

3PAR® Recovery Manager for Oracle 2.2.3 User's Guide for Oracle on Red Hat Linux

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1 Introduction

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This user's guide provides the information needed to install and use 3PAR® Recovery Manager 2.2.3 for Oracle on Linux®. Recovery Manager offers a specific data protection solution that has been enhanced to provide fast and efficient Oracle backups and restores with minimal impact on the primary host computer.

Audience

This user's guide is for system administrators and database administrators who are responsible for backing up databases and who understand Red Hat Linux and Oracle9*i*™ and Oracle10*g*™ databases.

Related Documents

The following documents also provide information related to the InServ Storage Server:

For Information About…	Read the…
Using the InForm command line interface (CLI)	*InForm OS Command Line Interface Reference*
Identifying InServ Storage Server components and fixing problems	*InForm OS Messages and Operator's Guide*
Configuring and managing InServ Storage Servers	*InForm OS Administrator's Guides*
Installing and configuring 3PAR Recovery Manager for Linux	*3PAR Recovery Manager Installation and Configuration Guide*

Organization

This guide is organized as follows:

- This chapter provides an overview of this guide, including intended audience, related documentation, typographical conventions, and advisories.
- Chapter 2, *Overview of Recovery Manager Operations*, describes how to perform basic Recovery Manager functions using the menu-driven application interface
- Chapter 3, *Verifying Recovery Manager Parameters*, describes procedures for installing and verifying Recovery Manager.
- Chapter 4, *Using Recovery Manager from the Menu-Driven Application*, describes procedures for using Recovery Manager from the Menu-driven application.
- Chapter 5, *Running Recovery Manager from the Command Line*, introduces the commands and procedures for using Recovery Manager.

- Chapter 6, *Using the Recovery Manager GUI Interface*, describes procedures for using Recovery Manager from the GUI.
- Chapter 7, *Using Remote Copy with Recovery Manager*, introduces and provides instructions for working with Recovery Manager with Remote Copy.
- Chapter 8, *Using the Recovery Manager Rollback Utility*, provides instructions for rolling back a database to a point-in-time stage with read-only or read-write virtual copy.
- Appendix A, *Support for Oracle 9i/10g RAC with OCFS/OCFS2*, describes special requirements for supporting Oracle 9i/10g RAC with OCFS/OCFS2.
- Appendix B, *Backup and Restore ASM Using Oracle RMAN and 3PAR Recovery Manager*, describes the procedure to work with RMAN and virtual copies created by Recovery Manager.
- This guide also contains an index and revision history for your reference.

Typographical Conventions

The following typographical conventions are used in this guide:

Typeface	Meaning	Example
ABCDabcd	Used for dialog box elements such as titles and button labels.	Enter your system name in the **Value** box and click **OK**.
ABCDabcd	Used for file names, paths, and screen output, and for text you are to enter.	`Found < 12 > 73G disks.` Enter `cli` at the Windows command prompt.

Typeface	Meaning	Example
ABCDabcd	Used to contrast your input with system output.	`cli% removevv VV1` `Removing vv VV1.`
<ABCDabcd>	Used for variables in file names, paths, and screen output, and variables in user input.	`[root@(<systemID-nodeID>)root]` `To continue Enter your system name ==> <systemname>`

Advisories

To avoid injury to people or damage to data and equipment, be sure to observe the cautions and warnings in this guide. ***Always be careful when handling any electrical equipment.***



NOTE: Notes are reminders, tips, or suggestions that supplement the procedures included in this guide.



CAUTION: Cautions alert you to actions that can cause damage to equipment, software, or data.



WARNING: Warnings alert you to actions that can cause injury to people or irreversible damage to data or the operating system.

2 Overview of Recovery Manager Operations

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This chapter introduces virtual copy technology and provides instructions for using Recovery Manager to back up and restore Oracle databases.

Virtual Copies

A virtual copy is a point-in-time image of a virtual volume created using the copy-on-write technique. It is composed of a pointer to the parent virtual volume and a record of all the changes made to the parent since the virtual copy was created. These changes can be rolled back to reproduce the parent's earlier state.

A virtual copy can be exported to or mounted on a host computer to allow regular operations such as backup or off-host processing.

Within the Recovery Manager, a virtual copy of a database instance is a point-in-time image of the database instance. It consists of virtual copies of the virtual volumes where the datafiles and the main archive log destination reside. Hereinafter, the term "virtual copy" is used to refer to a virtual copy of a database instance rather than of a virtual volume.

