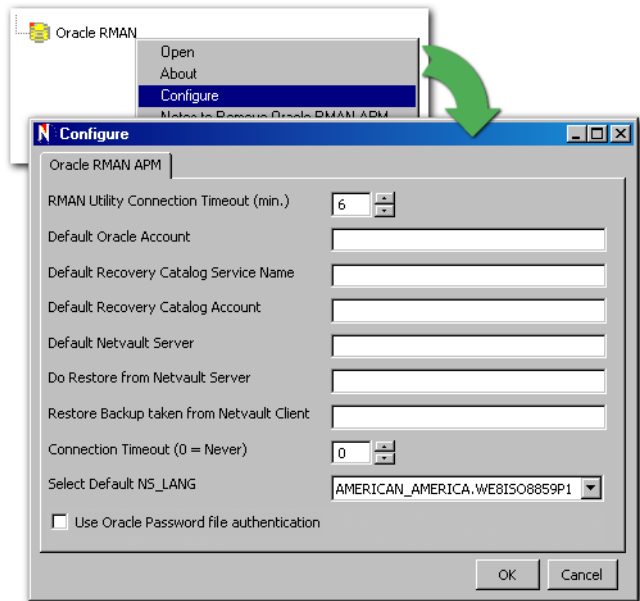
- **RMAN Utility Connection Timeout (min.)** - Use this option to set an amount of time (in minutes) that will serve as an inoperability timeout between the **Oracle RMAN APM** and the **RMAN Utility**. If the RMAN Utility senses no activity for this length of time during a backup, it will timeout and disconnect from the APM, thereby stopping the job.

- **Default Oracle Account** - The APM requires that a Once a database is added to the APM, each time it is accessed, account information is requested. Use this field to name a default account to be displayed each time a database is accessed in the NetVault GUI.

(An administrator-level account may be used which grants access to all Oracle databases to avoid the need to log on each time an individual database is accessed in the **Selections** window.)

- **Default Recovery Catalog Service Name** - Use this field to input the service name of the Recovery Catalog Oracle instance created by Net8.
- **Default Recovery Catalog Account** - Use this field to input the Account name of Recovery Catalog database.
- **Default NetVault Server** - Use this field to input a NetVault Server name that an RMAN **backup** will be directed to when it is initiated from an

**Figure 1-12:**  
The Configure window for the Oracle RMAN APM



RMAN command prompt. If left blank, a backup's data transfer will be local to the machine where the command was issued.

- **Do Restore from NetVault Server** - When a *restore* is performed from an RMAN prompt, the data transfer will initiate *from* a NetVault server specified in this field. If this field is left blank, the data transfer will be local to the machine where the RMAN prompt command was issued.
- **Restore Backup Taken from NetVault Client** - When a *restore* is performed from an RMAN command line prompt, a value input in this field indicates the NetVault client from which the original backup was performed. If no value is input, the restore command will default to the local NetVault machine performing it.
- **Connection Timeout (0 = Never)** - Use this option to set an amount of time (in minutes) that will serve as an inoperability timeout between the **Oracle RMAN APM** and the **Oracle Database**. (If NetVault senses no activity for this length of time during a backup, it will timeout and disconnect from the backup, thereby allowing access to the Oracle Database to not keep it locked up.) The default entry of zero ("0") indicates that no time out exists.
- **Select Default NS\_LANG** - Use this field to select the language for tablespace items for each newly added Oracle Database displayed in the NetVault GUI. This option can be changed on a per database basis with the **Edit** command that is accessed by right-clicking on a database after it has been successfully added.

**Important:** The options **Default NetVault Server**, **Do Restore from NetVault Server**, and **Restore Backup Taken from NetVault Client** pertain to backup/restore operations performed from an RMAN command prompt. If performing backup/restore operations from the RMAN command prompt, or from the NetVault Client, it is necessary to input values for these options.

- **Use Oracle Password Authentication File** - Select this option when the Oracle password file is in use on the Oracle RMAN Server for security authentication during a login.

### 1.2.3 Additional Configuration Procedures

This section covers additional configuration procedures, such as how to edit or remove a database from the **Oracle RMAN APM** once it has been added.

#### 1.2.3.a Editing an Added Database

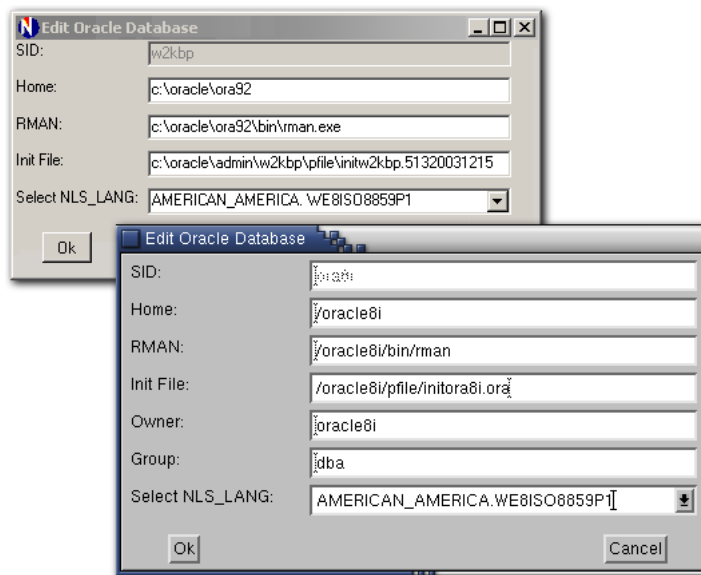
Once a database has been successfully set up for recognition by the APM, its configured information can be edited as desired. This can be accomplished by following the steps outlined below.

1. With the NetVault **Backup** window open and the **Selections** tab active on the NetVault server, open the client on which the **Oracle RMAN APM** is installed

by double-clicking on it. Locate the desired, previously configured database and right-click on it to reveal a pop-up menu.

2. From this pop-up menu, select the **Edit Database** command to launch the **Edit Oracle Database** window.
3. Modify the appropriate information. The SID is greyed-out and unavailable, as this value can not be edited once a database instance has been added to the APM. However, it is possible to edit the **Home**, **RMAN**, and **Init File** information as desired. For Linux, Mac OS X and UNIX-based operating systems, the following fields can also be edited as desired:
  - **Owner (Linux/Mac OS X/UNIX-based O/S ONLY)** - Input the user-owner of the Oracle database in this field. This could either be the default value of “**oracle**” (i.e., if the database was created with the default login of “**oracle**”), or the user name manually supplied when the database was originally created (e.g., via Oracle’s **create database** command).
  - **Group (Linux/Mac OS X/UNIX-based O/S ONLY)** - The group to which the above named owner belongs. For example, in the default Oracle configuration shown above, the user “**oracle**” belongs to the group “**dba**”. Otherwise, input the manually created group name to which the selected owner belongs.

**Figure 1-13:**  
The Edit Oracle Database windows for both the Windows-based and Linux/Mac OS X/UNIX-based installations of the Oracle RMAN APM

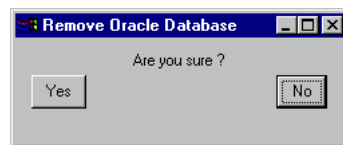


4. If the database’s tablespaces are to be displayed in a language other than what was set in the **Select Default NS\_LANG** field during the configuration process (as detailed in the section *Configuring the Oracle RMAN APM* on page 16), use the **Select NS\_LANG** field to select a desired language.
5. Click **OK** to close the window and commit the changes.

### 1.2.3.b Removing a Database

If it is no longer necessary to backup/recover a previously configured Oracle database, it can be removed from the APM's list of displayed databases by performing the following steps.

1. With the NetVault **Backup** window open and the **Selections** tab active on the NetVault server, locate and open the client on which the **Oracle RMAN APM** is installed by double-clicking on it. Locate the desired, previously configured database and right-click on it to reveal a pop-up menu.
2. From this pop-up menu, select the **Remove Database** command and the **Remove Oracle Database** dialog box will open, requesting confirmation of the removal of this database.
3. Confirm that the database is to be removed by clicking **Yes**. To cancel the command, click **No**.



**Figure 1-14:**  
The confirmation dialog box that appears when attempting to remove a database

### 1.2.3.c Configuring for CLI-based Backups/Restores (NetVault ver. 7.0 and Later ONLY)

All versions of NetVault from version 7.0 and later, offer access control functionality. This utility allows an administrator to establish user accounts which grant or deny access to various areas of NetVault functionality. At default, the ability to generate backups and restores from a remote terminal session prompt via various APMs is **disabled** to ensure complete security (otherwise, a terminal session could be used as a “back door” to circumvent NetVault’s access control functionality). To enable remote terminal session invoked backups and restores using **rman**, a tool must be run **on the NetVault Server** to provide the APM with the security clearance required. This tool is available in the “**.../NetVault/util**” directory after a successful installation (or “**.../NetVault6/util**” after an upgrade from a 6.x version of NetVault) and its features are detailed in the table below.

CLI Command	Specifics
nvpluginaccess	<b>Description:</b>
	Use this command to enable off-server CLI invoked backups and restores (but not actually perform them).
	<b>Syntax:</b>
	<b>nvpluginaccess -client [client] -account [account] -password [password]</b>
	<b>Available Switches for use with this Utility:</b>
	<b>-client:</b> The name of the NetVault client that the plugin to be used is installed on (e.g., the NetVault machine name).

CLI Command	Specifics
<b>nvpluginaccess</b> (cont.)	<p><b>-account:</b> Pertains to access control account used to log on to the NetVault server (if applicable). If access control is not in use, input "default" for this value.</p> <p><b>-password:</b> Also used for access control, the password associated with the account input (if applicable). If access control is not in use, do not use this switch.</p> <p><b>-remove:</b> When used in conjunction with the "<b>-client</b>" switch, this switch can be used to remove a client that was previously granted access.</p>

Once the command has been issued properly, it will invoke a prompt requesting the desired plugins to which the specified Client should have access. The sections that follow offer a step-by-step example of how this process should be carried out.

### **Step 1: Configuring for the NetVault Server**

It is first necessary to run the "nvpluginaccess" command for the NetVault Server itself. Follow the steps below to successfully accomplish this:

1. Initiate a command line session and navigate to the following directory:

**.../netvault/util**

(where "... " represents the path to the NetVault installation directory)

2. Issue the following command at the prompt:

**nvpluginaccess -client <NetVault Server Name>**

3. A list of available plugin(s) will be displayed. Input the number that corresponds to the desired plugin in the list and press **Enter**.
4. The next prompt will request an account name that corresponds to the NetVault name of the machine to be given access. Input the name of the NetVault Server and press **Enter**.
5. The final prompt will request the password that is associated with the account named in the previous prompt. This is the password value assigned to this machine's version of NetVault during the installation process. Input the value and press **Enter** to continue.

#### **Important:**

1. Password values are case-sensitive. Ensure that the exact value used to originally set up this account is entered.
2. When a password value is input at the provided prompt, it will be visible (i.e., when entered, the actual characters will be revealed and not replaced with "\*" characters). If password secrecy is necessary, ensure that the proper precautions are taken when entering the password.

4. A confirmation message will be displayed stating that access has been granted for the named machine.

**Figure 1-15:**  
A command line session in which the `nvpluginaccess` utility has been successfully run for the NetVault Server

```

C:\WINNT\system32\command.com
D:\NETVAULT\UTIL>nvpluginaccess -client netvault_server
Please select a plugin you wish to allow client 'netvault_server' to access:
1) Informix plugin
2) Oracle RMAN plugin
3) Informix and Oracle RMAN plugins
4) Specify plugin name
1
Please enter the user account: netvault_server
Please enter the password for the account 'netvault_server': access1
Successfully added client 'netvault_server'
D:\NETVAULT\UTIL>

```

**Important:** Steps 3 and 4 above can be skipped if desired, by adding the following switches to the `nvpluginaccess` command:

- `-account <NetVault machine name>` followed by
- `-password <NetVault password for the account>`

As an end result, the command input would appear as follows:

```
nvpluginaccess -client <client> -account <account> -password <password>
```

### Step 2: Configuring for NetVault Client(s)

The same procedure outlined in *Step 1: Configuring for the NetVault Server* on page 24 is to be followed from the NetVault Server for **each** client machine on which the **Oracle RMAN APM** is installed. The following information will be required per client machine:

- **Client Machine's NetVault Name** - This is required for both the “`-client`” and “`-account`” variables used in the command
- **Client Machine's NetVault Password** - The password associated with each client. Used in the “`-password`” variable.

**Important:** This procedure *must be* run from the NetVault Server **for each** Oracle RMAN Client to be backed up by the NetVault Server.

## 1.3.0 Backing Up Data with the Oracle RMAN APM

Several backup operations and configuration settings are available from NetVault's **Backup** window for use in conjunction with the **File System Plugin**. To adequately cover all of this functionality, this portion of the guide has been broken down into three main sections:

- **Basic Operations in the Backup Window** - Basic instructions on the use and navigation of NetVault's **Backup** window to set up a **Oracle RMAN APM** backup is covered here.

- **Additional Backup Operations** - This section illustrates the optional backup operations and configurations available for use with the **Oracle RMAN APM**.

### 1.3.1 Basic Operations in the Backup Window

**Important:** An Oracle instance must be running and started on the target Oracle Database Server before attempting to perform any form of backup with this APM. Please see the appropriate Oracle documentation for instructions on ensuring that a database instance is up and running.

When setting up a basic backup job of **Oracle RMAN APM** data, the steps required can be broken down into three phases:

- **Phase 1: Obtaining Valid Account Information**
- **Phase 2: Selecting Data for a Backup**
- **Phase 3: Setting Backup Options**
- **Phase 4: Finalizing and Submitting the Backup Job**

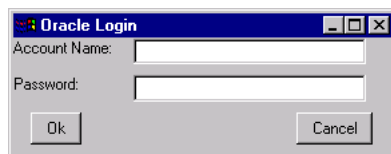
#### 1.3.1.a Phase 1: Obtaining Valid Account Information

In order to access an added database instance to select items for inclusion in a backup, NetVault will request that an account name and password be input to gain access. This account must have suitable permission to backup and restore the target database instance. Please make note of a suitable account and its associated password before attempting to create a backup job with this APM.

#### 1.3.1.b Phase 2: Selecting Data Items for a Backup

1. From the NetVault Server, open the NetVault **Backup** window by clicking the **Backup** button on the command toolbar (or by choosing the **Backup** command from the **Operations** pull-down menu). The NetVault **Backup** window will launch, displaying a list of added client machines in the **Selections** tab.
2. Right-click on the Client serving as the Oracle Database Server, and select **Open** from the pop-up menu to open it (or double-click on the Client itself). A list of installed APMs and plugins will be revealed.
3. Locate the **Oracle RMAN APM** and double-click on it to access the **Oracle Login** window. Supply the required **Account Name** and **Password** information to access the Oracle Database and click on **OK** to continue.

**Figure 1-16:**  
The Oracle  
Login window

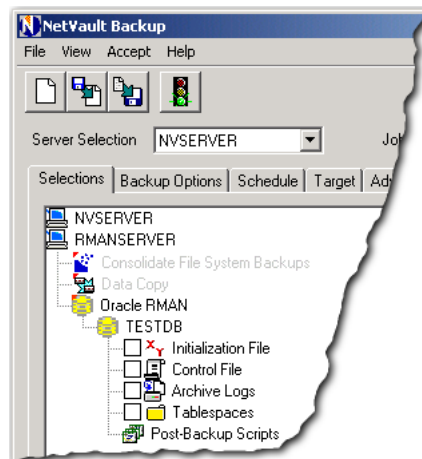


**Important:** If the password associated with the named account is updated in Oracle **after** it has been established here (and backups have been run), the account information for the selected database instance **must be** updated to reflect this new password. The **Oracle RMAN APM** uses these credentials to log in to Oracle and access the selected instance of the database. For instructions on updating this value, please see the section, *Updating the Oracle Database Password* on page 32. If the previous password value is used, and no update is made, access will not be successfully granted to the APM and further backups will fail (i.e., they will be incomplete). The level of display of this failure is based on the version of the **Oracle RMAN APM** in use:

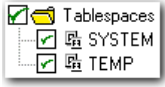
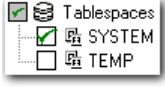
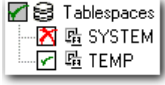
- **Oracle RMAN APM Versions 3.6 (and Later)** - The **Job Management** window and the **Logs** window will state that the backup failed.
- **Earlier Oracle RMAN APM Versions** - The **Job Management** window will display an entry stating that the backup completed successfully, and the **Logs** window will display entries indicating which data was **not** backed up.

**Figure 1-17:**  
The Oracle RMAN APM opened to reveal added databases containing items available for inclusion in a backup

4. With the proper login information given, a list of the previously configured databases will be displayed (i.e., those database that were successfully added to the APM, via the procedure outlined in the section *Step 4: Adding the Database to the Oracle RMAN APM* on page 19). Each of these individual databases can be opened (by double-clicking on them) to access their contents for inclusion in a backup. The following items are revealed when a database is opened:



- **Initialization File/Control File/Archive Logs Items** - Each one of these items is individually available for selection and inclusion in a backup job. None of these items can be opened further and must be selected in their entirety.
  - **Tablespaces Folder** - This folder item can be opened and browsed so that the individual tablespaces that make up the data base can be selected for inclusion in the backup job.
  - **Post Backup Scripts** - This item can be double-clicked and opened in order to select any number of generated script files that are to be run once the backup job has completed. This item is also used to generate these scripts. Please see the section,
5. Navigate the database file structure and select data items as desired. Data item selection in the **Selections** tab works as follows:

Marker	Description	Example Image
<b>Green Check</b>	Once an item is selected, it will be marked with a large green check. If a parent-level item is selected in this manner, all of its child-level items will be automatically marked as selected (with a smaller green check).	
<b>Green Check (with Shaded Background)</b>	If a child-level item is physically selected or omitted (e.g., an individual tablespace), its parent-level item will be marked with a green check and the checkbox will be shaded.	
<b>Red "X"</b>	This indicates that an item has been manually <i>omitted</i> . For example, if a parent-level item is selected and then one of its children is clicked, it will be marked with a red "X" and once the backup job is submitted, this particular item will be left out of the backup.	

**Important:**

1. If the Oracle instance has **not** been successfully started or the database does not open after performing **Step 4**, an error message will appear. The Oracle instance must be set up to run, and this process must be restarted (including re-logging into the Oracle instance with the proper login information).
2. The **Control File** item can be backed up whether the database is open or closed. This file is used to ensure consistency. If a **"Whole Database"** form of backup is to be performed, this file should be included.

**Figure 1-18:**  
The Backup  
Selections Set  
area

6. With the desired items selected, it is recommended that a **Backup Selection Set** be generated. This allows for often used selections made in this tab to be saved into a composite set that can be retrieved for later use (e.g., for future backup jobs). For complete details on creating, loading and modifying **Selection Sets**, please see *Appendix B: Working With Selection Sets* of the *NetVault Administrator's Guide*.