Using the Recovery Manager Repository

Information about virtual copies, database structures, and backup image timestamps are stored in the Recovery Manager repository when a virtual copy is created or when a backup operation is performed. The information in the repository is used to manage virtual copies and to restore from a virtual copy backup image.

Some other Oracle-related files such as parameter files, password files, and control files are also saved in the Recovery Manager repository, along with the backup image, for each virtual copy created.

The Recovery Manager repository is located in the following directory on the backup host computer:

```
/etc/3par/solutions/<primary_host>.<dbms>.<dbid>
```

where:

- <primary_host> is the name of the primary host computer where the database instance is running.
- <dbms> is the database type: ora for Oracle, db2 for DB2UDB, and syb for Sybase.
- <dbid> is the database name, such as the Oracle database ID.

The following example is the location of the Recovery Manager repository on the backup host computer for Oracle database instance test, that is running on primary host Host1.

```
/etc/3par/solutions/Host1.ora.test
```

Interacting with Oracle

The Recovery Manager can be used to create a virtual copy of a database instance while the database is either online or offline.

To create a virtual copy while the database instance is online, you must enable archive log mode.

To ensure that the database is running in archive log mode, use SQLPLUS to retrieve archive log information, for example

```
$ sqlplus /nolog

SQL *Plus: Release 9.2.0.4.0 - Production on Tue Jun 1
21:25:00 2004

(c) Copyright 2000 Oracle Corporation. All rights reserved.

SQL> connect / as sysdba;
Connected.
SQL> archive log list
Database log mode   Archive Mode
Automatic archival   Enabled
Archive destination   /oracle/arch/PROD/
Oldest online log sequence 59
Next log sequence to archive 61
Current log sequence   61
```

When you create a virtual copy of a database while it is online, Recovery Manager does the following:

- puts all tablespaces of the database instance into backup mode.
- creates a virtual copy of the database instance. It takes only a few seconds to create a virtual copy, so the data generated by the online redo log is small.
- takes all tablespaces of the database instance out of backup mode.
- switches the log from online redo logs to archive logs.
- creates another virtual copy of the main archive log destination.

When you create a virtual copy of a database while it is offline, Recovery Manager does the following:

- starts up the database instance with the `startup mount` option to retrieve a list of datafiles.
- shuts down the database.
- creates a virtual copy of the database instance based on the retrieved database information.

For ASM managed databases, Recovery Manager requires three different ASM disk groups:

- ASM disk group for all datafiles
- ASM disk group for online redo log files
- ASM disk group for archive log destination.

Recovery Manager requires each disk group used only by one database, disk groups should not be shared among other databases, this is to avoid data loss when performing virtual volumes rolling back, or old files get restored which is unwanted.

Because Recovery Manager does not backup online redo logs, separate redo log files in a different disk group can protect redo log files being overwritten by restore or volume rolling back.

Interacting with VERITAS NetBackup

If using NetBackup, create at least one NetBackup policy to perform a full backup of an entire database instance. You can also create another NetBackup policy for full and incremental backups of the main archive log destination of a database instance.

Recovery Manager supports two types of backups:

- *immediate backup* is a backup that is initiated from the Recovery Manager command. When you use immediate backup, Recovery Manager calls the NetBackup command bpbackup on the NetBackup master server.
- *automatic backup* is a backup that is initiated from NetBackup to trigger Recovery Manager. When you use automatic backup, the Recovery Manager always does an online backup.

When you use the Recovery Manager to initiate an immediate backup, the following occurs:

- Recovery Manager creates a virtual copy for the database instance that is specified in the configuration file.
- Recovery Manager imports the virtual copy and mounts it (if the datafiles reside on a file system) on the backup host computer.

- Recovery Manager generates an include list, that contains a list of raw devices or file systems in the virtual copy and stores it in `/usr/openv/netbackup/include_list.policy_name` on the NetBackup client (backup host computer).
- Recovery Manager calls `bpbackup` from the NetBackup master server to initiate an immediate backup.
- NetBackup Scheduler process `bpbkar` processes the include list on the NetBackup client, backs up everything that is specified in the list.

When you initiate an automatic backup from the NetBackup Scheduler, the following occurs:

- NetBackup Scheduler process `bpbkar` calls `bpstart_notify.policy_name`, that is a script from Recovery Manager.
- Recovery Manager executes the script and creates a virtual copy of the database instance, that the Recovery Manager imports and mounts (if the datafiles reside on a file system) on the backup host computer.
- Recovery Manager generates an include list, that contains a list of raw devices or file systems in the virtual copy and stores it in `/usr/openv/netbackup/include_list.policy_name` on the NetBackup client (backup host computer).
- NetBackup Scheduler process `bpbkar` processes the include list on the NetBackup client, backs up everything that is specified in the list.
- NetBackup Scheduler process `bpbkar` calls `bpend_notify.policy_name`, that is a script from the Recovery Manager.
- Recovery Manager executes the script and keeps or removes the virtual copy from the backup host, depending on whether or not the *remove virtual copy after backup complete* flag has been set in the configuration file.