## 1.3.1.c Phase 2: Setting Backup Options

With the desired data items selected for a backup, the **Backup Options** tab can be selected to configure the options available here. Multiple sub-tab selections are

available from the **Backup Options** tab. The options contained in each are covered in the following sections.

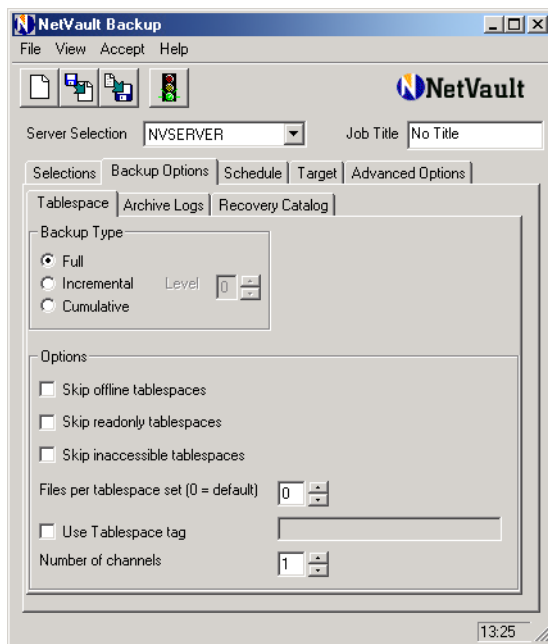
### The Tablespaces Sub-Tab

The **Tablespaces** Sub-Tab is the default selected tab. This sub-tab is comprised of two frames.

**Figure 1-19:**  
The  
Tablespaces  
sub-tab of the  
Backup  
Options  
window as  
revealed in the  
Oracle RMAN  
APM

#### ■ The Backup Type Frame - this frame contains the following options:

- ❖ **Full** - Fully backs up all data selected in the **Selection** tab. This method of backup should only be selected when intending to perform a single full backup of this selected data. If an Incremental/Cumulative scenario is to be established, a Full backup is not required. The proper level of Incremental/Cumulative must be set to serve as a starting point for the series.
- ❖ **Incremental** - With this form of backup selected, the **Level** option is enabled. Use this field to input the desired level of Incremental backup to be performed. A **Level 0** (zero) Incremental is required to serve as the starting point for an Incremental series. A **Level 1** Incremental will only include data that is new or changed since the **Level 0** was performed. A **Level 2** Incremental will only included data that is new or changed since the **Level 1** was performed, and so on.
- ❖ **Cumulative** - With this form of backup selected, the **Level** option is also enabled. Use this field to input the desired level of Cumulative backup to be performed. A **Level 0** (zero) Cumulative is required to serve as the starting point for the series. A Level 1 Cumulative backup would only include data that is new or changed since the Level 0 was performed. A Level 2 Cumulative will include all data that is new or changed since the Level 1 was performed, and it will also include all of the data backed up with the Level 1 backup. Each successive level of a Cumulative backup will include data that is new or changed since the



previous Cumulative as well as all other new or changed data since the original Level 0 backup was performed. Backs up data changed since the last incremental backup was performed.

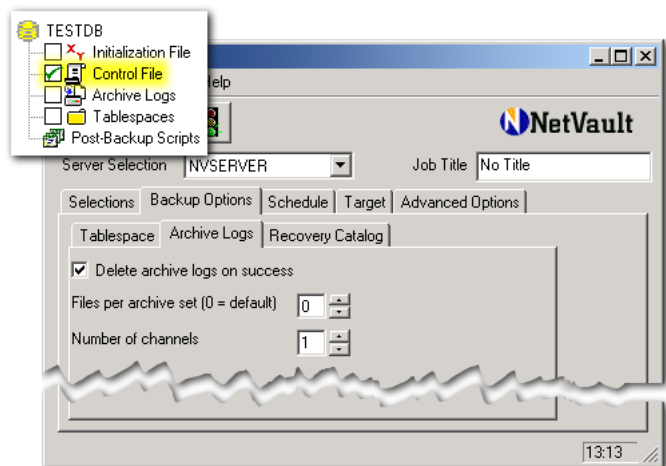
**Important:** A Level 0 (zero) Incremental/Cumulative backup should be performed of a selected set of data **before** a series of either type of backup can be initiated. However, if one is not established, it will be created automatically. For example, if an Incremental series was started with a **Level 1** Incremental backup, NetVault will automatically create the required **Level 0** Incremental.

- **The Options Frame** - This frame is comprised of the following options:
  - ❖ **Skip Offline Tablespaces** - Selecting this option will cause any offline tablespaces to be excluded from the backup.
  - ❖ **Skip Readonly Tablespaces** - Selecting this option will result in the exclusion of any tablespaces designated as **read only** from a backup.
  - ❖ **Skip Inaccessible Tablespaces** - Selecting this option will exclude any inaccessible tablespaces from a backup.
  - ❖ **Files Per Tablespace Set (0 = default)** - Inputting a value in this field will set the number of files contained in each set to that value.
  - ❖ **Use Tablespace Tag** - Selecting this option will activate the accompanying field in which a name for the tablespace can be input for easy identification.
  - ❖ **Number of Channels** - Input the desired number of channels to dedicate to this job (by inputting the value manually or using the up/down arrow buttons).

### The Archive Logs Sub-Tab

This sub-tab contains options that apply only when the **Archive Logs** item is selected for backup from the **Selections** tab. Archive Logs can be included in a backup job comprised of multiple selections, or they can be backed up separately. The options included in this tab include:

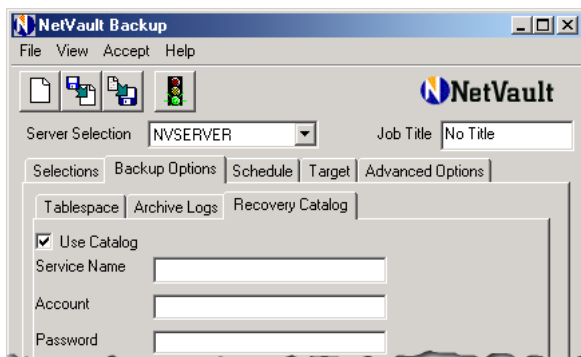
**Figure 1-20:**  
With the Archive Logs item selected for inclusion in a backup, the options available in the Archive Logs sub-tab can be utilized



- **Delete Archive Logs on Success** - Deletes the current logs when the backup completes successfully. Selecting this option is similar to issuing the following command from an RMAN prompt:  
**archive log all delete input**
- ❖ **Files per Archive Set (0 = default)** - Sets the number of files contained in each set when backing up the archive logs. See the relevant Oracle documentation, "Backup using one or several file sets" for more information.
- ❖ **Number of channels:** Allows the user to allocate the number of channels used to perform the backup of the archive logs. The default value is one.

### The Recovery Catalog Sub-Tab

If using a recovery catalog with an Oracle database, click the **Recovery Catalog** tab to set additional backup options available in this sub-tab. Each field here can be utilized once the **Use Catalog** option is selected. The options available include:



- ❖ **Service Name:** The Service Name of the recovery catalog database.
- ❖ **Account:** The account name of the recovery catalog database.
- ❖ **Password:** The password value associated with the named **Account**.

**Figure 1-21:**  
The options available from the Recovery Catalog sub-tab

#### Important:

1. In the event that the **"Use Catalog"** option is not selected for a backup, it is important to note that a backed up **Control File** item **cannot** be recovered. (For more details on this form of restore, please see the section *Restore Operations* on page 36). Due to Oracle RMAN software restrictions (i.e., non-NetVault), if the target database fails to start up (i.e., errors on control files), an attempt to recover this item when backed up in this manner will result in a failed restore.
2. Select the **Use Catalog** option and input values for options contained in the **Recovery Catalog** database sub-tab **only** if using an RMAN recovery catalog with the database; otherwise, leave the option cleared and these fields empty. If this option is selected and a recovery catalog is not being used, the backup job will fail.

## 1.3.1.d Phase 3: Finalizing and Submitting the Backup Job

With desired data items selected and the necessary Backup Options set, follow the steps below to finalize set up of the backup job and submit it.

1. The remaining tabs available in the **Backup** window (e.g., **Schedule**, **Target** and **Advanced Options**) contain additional options that can be set as desired (for more information on these tabs, please see the *NetVault Administrator's Guide*).
2. Enter a suitable name for the job in the **Job Title** box and start the backup job by clicking the **Submit** button on the command toolbar.
3. The GUI on the NetVault Server can be used to monitor the job in regards to its progress and job log entries (i.e., via the **Job Management** and **NetVault Logs** windows, respectively -- For complete details on the use of these windows in the NetVault GUI, please see *NetVault Administrator's Guide*).



**Figure 1-22:**  
The Job Title field with a suitable job name input, and the Submit button

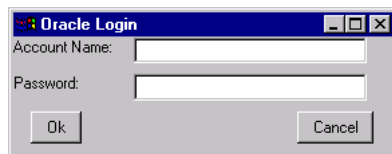
## 1.3.2 Additional Backup Operations

The following sub-sections illustrate additional backup operations available for use with **Oracle RMAN APM** backups.

## 1.3.2.a Updating the Oracle Database Password

As noted in an earlier section of this guide, if the password used by a target instance of an Oracle database is changed in Oracle itself, **after** it has been set up with the **Oracle RMAN APM**, it must be updated within the APM as well. To accomplish this follow the steps below:

1. Launch the GUI on the NetVault Server and access the **Backup** window.
2. In the selections tab, locate the NetVault Client serving as the Oracle Database Server and double-click on it to open it.
3. In the list of available APMs/plugins, locate the Oracle RMAN APM and double-click on it to open it.
4. A list of the available database instances will be revealed. Right-click on the one whose password value has changed and select the **Set Data Password** command.
5. The **Oracle Login** window will appear. Input the **Account Name** and new **Password** value in the appropriate fields and click on **OK** to update the password information.



**Figure 1-23:**  
The Oracle Login window

1.3.2.b RMAN Post-Backup Scripts

The **Oracle RMAN APM** makes it possible for an administrator to create a script that will be run as soon as all backup jobs of a selected database complete (e.g., a script can be written to bring the database back on-line once a backup is complete). To create a script for this purpose, follow the steps below.

1. From the **Selections** tab of the **Backup** window, open the **Oracle RMAN APM** to reveal all added databases. Open the desired database item by double-clicking on it (or by right-clicking on it and selecting **Open** from the pop-up menu).
2. Locate the **Post-Backup Scripts** item in the tree and right-click on it to access the pop-up menu. From this menu, select the **Add RMAN Post-Backup Script** command.
3. The **Add RMAN Post-Backup Script** window will appear containing the following fields/options:

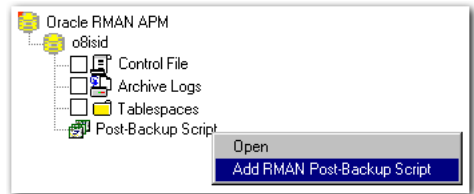


Figure 1-24:  
The Add RMAN Post-Backup Script command

- **Script Name** - Input a value in this field to name the script. This name is how NetVault will display the script for future selection/editing.
- **Script** - This field allows for the raw generation of a script. (If the O/S allows, text can be copied from a text editing application and pasted into this window). Include any necessary connection strings in this script.
- **Use 'catalog'/Use 'nocatalog'** - Select whether or not the script will connect to the catalog with these options.

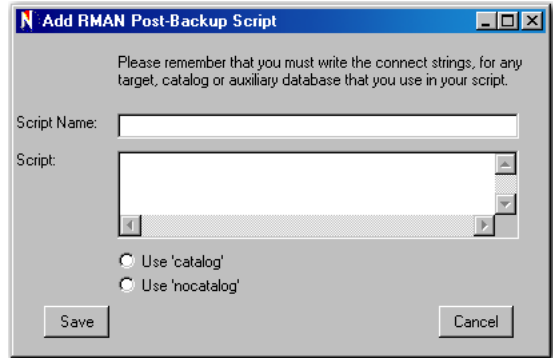


Figure 1-25:  
The Add RMAN Script window

4. With the script information properly input and desired options selected, click on the **Save** button. The script will be saved and this window will close.
5. Now that the Post-Backup Script has been saved, it will appear beneath the **Post-Backup Scripts** item in the **Selections** tab, where it can be selected for use. When a script listing is right-clicked, a pop-up menu will be revealed containing options to **Edit** (in which this window will be launched with the script information loaded for editing) or **Remove** the script.

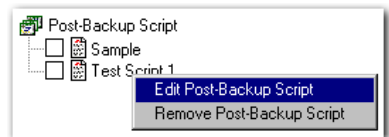
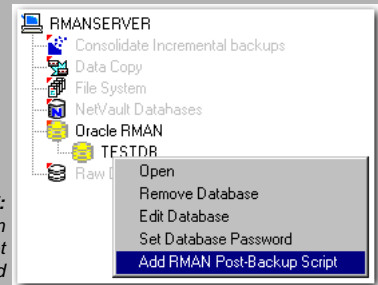


Figure 1-26:  
The pop-up menu commands available from an added Post-Backup Script

**Important:**

1. No instructions on generating Oracle RMAN scripts are offered in this documentation and BakBone Software does not offer support services for the creation of Oracle RMAN-compatible scripts. Therefore, it is strongly recommended that only Oracle RMAN DBA's with a strong knowledge of scripting use this functionality. If an incorrect script is generated and used in this process, NetVault will be unable to execute it.
2. A sample version of a script is available for viewing to obtain a rough idea of the layout required. To view this script, follow the steps below:
  - a. Open the **Post-Backup Script** item in the selection tree (by double-clicking on it)
  - b. Right-click on the **Sample** script that is revealed
  - c. Select the **Edit Post-Backup Script** command from the pop-up menu that appears. The Edit RMAN Post-Backup Script window will be launched with the **Sample** script loaded for review.
3. The **Add RMAN Post-Backup Script** command is also accessible from the root database node, when it is still closed in the Selections tab (i.e., with the Root database node closed, right click on it to access its associated pop-up menu which contains this command).



**Figure 1-27:**  
The Add RMAN Post-Backup Script command can also be accessed by right-clicking on the root database node when it is closed

4. It is only possible to select **one** Post-backup Script for use with an Oracle RMAN database backup job.

### 1.3.2.c Backing Up Data Using the Command Line Interface

In addition to performing backups using the NetVault GUI from the NetVault Server, it is possible to perform backups using the RMAN commands from a terminal session prompt while locally logged in to the Oracle Database Server. The steps below offer an example process in which commands are issued to perform a full backup of the Oracle Database tablespaces, “**USERS**” and “**TOOLS**”.

1. While locally logged on to the Oracle Database Server, initiate a terminal session.
2. From the prompt, enter the following commands (in the order they appear):
  - **run {**
  - **allocate channel c1 type 'SBT\_TAPE';**
  - **backup full**

3. The next command should be input as follows:

- **format '<Variable\_1>:<Variable\_2>:<Variable\_3>::%d\_%s\_%t'**

Each item labelled as “<Variable\_#>” corresponds to a variable used to determine specific NetVault and RMAN values, each of which are outlined in the following table:

Variable	Description
<Variable_1>	<b>NetVault Server Name</b> - The NetVault name this machine (i.e., the name given for this machine during installation of NetVault). This is a <i>required</i> value.
<Variable_2>	<b>The Target Set Name</b> - This applies to a Target Set created for use with Oracle RMAN backups, in order to target a specific device during backup. If NetVault's default setting of “ <b>Any Device</b> ” is to be used (i.e., the backup will target any available device). This variable can be left out.
<Variable_3>	<b>The Advanced Options Set Name</b> - This applies to an Advanced Options Set created for use with Oracle RMAN backups. A Set is created to group Advanced Options tab settings into a composite that can be used for multiple jobs. If NetVault's default Advanced Options settings are to be used, this variable can be left out.
“%d_%s_%t”	These values pertain to unique RMAN identifiers (i.e., they are Oracle environmental variables).

**Important:** Ensure that each variable input in the command is separated by a colon (“:”).

4. Complete the process by inputting the following commands (in the order that they appear).

- **(tablespace USERS, TOOLS);**
- **release channel c1;**
- **}**

## 1.4.0 Restore Operations

### 1.4.1 Restore Pre-Requisites (Mac OS X Restores Only)

If performing a restore of Oracle RMAN data in an environment in which the NetVault Server is running a Mac OS X operating system, the following pre-requisite must be met before attempting the restore:

- **Change Permissions on the NetVault “tmp” Directory** - The following NetVault sub-directory on the machine serving as the NetVault Server must have **global read/write access**:

**/usr/netvault/tmp**

To apply this level of access, initiate a terminal session and issue the following command at the prompt:

**chmod 777 /usr/netvault/tmp**

### 1.4.2 Restoring with the Oracle RMAN Application

**Important:** This section applies **ONLY** to **Oracle RMAN APM ver. 3.1 and earlier**.

RMAN restores are handled by the actual RMAN application. To restore data, it is necessary to use the Oracle Recovery Manager software to initiate the restore for the selected server. Please see the relevant Oracle documentation for complete restore instructions with the Oracle Recovery Manager software.

**Important:**

1. Please read the Oracle Recovery Manager documentation for complete instructions on performing restores. For first time users of RMAN, it is recommended that a practice backup and restore are performed in order to familiarize the user with the procedures involved in the backup. This is particularly important involving a recovery of Oracle databases before running Oracle in a live environment.
2. NetVault requires the existence of an SBT\_TAPE channel to perform restore and recovery operations. See the RMAN documentation for complete instructions on allocating the proper channel.
3. Full system recovery requires the restore of “critical files” which are often backed up outside of NetVault. It is necessary to ensure that these files are always backed up. For more information, see the RMAN documentation.

### 1.4.3 Restoring with the NetVault GUI

**Important:** This section applies **ONLY** to **Oracle RMAN APM ver. 3.2 and later**.

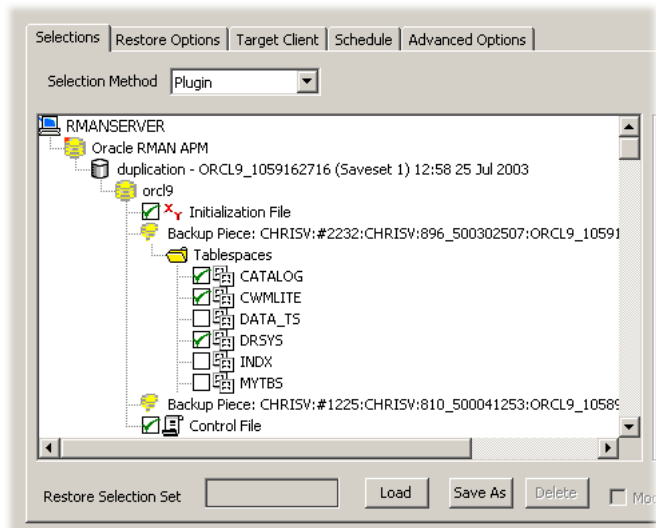
Currently, NetVault makes it possible for users of the **Oracle RMAN APM** version 3.2 and later to use NetVault's native GUI to perform restores of data that have been backed up *with the GUI* (i.e., **not** backups that have been performed via command line script). To accomplish this, follow the instructions detailed below:

1. From an instance of the GUI on the NetVault server, access the **Restore** window (by clicking either of the **Restore** buttons in the command toolbar or by choosing the **Restore** command from the **Operations** pull-down menu). With the window accessed, the **Selections** tab will be displayed, containing a list of clients which have completed successful backups.
2. Locate the client in the list which completed the desired backup and open it (by double-clicking on it or right-clicking on it and choosing **Open** from the pop-up menu). A list of the plugins used to complete successful backups on the target machine will be displayed.
3. Open the **Oracle RMAN APM** (via double-clicking on it or right-clicking and selecting the **Open** command) to display all backup savesets generated with this APM that are available for restore.
4. Open the desired backup saveset (by double-clicking on it) to display the list of databases available for restore.
5. The root Oracle database will be revealed. Double-click on this item to open it and reveal its selectable contents.