Configuring Recovery Manager

The Recovery Manager utilities: menu driven application and user graphic interface can be used to configure virtual copy.

The Recovery Manager configure utility creates a Recovery Manager configuration file for each database instance. All operations, that are available from Recovery Manager, requires this configuration file. After the Recovery Manager configuration file is created for a database instance, it will be stored at:

```
/etc/3par/solutions/<PRIMARYHOST>.<DBMS>.<DBNAME>/config
```

An equivalent environment file is also created for each configuration file. It contains all configuration options, that is specified in the configuration file. Recovery Manager uses the environment file instead. The environment file is also stored at the same location as the configuration file.

```
/etc/3par/solutions/<PRIMARYHOST>.<DBMS>.<DBNAME>/
config_exp.sh
```

If a configuration file of a database instance exists, it is overwritten. The permission of the configuration file is set to the owner.

Recovery Manager requires the following information:

- `ORACLE_SID` - The Oracle database instance ID.
- `ORACLE_HOME` - The Oracle home setting for `ORACLE_SID`.
- `ORACLE_OWNER` - Oracle Database Owner of this database instance.
- `ORACLE_INIT` - The Oracle Database Parameter file for this database instance.
- `ORACLE_PWDFILE` - The Oracle password file for this database instance if any.
- `PRIMARYHOST` - The primary host where the Oracle database instance is running.

- TPDHOST - The 3PAR Inserv Storage Server host name of the current host, which is defined in the 3PAR system. This might not be the UNIX host name.
- `Connection method (ssh)` – The connection method used to communicate among the backup host, the primary host and the InServ Storage Server(s). See *3PAR Recovery Manager for Oracle 2.2.3 Installation and Configuration Guide for Oracle on Red Hat Linux* for more details. Recovery Manager currently supports ssh.
- BACKTOOL - The backup tool to use for backup. VERITAS NetBackup is the only supported tool.

Creating a Virtual Copy

The Recovery Manager "create" utility creates a virtual copy of a database instance on the primary host, where the database instance is running. The virtual copy can be exported (and mounted if it contains file systems) to the backup host, that is the current system where this command is executed for other operations (backup or clone database).

If datafiles are symbolic links that point to actual files and the links do not reside on same file systems as the actual files, only the actual files are backed up. Otherwise, only the first links and the actual files are backed up; intermediate links are not backed up.

This utility can be used to create a virtual copy of an entire database instance for hot (online) or cold backup (offline), as well as a virtual copy of archive log destination only.

Displaying a Virtual Copy

The Recovery Manager's "display" utility displays all existing virtual copies of a specified Oracle database instance. If a virtual copy is specified, its detail information is displayed.

Mounting a Virtual Copy

The Recovery Manager's "mount" utility mounts an existing virtual copy to a backup host, that is the current host where this command is executed. The mounted virtual copy can be backed up or cloned.

The virtual copy must have 'Available' status to be mounted.

The mounting virtual copy operation includes creating a read-write virtual copy from a read-only virtual copy, importing it to the backup host, and mounting file systems, if any.

If ASM is used to manage database storage, only one virtual copy can be mounted and cloned at a time. The reasons for this are as follows:

- There is only one ASM instance on the backup host and the ASM disk group names are unique, multiple virtual copies from the same database have same disk groups, that cannot be mounted at the same time.
- Some of devices might still be held by ASM's idle processes even though the disks and disk groups have already been removed, therefore devices cannot always be reclaimed back on the backup host, which would cause mounting errors.
- Mount operation includes: startup +ASM instance, mounting ASM diskgroups on the backup host.

Unmounting a Virtual Copy

The Recovery Manager's "umount" utility unmounts the file system where a virtual copy is currently mounted. The read/write virtual copy is removed, as well as any components that were created during the **Mount Virtual Copy** stage.

The virtual copy must have *Mounted* status in order to be unmounted. Status of a virtual copy can be obtained using display utility like `vcdba_display` command.

If ASM is being used, unmounting includes: unmounting ASM diskgroups and shutting down +ASM instances on the backup host.

Exporting a Virtual Copy

The Recovery Manager's "export" utility exports an existing virtual copy to multiple alternate backup host. The exported virtual copy can then be mounted, backed up or cloned at an alternate backup host.