**Important:** From this level of the backup saveset and lower, it is only possible to open browsable items in the tree by double-clicking on them (i.e., no **Open** command is offered from the pop-up menu).

6. With the database open, the various items will be revealed based on what was included in the backup, including any or all of the following:
  - **Initialization and Control File Items** - If included in the backup, these items will be revealed at this level and are available for selection.
  - **Individual Databases** - Those contained within the root that were selected for the original backup will be revealed. Each of these individual databases can be opened (via double-clicking) to reveal a **Tablespaces** folder which can also be opened to reveal the individual tablespaces contained in that database.
  - **Individual Tablespaces (Accessible by opening an individual database's Tablespaces folder)** - These individual items can be marked for inclusion in a restore. Select the desired items by clicking the box to the left of the item. Selected items will be marked with a green check.

**Figure 1-28:**  
A cut-away  
section of the  
Selections tab  
revealing a  
backup  
saveset open  
and items  
selected for a  
restore



**Important:** An entire database cannot be selected for a restore (i.e., no selection box is provided for a complete database). In order to select an entire database, it must be opened in the manner described above and each individual tablespace must be selected.

7. With the desired items selected for a restore, click the **Restore Options** tab to display these options and set them as required. (See the section *The Restore Options Tab* on page 39 for complete details on the options available in this tab.)
8. All other tab selections (e.g., **Schedule**, **Target** and **Advanced Options**) function the same as a standard NetVault backup. (For more information on the options available in these tabs, see the *NetVault Administrator's Guide*.)
9. Enter a suitable title for the job in the **Job Title** box.
10. Submit the restore job by clicking the **Submit** button.

**Important:** It is important to note that backups performed via an Oracle command line session (i.e., not with the NetVault GUI) cannot be restored in this manner. This type of backups must be restored in the same manner they were backed up.

### 1.4.3.a The Restore Options Tab

This tab contains options that can be set in conjunction with items chosen for a restore in the **Selections** tab. The tab is broken down into three sub-tabs, which are detailed below.

*Figure 1-29:  
The Restore  
Options tab for  
the Oracle  
RMAN APM*

- **The Table Spaces Sub-Tab**

- The default sub-tab, it contains the **Options** frame which is comprised of the following options:

- ❖ **Alter Tablespaces**

- ❖ **Offline, Before Restore**

- Select this option if it is necessary to have tablespaces that are to be restored and altered offline (thereby rendering them inactive) **before** the restore is to take place.

- ❖ **Recover Datafiles After**

- Restore** - Select this option to recover any corresponding data files in addition to the selected restored data once the restore has completed.

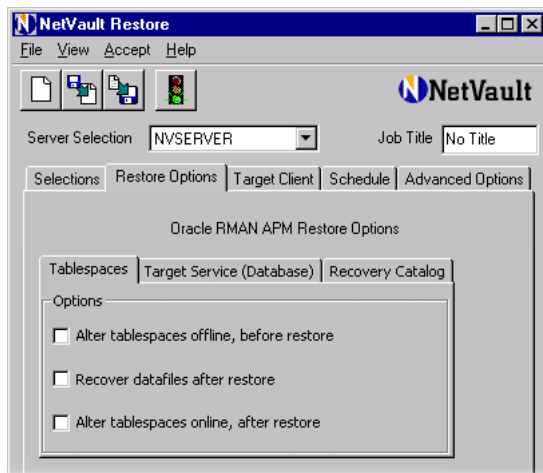
- ❖ **Alter Tablespaces Online, After Restore** - Select this option if it is necessary to have tablespaces that are to be restored and altered online (thereby leaving them active and available) **after** a completed restore.

- **Target Service (Database) Sub-Tab** - This sub-tab allows for a Target Service (Database) for restore and offers the following options:

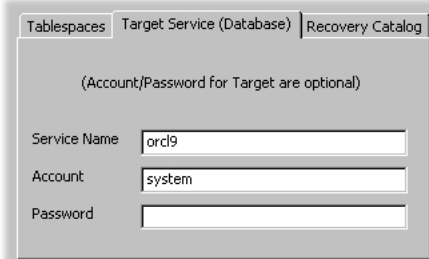
- ❖ **Service Name** - Use this field to input the name of the desired target service. The **Service Name** used to conduct the backup of selected data will be revealed in this field at default.

- ❖ **Account** - Use this field to input the account name with access to the service named in the **Service Name** field. The Account associated with the Service used to generate the selected backup will be revealed in this field at default. (This is an optional field and only needs to have information input if the named Service requires an account for access.)

- ❖ **Password** - Input the accompanying password to the account named in the previous field (if applicable).



*Figure 1-30:  
The Target  
Service  
(Database)  
sub-tab and its  
available  
options*



**Figure 1-31:**  
The Recovery  
Catalog sub-  
tab and its  
available  
options

- **Recovery Catalog Sub-Tab** - This sub-tab allows for a Recovery Catalog form of restore and offers the following options:

- ❖ **Use Catalog** - Select this option if using a Recovery Catalog.
- ❖ **Service Name** - Use this field to input the name of the desired **Recovery Catalog** service.
- ❖ **Account** - Use this field to input the account name with access to the service named in the **Service Name** field.
- ❖ **Password** - Input the accompanying password to the **Account** named in the previous field.

## 1.5.0 Troubleshooting

The following table describes some commonly encountered problems and possible solutions.

Symptom	Error	Explanation
<p><b>Backup fails. The Job Management window and the Logs window will state that the backup failed. (Oracle RMAN APM version 3.6 and later)</b></p> <p><i>or</i></p> <p><b>Backup fails. The Job Management window will display a entry stating that the backup completed successfully, and the Logs window will display an entry stating that the backup completed successfully, as well as entries indicating which data was not backed up. (Oracle RMAN APM versions prior to 3.6)</b></p>	Failed to back up all data	If the Oracle database password is updated, the value in the <b>Password</b> field of the <b>Oracle Login</b> window in the <b>Oracle RMAN APM</b> must be updated to match it.

Symptom	Error	Explanation
<b>Restore fails to run from NetVault GUI, and/or Backup/Restore fails to run from RMAN</b>	ORA-27007: failed to open file ORA-19511: Error received from media manager, error text: SBT error=7011, errno=1, sbtopen: system error or ORA-27012: read from file failed ORA-19511: Error received from media manager layer, error text: SBT error= 7063, errno = 0, sbtread: i/o error	The nvpluginaccess utility has not been successfully run on the NetVault Server. Make sure that the following Oracle RMAN APM configuration fields have the correct values: 'Default NetVault Server,' 'Do Restore from NetVault Server,' and 'Restore Backup taken from NetVault Client.' Refer to <i>Configuring the Oracle RMAN APM</i> on page 16 for more details.
<b>Backup fails to run</b>	Failed to connect to database	The Oracle instance that targeted by the back up is shut down.
<b>Backup fails to run</b>	ORA-01031: insufficient privileges on Oracle backup	The account used for the Oracle RMAN APM had insufficient privileges to dump online log files to archive. or The Oracle Database Server is running a Windows-based O/S and the process covered in the section, <i>Step B: Setting Up the NetVault Process Manager</i> on page 10 was not followed properly
<b>Backup fails to run</b>	ORA-01123: cannot start online backup; media recovery not enabled	The Oracle instance is not running in archive log mode.
<b>Oracle instance is not available.</b>	ORA-01034: Oracle is not available	The Oracle instance is not running. Start RMAN and mount the database.
<b>Oracle database cannot be opened.</b>	ORA-01219: Database is not open.	The database is closed. From Oracle, open the database.



## Linking to the NetVault SBT Library

A.0.0 - About this Appendix .....	45
A.1.0 - Linking NetVault and Oracle Libraries.....	45
• <b>A.1.1 - Linking Libraries in a Linux-based O/S</b> .....	45
- A.1.1.a - Step 1: Noting the Location of the "orasbt.so" File .....	45
- A.1.1.b - Step 2: Noting the Oracle Library File in Use.....	46
- A.1.1.c - Step 3: Linking the Libraries .....	46
• <b>A.1.2 - Linking Libraries in a Macintosh OS X O/S</b> .....	49
- A.1.2.a - Step 1: Noting the Location of the "orasbt.dylib" File .....	49
- A.1.2.b - Step 2: Linking the Libraries.....	49
• <b>A.1.3 - Linking Libraries in a Solaris (SPARC)-based O/S</b> .....	53
- A.1.3.a - Step 1: Noting the Location of the "orasbt.so" File .....	53
- A.1.3.b - Step 2: Linking the Libraries.....	53
• <b>A.1.4 - Linking Libraries in Other UNIX-based O/S</b> .....	58
• <b>A.1.5 - Verifying the Link</b> .....	58
A.2.0 - Technical Support .....	59
• <b>A.2.1 - Helpdesk Support Lines</b> .....	59
• <b>A.2.2 - BakBone Software's Web Site</b> .....	59



## A.0.0 About this Appendix

This appendix is designed to offer instruction on a post-installation process that **may be required** to completely configure an Oracle RMAN environment to be compatible with NetVault and the **Oracle RMAN APM**.

**Important:** The procedures offered in this guide should only be followed if the **Pre-** and **Post Installation** instructions offered in the section *Installation of Chapter 1* on page 6 were performed **first** and the environment is still not properly configured (i.e., The APM does not function correctly and/or it not possible to access the Oracle Database Server for backup and restore). In addition, this process can only be followed **after** the **Oracle RMAN APM** has been installed on the Oracle Database Server.

## A.1.0 Linking NetVault and Oracle Libraries

NetVault backups are performed through RMAN using the NetVault MMS SBT API. As a post-installation requirement for some operating systems, it may be necessary to ensure that the appropriate Oracle library is pointing to the NetVault library, in order to allow the above noted API proper access to RMAN. The following sections of this guide illustrate the steps required to perform this linking operation, based on Operating System and version of Oracle in use on the Oracle Database Server.

### A.1.1 Linking Libraries in a Linux-based O/S

#### A.1.1.a Step 1: Noting the Location of the "orasbt.so" File

The required NetVault library file, entitled "**orasbt.so**" is located in the NetVault installation directory on the Oracle Database Server in the sub-directory, "**.../netvault/lib/**" (where "**...**" refers to the complete path to the installation of NetVault). For example, if a default installation of NetVault was performed, its installation directory path would be "**/usr/netvault**". Therefore, the full path to the target library will be "**/usr/netvault/lib/orasbt.so**". Locate this file and make note of its full path destination.

**Important:** Based on the version of NetVault installed (7.x vs. 6.x) the name of the installation directory for NetVault software may vary (e.g., **new** installs of all versions from **7.0**, forward install to "**.../netvault**", while **6.x** versions **and upgrades from 6.x to 7.x** versions install to "**.../netvault6**"). Keep this in mind when including the NetVault installation directory in a path for this procedure.

## A.1.1.b Step 2: Noting the Oracle Library File in Use

The linking procedures that follow make reference to the Oracle library file, “**libobk.so**”. However, Oracle utilizes three different variables for media management libraries: “**libmm.so**”, “**libmm.so**” and “**libobk.so**”, depending on the version of Oracle in use. Prior to beginning the linking procedure, it is recommended that the following files be viewed to determine which version of this Oracle library file is in use

- “**ins\_rdbms.mk**”
- “**env\_rdbms.mk**”

Note this version of the library file in use. This value will be required whenever the “**libobk.so**” file is called out in the steps of the section, *Step 3: Linking the Libraries*, that follows.

**Important:** It is also recommended that the Oracle documentation be consulted to see if additional file formats are used for Oracle media management libraries.

## A.1.1.c Step 3: Linking the Libraries

The steps required to perform this operation are outlined in the following subsections, sorted by Oracle version installed on the Oracle Database Server.

**Oracle 8.x Versions**

To link to the **orasbt.so** library for an Oracle 8.x installation of the **Oracle RMAN APM**, perform the following steps:

1. Access the Oracle Database Server locally, initiate a terminal session and log into Oracle as a user.

**Important:** Please see the relevant Oracle RMAN documentation for instructions on logging in to Oracle from a terminal session prompt.

2. Shut down the service by using the **SVRMGRL** utility. Input the following commands from the terminal session prompt to accomplish this:
  - **%svrmgrl** (This will launch the utility -- The terminal session prompt should contain the “**SVRMGRL>**” prompt at this point)
  - **connect internal**
  - **shutdown normal;**
  - **exit** (once executed, the standard terminal session prompt should appear).
3. Navigate to the **\$ORACLE\_HOME/lib** directory and save a copy of the **libobk.so** file, by issuing the following commands:

- **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libobk.so libobk.so.SAVE** (to generate a copy of this file)
4. Remove the existing **libobk.so** file, by issuing the following command:
    - **rm libobk.so**
  5. Create a symbolic link from **libobk.so** to NetVault's **orasbt.so** library, by issuing the following command:
    - **ln -s /<path to netvault installation>/orasbt.so libobk.so**
  6. Navigate to the **.../bin** directory, where “...” represents the full path to the Oracle home directory (e.g., **\$Oracle\_Home/bin**), and verify that the new Oracle executable links the **orasbt.so** library file (e.g., by navigating to the proper directory and issuing the necessary “**ldd**” command):
    - **cd \$ORACLE\_HOME/bin**
    - **ldd oracle** (once this command is executed, a table-like display of data pertaining to Oracle will be displayed, where this new link information can be verified).
  7. Restart Oracle services by again calling up the **SVRMGRL** utility, via the following commands:
    - **%svrmgrl** (This will launch the utility -- The terminal session prompt should contain the “**SVRMGRL>**” prompt at this point)
    - **connect internal**
    - **startup;**
    - **exit** (once executed, the standard terminal session prompt should appear).

**Figure A-1:**  
An example of the syntax required to complete this procedure for an Oracle 8.x installation (with each section labelled with its corresponding step)

```

2.  %svrmgrl
    SVRMGRL> connect internal
    SVRMGRL> shutdown normal;
    SVRMGRL> exit
3.  cd $ORACLE_HOME/lib
    cp libobk.so libobk.so.SAVE
4.  rm libobk.so
5.  ln -s /<path to NetVault install>/lib/orasbt.so libobk.so
    cd $ORACLE_HOME/bin
    ldd oracle
6.  ***LIBRARY TEST SECTION***
    Name      Time-Stamp  CheckSum  Flags  Version
    oracle:
7.  %svrmgrl
    SVRMGRL> connect internal
    SVRMGRL> startup;
    SVRMGRL> exit

```

### All Other Oracle Versions (Non-8.x)

To link to the **orasbt.so** library for all other Oracle installations of the **Oracle RMAN APM**, perform the following steps:

1. Access the Oracle Database Server locally, initiate a terminal session and log into Oracle as a user.

**Important:** Please see the relevant Oracle RMAN documentation for instructions on logging in to Oracle from a terminal session prompt.

2. Shut down the service by using the **SQLPLUS** utility. Input the following commands from the terminal session prompt to accomplish this:
  - **%sqlplus /nolog** (This will launch the utility -- The terminal session prompt should contain the “**SQL>**” prompt at this point)
  - **connect / as sysdba**
  - **shutdown normal;**
  - **exit** (once executed, the standard terminal session prompt should appear).
3. Navigate to the **\$ORACLE\_HOME/lib** directory and save a copy of the **libobk.so** file, by issuing the following commands:
  - **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libobk.so libobk.so.SAVE** (to generate a copy of this file)
4. Remove the existing **libobk.so** file, by issuing the following command:
  - **rm libobk.so**
5. Create a symbolic link from **libobk.so** to NetVault’s **orasbt.so** library, by issuing the following command:
  - **ln -s /<path to netvault installation>/orasbt.so orasbt.so**
  - **ln -s orasbt.so libobk.so**
6. Navigate to the **.../bin** directory, where “...” represents the full path to the Oracle home directory (e.g., **\$Oracle\_Home/bin**), and verify that the new Oracle executable links the **orasbt.so** library file (e.g., by navigating to the proper directory and issuing the necessary “**ldd**” command):
  - **cd \$ORACLE\_HOME/bin**
  - **ldd oracle** (once this command is executed, a table-like display of data pertaining to Oracle will be displayed, where this new link information can be verified).
7. Restart Oracle services by again calling up the **SQLPLUS** utility, via the following commands:
  - **%sqlplus /nolog** (This will launch the utility -- The terminal session prompt should contain the “**SQL>**” prompt at this point)

**Figure A-2:**  
An example of the syntax required to complete this procedure for an Oracle 9.x or Oracle 10g (non-Itanium Linux) installation (with each section labelled with its corresponding step)

- **connect / as sysdba**
- **startup;**
- **exit** (once executed, the standard terminal session prompt should appear).

```

2.  %sqlplus /nolog
    SQL> connect / as sysdba
    SQL> shutdown normal;
    SQL> exit
3.  cd $ORACLE_HOME/lib
    cp libobk.so libobk.so.SAVE
4.  rm libobk.so
5.  ln -s <path to NetVault install>/lib/orasbt.so orasbt.so
    ln -s orasbt.so libobk.so
6.  cd $ORACLE_HOME/bin
    ldd oracle
    ***LIBRARY TEST SECTION***
    Name Time-Stamp CheckSum Flags Version
oracle:
7.  %sqlplus /nolog
    SQL> connect / as sysdba
    SQL> startup;
    SQL> exit
  
```

## A.1.2 Linking Libraries in a Macintosh OS X O/S

### A.1.2.a Step 1: Noting the Location of the "orasbt.dylib" File

The required NetVault library file, entitled "**orasbt.dylib**" is located in the NetVault installation directory on the Oracle Database Server in the sub-directory, "**.../netvault/lib/**" (where "**...**" refers to the complete path to the installation of NetVault). For example, if a default installation of NetVault was performed, its installation directory path would be "**/usr/netvault**". Therefore, the full path to the target library will be "**/usr/netvault/lib/orasbt.dylib**". Locate this file and make note of its full path destination.

### A.1.2.b Step 2: Linking the Libraries

The steps required to perform this operation are outlined in the following sub-sections, sorted by Oracle version installed on the Oracle Database Server.

#### **Oracle 8.x Versions**

To link to the **orasbt.so** library for an Oracle 8.x installation of the **Oracle RMAN APM**, perform the following steps:

1. Access the Oracle Database Server locally, initiate a terminal session and log into Oracle as a user.

**Important:** Please see the relevant Oracle RMAN documentation for instructions on logging in to Oracle from a terminal session prompt.

2. Shut down the service by using the **SVRMGRL** utility. Input the following commands from the terminal session prompt to accomplish this:
  - **%svrmgrl** (This will launch the utility -- The terminal session prompt should contain the "**SVRMGRL>**" prompt at this point)
  - **connect internal**
  - **shutdown normal;**
  - **exit** (once executed, the standard terminal session prompt should appear).
3. Navigate to the **\$ORACLE\_HOME/lib** directory and save a copy of the **libobk.dylib** file, by issuing the following commands:
  - **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libobk.dylib libobk.dylib.SAVE** (to generate a copy of this file)
4. Remove the existing **libobk.so** file, by issuing the following command:
  - **rm libobk.so**
5. Create a symbolic link from **libobk.so** to NetVault's **orasbt.so** library, by issuing the following command:
  - **ln -s /<path to netvault installation>/orasbt.dylib libobk.dylib**
6. Navigate to the **.../bin** directory, where "**...**" represents the full path to the Oracle home directory (e.g., **\$Oracle\_Home/bin**), and verify that the new Oracle executable links the **orasbt.dylib** library file (e.g., by navigating to the proper directory and issuing the necessary "**ldd**" command):
  - **cd \$ORACLE\_HOME/bin**
  - **ldd oracle** (once this command is executed, a table-like display of data pertaining to Oracle will be displayed, where this new link information can be verified).
7. Restart Oracle services by again calling up the **SVRMGRL** utility, via the following commands:
  - **%svrmgrl** (This will launch the utility -- The terminal session prompt should contain the "**SVRMGRL>**" prompt at this point)
  - **connect internal**
  - **startup;**
  - **exit** (once executed, the standard terminal session prompt should appear).

**Figure A-1:**  
An example of the syntax required to complete this procedure for an Oracle 8.x installation (with each section labelled with its corresponding step)

```

2.  %svrmgrl
    SVRMGRL> connect internal
    SVRMGRL> shutdown normal;
    SVRMGRL> exit
3.  cd $ORACLE_HOME/lib
    cp libobk.dylib libobk.dylib.SAVE
4.  rm libobk.dylib
5.  ln -s /<path to NetVault install>/lib/orasbt.dylib libobk.dylib
    cd $ORACLE_HOME/bin
6.  ldd oracle
    ***LIBRARY TEST SECTION***
    Name Time-Stamp CheckSum Flags Version
    oracle:
7.  %svrmgrl
    SVRMGRL> connect internal
    SVRMGRL> startup;
    SVRMGRL> exit

```

### ***All Other Oracle Versions (Non-8.x)***

To link to the **orasbt.so** library for all other Oracle installations of the **Oracle RMAN APM**, perform the following steps:

1. Access the Oracle Database Server locally, initiate a terminal session and log into Oracle as a user.

**Important:** Please see the relevant Oracle RMAN documentation for instructions on logging in to Oracle from a terminal session prompt.

2. Shut down the service by using the **SQLPLUS** utility. Input the following commands from the terminal session prompt to accomplish this:
  - **%sqlplus /nolog** (This will launch the utility -- The terminal session prompt should contain the “**SQL>**” prompt at this point)
  - **connect / as sysdba**
  - **shutdown normal;**
  - **exit** (once executed, the standard terminal session prompt should appear).
3. Navigate to the **\$ORACLE\_HOME/lib** directory and save a copy of the **libobk.so** file, by issuing the following commands:
  - **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libobk.so libobk.dylib.SAVE** (to generate a copy of this file)
4. Remove the existing **libobk.dylib** file, by issuing the following command:

- **rm libobk.dylib**
- 5. Create a symbolic link from **libobk.dylib** to NetVault's **orasbt.dylib** library, by issuing the following command:
  - **ln -s /<path to netvault installation>/orasbt.dylib orasbt.dylib**
  - **ln -s orasbt.so libobk.dylib**
- 6. Navigate to the **.../bin** directory, where “...” represents the full path to the Oracle home directory (e.g., **\$Oracle\_Home/bin**), and verify that the new Oracle executable links the **orasbt.dylib** library file (e.g., by navigating to the proper directory and issuing the necessary “**ldd**” command):
  - **cd \$ORACLE\_HOME/bin**
  - **ldd oracle** (once this command is executed, a table-like display of data pertaining to Oracle will be displayed, where this new link information can be verified).
- 7. Restart Oracle services by again calling up the **SQLPLUS** utility, via the following commands:
  - **%sqlplus /nolog** (This will launch the utility -- The terminal session prompt should contain the “**SQL>**” prompt at this point)
  - **connect / as sysdba**
  - **startup;**
  - **exit** (once executed, the standard terminal prompt should will appear).

**Figure A-2:**  
An example of the syntax required to complete this procedure for an Oracle 9.x or Oracle 10g (non-Itanium Linux) installation (with each section labelled with its corresponding step)

```

2.  [ ] %sqlplus /nolog
    [ ] SQL> connect / as sysdba
    [ ] SQL> shutdown normal;
    [ ] SQL> exit
3.  [ ] cd $ORACLE_HOME/lib
    [ ] cp libobk.dylib libobk.dylib.SAVE
4.  [ ] rm libobk.dylib
5.  [ ] ln -s /<path to NetVault install>/lib/orasbt.dylib orasbt.dylib
    [ ] ln -s orasbt.dslib libobk.dylib
6.  [ ] cd $ORACLE_HOME/bin
    [ ] ldd oracle
    [ ] ***LIBRARY TEST SECTION***
    [ ]      Name   Time-Stamp   CheckSum   Flags   Version
    [ ] oracle:
7.  [ ] %sqlplus /nolog
    [ ] SQL> connect / as sysdba
    [ ] SQL> startup;
    [ ] SQL> exit
  
```

### A.1.3 Linking Libraries in a Solaris (SPARC)-based O/S

#### A.1.3.a Step 1: Noting the Location of the “orasbt.so” File

The required NetVault library file, entitled “**orasbt.so**” is located in the NetVault installation directory on the Oracle Database Server in the sub-directory, “**.../netvault/lib/**” (where “**...**” refers to the complete path to the installation of NetVault). For example, if a default installation of NetVault was performed, its installation directory path would be “**/usr/netvault**”. Therefore, the full path to the target library will be “**/usr/netvault/lib/orasbt.so**” in a 32-bit version of Solaris (SPARC) and “**/usr/netvault/lib/orastb64.so**” for a 64-bit version of the O/S. Locate this file and make note of its full path destination.

**Important:** Based on the version of NetVault installed (7.x vs. 6.x) the name of the installation directory for NetVault software may vary (e.g., **new** installs of all versions from **7.0**, forward install to “**.../netvault**”, while **6.x** versions **and upgrades from 6.x to 7.x** versions install to “**.../netvault6**”). Keep this in mind when including the NetVault installation directory in a path for this procedure.

#### A.1.3.b Step 2: Linking the Libraries

The steps required to perform this operation are outlined in the following sub-sections, sorted by Oracle version installed on the Oracle Database Server.

##### **Oracle Version 8.0.6**

To link to the **orasbt.so** library for an Oracle **8.0.6** installation (32 and 64-bit versions) of the **Oracle RMAN APM**, perform the following operations:

1. Navigate to the **\$ORACLE\_HOME/lib** directory and save a backup copy of the **libdsbtsh8.so** file that was previous used for linking, by issuing the following commands:
  - **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libdsbtsh8.so libdsbtsh8.so.SAVE** (to generate a copy of this file)
2. A file entitled “**libobk.so**” is currently the symbolic link to the file, **libdsbtsh8.so** and it must be removed so that the proper link can be established. Do this by issuing the following command:
  - **rm libobk.so**
3. A new **libobk.so** file is then created, with a symbolic link to NetVault's **orasbt.so** library. The directory path named in this step varies based on the version of Oracle RMAN in use (i.e., as noted in the section, *Step 1: Noting the Location of the “orasbt.so” File* on page 53). Based on the bit version of Solaris (SPARC) installed, the following command would be issued:

**Figure A-1:**  
Example syntax used to perform this procedure for both a 32-bit (top) and a 64-bit (bottom) installation of Oracle 8.0.6

- In -s /<path to netvault install>/lib/orasbt.so libobk.so (32-bit)
- In -s /<path to netvault install>/lib/orasbt64.so libobk.so (64-bit)

```

1. — cd $ORACLE_HOME/lib
2. — cp libdsbtsh8.so libdsbtsh8.so.SAVE
3. — rm libobk.so
In -s /<path to NetVault install>/lib/orasbt.so libobk.so

```

```

1. — cd $ORACLE_HOME/lib
2. — cp libdsbtsh8.so libdsbtsh8.so.SAVE
3. — rm libobk.so
In -s /<path to NetVault install>/lib/orasbt64.so libobk.so

```

### Oracle 8i Versions (8.1.6, 8.1.7)

To link to the **orasbt.so** library for an **Oracle 8i** installation (for 32 and 64-bit versions) of the **Oracle RMAN APM**, perform the following operations:

1. Navigate to the **\$ORACLE\_HOME/lib** directory and save a backup copy of the **libdsbtsh8.so** file that was previous used for linking, by issuing the following commands:
  - **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libdsbtsh8.so libdsbtsh8.so.SAVE** (to generate a copy of this file)
2. The current version of the **libdsbtsh8.so** file is serving as the symbolic link and it must be removed so that the proper link can be established. Do this by issuing the following command:
  - **libdsbtsh8.so**
3. A new **libdsbtsh8.so** file is then created, with a symbolic link to NetVault's **orasbt.so** library. The directory path named in this step varies based on the version of Oracle RMAN in use (i.e., as noted in the section, *Step 1: Noting the Location of the "orasbt.so" File* on page 53). Based on the bit version of Solaris (SPARC) installed, the following command is issued:
  - In -s /<path to netvault install>/lib/orasbt.so libobk.so (32-bit)
  - In -s /<path to netvault install>/lib/orasbt64.so libobk.so (64-bit)

**Figure A-2:**  
Example syntax used to perform this procedure for both a 32-bit (top) and a 64-bit (bottom) installation of Oracle 8i (8.1.6, 8.1.7)

```
1. — cd $ORACLE_HOME/lib
2. — cp libdsbtsh8.so libdsbtsh8.so.SAVE
3. — rm libobk.so
   In -s /<path to NetVault install>/lib/orasbt.so libdsbtsh8.so
```

```
1. — cd $ORACLE_HOME/lib
2. — cp libdsbtsh8.so libdsbtsh8.so.SAVE
3. — rm libobk.so
   In -s /<path to NetVault install>/lib/orasbt64.so libdsbtsh8.so
```

### Oracle 9i (9/9.2) or Oracle 10g

To link to the **orasbt.so** library for an **Oracle 9i** or **Oracle 10g** installation (for 32 and 64-bit versions) of the **Oracle RMAN APM**, perform the following operations:

1. Access the Oracle Database Server locally, initiate a terminal session and log into Oracle as a user.

**Important:** Please see the relevant Oracle RMAN documentation for instructions on logging in to Oracle from a terminal session prompt.

2. Shut down the service by using the **SQLPLUS** utility. Input the following commands from the terminal session prompt to accomplish this:
  - **%sqlplus /nolog** (This will launch the utility -- The terminal session prompt should contain the “**SQLPLUS>**” prompt at this point)
  - **connect / as sysdba**
  - **shutdown normal;**
  - **exit** (once executed, the standard terminal prompt will appear).
3. Navigate to the **\$ORACLE\_HOME/lib** directory and save a copy of the **libobk.so** file, by issuing the following commands:
  - **cd \$ORACLE\_HOME/lib** (to navigate to the directory)
  - **cp libobk.so libobk.so.SAVE** (to generate a copy of this file)
4. Remove the existing **libobk.so** file, by issuing the following command:
  - **rm libobk.so**
5. Create a symbolic link from **libobk.so** to NetVault's **orasbt.so** library, by issuing the following commands (based on the bit-version of the O/S in use on the Oracle Database Server):
  - **In -s /<path to netvault install>/orasbt.so orasbt.so** (32-bit)
  - **In -s /<path to netvault install>/orasbt64.so orasbt.so** (64-bit)

- **In -s orasbt.so libobk.so**
6. Navigate to the “**.../rdbms/lib**” directory, where “**...**” represents the full path to the Oracle home directory (e.g., **\$Oracle\_Home/rdbms/lib**), and issue the following “make” commands:
    - **cd \$ORACLE\_HOME/rdbms/lib** (to navigate to the directory)
    - **make -f ins\_rdbms.mk irman**
    - **make -f ins\_rdbms.mk ioracle LLIBMM=-lobk**
  7. Navigate to the **.../bin** directory, where “**...**” represents the full path to the Oracle home directory (e.g., **\$Oracle\_Home/bin**), and verify that the new Oracle executable links the **orasbt.so** library file (e.g., by navigating to the proper directory and issuing the necessary “**ldd**” command):
    - **cd \$ORACLE\_HOME/bin**
    - **ldd oracle** (once this command is executed, a table-like display of data pertaining to Oracle will be displayed, where this new link information can be verified).
  8. Restart Oracle services by again calling up the **SQLPLUS** utility, via the following commands:
    - **%sqlplus /nolog** (This will launch the utility -- The terminal session prompt should contain the “**SQL>**” prompt at this point)
    - **connect / as sysdba**
    - **startup;**
    - **exit** (once executed, the standard terminal prompt will appear).

**Figure A-3:**  
Example syntax used to perform this procedure for an Oracle 9i or Oracle 10g (32-bit version) installation of the APM (with each section labelled with its corresponding step)

```

2.  %sqlplus /nolog
    SQL> connect / as sysdba
    SQL> shutdown normal;
    SQL> exit
3.  cd $ORACLE_HOME/lib
    cp libobk.so libobk.so.SAVE
4.  rm libobk.so
5.  ln -s /<path to NetVault install>/lib/orasbt.so orasbt.so
    ln -s orasbt.so libobk.so
6.  cd $ORACLE_HOME/rdbms/lib
    make -f ins_rdbms.mk irman
    make -f ins_rdbms.mk ioracle LLIBMM=-lobk
7.  cd $ORACLE_HOME/bin
    ldd oracle
    ***LIBRARY TEST SECTION***
    Name      Time-Stamp  CheckSum   Flags Version
oracle:
8.  %sqlplus /nolog
    SQL> connect / as sysdba
    SQL> startup;
    SQL> exit
  
```

**Figure A-4:**  
Example syntax used to perform this procedure for an Oracle 9i or Oracle 10g (64-bit version) installation of the APM (with each section labelled with its corresponding step)

```

2.  %sqlplus /nolog
    SQL> connect / as sysdba
    SQL> shutdown normal;
    SQL> exit
3.  cd $ORACLE_HOME/lib
    cp libobk.so libobk.so.SAVE
4.  rm libobk.so
5.  ln -s /<path to NetVault install>/lib/orasbt64.so orasbt.so
    ln -s orasbt.so libobk.so
6.  cd $ORACLE_HOME/rdbms/lib
    make -f ins_rdbms.mk irman
    make -f ins_rdbms.mk ioracle LLIBMM=-lobk
7.  cd $ORACLE_HOME/bin
    ldd oracle
    ***LIBRARY TEST SECTION***
    Name      Time-Stamp  CheckSum   Flags Version
oracle:
8.  %sqlplus /nolog
    SQL> connect / as sysdba
    SQL> startup;
    SQL> exit
  
```

### A.1.4 Linking Libraries in Other UNIX-based O/S

Follow the procedures outlined in the section, *Linking Libraries in a Solaris (SPARC)-based O/S* on page 53, based on the version of Oracle installed on the Oracle Database Server. However, when calling out the “**orasbt.so**” file for operations, its extension varies on the operating system installed:

- **Compaq Tru64:** “**orasbt.so**” (the file name is the same, the process can be duplicated as is)
- **HP-UX:**
  - ❖ “**orasbt.sl**” (for 32-bit versions of this O/S)
  - ❖ “**orasbt64**” (for 64-bit versions of this O/S)
- **IBM AIX:** “**orasbt.a**”

#### Important:

1. This extension differentiation only applies when calling out the file from the O/S for linking to the NetVault version of this file. When instructed to establish the link with the command, “**In -s /usr/netvault/lib/orasbt.so orasbt.so**”, only the first instance of the **orasbt.so** file would need to be modified to coincide with the proper O/S. For example, if the target Oracle Database Server was running an IBM-AIX O/S, the command would appear as follows:

**In -s /usr/netvault/lib/orasbt.a orasbt.so**

2. If a supported O/S is not listed above as requiring a different extension for the “orasbt.so” file, the instructions offered in the section *Linking Libraries in a Solaris (SPARC)-based O/S* on page 53 are the same.

### A.1.5 Verifying the Link

After the symbolic link has been created, verify that the libraries are properly linked. This can be accomplished by performing the following steps:

1. From the Oracle Database Server, initiate a terminal session
2. From the prompt, input the following commands (in the order they appear).
  - **% rman nocatalog**
  - **RMAN> connect target /**
  - **RMAN> run {**
  - **2> allocate channel ch1 type 'SBT\_TAPE';**
  - **3> backup tablespace TOOLS format prompt“%u”;**
  - **4> }**

If this command is successful, a banner will indicate the name of the NetVault SBT library. If this command fails, verify that the procedures above were followed correctly (based on the O/S installed on the Oracle Database Server). If the command continues to fail, contact BakBone technical support (see the section that follows for contact information).

## A.1.0 Technical Support

BakBone Software is dedicated to providing friendly, expert advice to NetVault customers. Our highly trained professionals are available to answer questions, offer solutions to problems and generally help make the most of any NetVault purchase. Log on to our web site, or contact our Helpdesk, for more information.

### A.1.1 Helpdesk Support Lines

Region	Contact	
North America	<b>Telephone</b>	
	1.877.955.BONE (2663)	
	<b>E-mail</b>	
	support@bakbone.com	
Europe	<b>Telephone</b>	
	+44.1202.244727 ● +44.1202.244728	
	<b>E-mail</b>	
	support@bakbone.co.uk	
Asia/Pacific Rim	<b>Telephone</b>	
	+86.10.6567.3331	
	<b>E-mail:</b>	
	<i>Multiple offices exist in our Asia, Pacific Rim district. Please contact the closest support office for assistance:</i>	
	<b>Japan Office:</b>	<b>Korea Office:</b>
	support@bakbone.co.jp	koreasupport@bakbone.com
	<b>Greater China Office:</b>	<b>Southeast Asia Office:</b>
	support@bakbone.com.cn	aseansupport@bakbone.com
	<b>India Office:</b>	<b>South Pacific Office:</b>
	indiansupport@bakbone.com	anzsupport@bakbone.com

### A.1.2 BakBone Software's Web Site

BakBone's web site can be reached at the following address:

<http://www.bakbone.com>