The virtual copy must have 'Available' status in order to be exported. An alternate backup host must have the same Operating System, file system, and volume manager version as the current backup host.

When mount option is involved, make sure the mountpoint at the alternate backup host exists and Recovery Manager has full access to the mountpoint. Status of a virtual copy can be obtained using display utility like `vcdba_display` command.

Only a super user or the owner of virtual copy can export it. Only a super user can change the ownership of a virtual copy at the alternate backup host.

Current 3PAR InServ Storage Server name is used to execute 3PAR InForm CLI command at the alternate backup host.

If an Oracle Database Administrator invokes this command, then an identical Oracle Database Administrator user ID and group ID must exist on the alternate backup host.

Secure shell connection must be set up between the backup host and the alternate backup host prior to executing this utility.

The alternate backup host can mount, umount, backup, restore exported virtual copies and remove the exported virtual copy's repository. Exported virtual copies cannot be removed from the alternate backup host.

Only the original backup host where the virtual copy is created can remove the virtual copy.

Cloning a Database

The Recovery Manager's `createdb` command utility creates a point-in-time database instance from an existing virtual copy. This virtual copy must be mounted on the current system where the command is executed.

The virtual copy that is used for creating the database instance must be created with either online or offline option.

The point-in-time database is created with minimal database configurations; only one archive log destination if any, one control file, two online redo logs (each per group). A new Oracle parameter file is created to reflect the changes in locations of control files and redo log files.

The new `init.ora` file and the control file are placed under `$ORACLE_HOME/dbs`. All parameters that have location specifications in the old `init.ora` file are removed, which means Oracle assigns a default location for them.

If the redo log location is not specified, the new redo logs are placed at:
`/etc/3par/solutions/<primary_host>.ora.<oracle_sid>/<timestamp>`

Each virtual copy has a saved Oracle parameter file. The saved file is located at:
`/etc/3par/solutions/<primary_host>.ora.<oracle_sid>/<timestamp>`

Modify this file to adjust parameters to fit available resources of the current system before running this utility.

Removing a Cloned Database

The Recovery Manager `removedb` command utility removes a point-in-time database instance that was created from a virtual copy using the `createdb` command utility.

When Recovery Manager removes a point-in-time database, the program shuts down the `cloned` database instance with the `shutdown immediate` option and remove the files created by the `createdb` command utility. The virtual copy remains mounted so the virtual copy can be reused to create the database.

While working on the point-in-time database, the changes do not affect the original database, and both databases can be running at the same time.

Removing a Virtual Copy

The Recovery Manager's "remove" utility removes an existing virtual copy from the InServ storage system. The virtual copy must have 'Available' status in order to be removed. The status of a virtual copy is obtained by using the display utility `vcdba_display`.

The Recovery Manager's remove utility only removes the read-only virtual copy from the system to free up the snapshot space. It does not actually remove the repository information if the virtual copy has been backed up to the media. This enables Recovery Manager to restore a virtual copy, which has been previously backed-up to the media to the original volume, as long as the virtual copy repository exists.

Exported virtual copy cannot be removed from the alternate backup host. Only the original backup host where a virtual copy is created can remove the virtual copy.

Removing a Virtual Copy Repository

Recovery Manager records important information for each virtual copy taken by the Recovery Manager utilities. The information can be used to restore the original volumes to the point-in-time stages when the virtual copy was taken. The information is stored in the repository at:

`/etc/3par/solutions/$PRIMARY_HOST.ora.$ORACLE_SID/<timestamp>`

The Recovery Manager's "remove repository" utility removes a virtual copy's repository. The virtual copy must have 'Removed' status in order for Recovery Manager to remove the repository. The status of a virtual copy can be obtained using the `vcdba_display` command.

If a virtual copy has been backed up by a third-party backup tool, `vcdba_rmrep` command fails unless the "`-f`" option is used.

Virtual Copy Policy

Recovery Manager provides the capability to limit the maximum number of online virtual copies allowed per database instance at a time.

For example, a policy can be set to only allow 12 online virtual copies at all times for a particular database instance, Recovery Manager recycles the oldest virtual copy with the latest created virtual copy. The system would always maintain the 12 latest virtual copies.

Rolling Back a Database from a Virtual Copy

When a database instance is corrupted, you can restore the database to the most recent database images from the most recently created virtual copy by using the `rollback` utility.

The Recovery Manager `rollback` utility rolls back datafiles from an online virtual copy backup image to the base virtual volume. The involved database virtual volumes must be offline, unmounted from the filesystem and cannot be exported to any hosts for this operation. The involved virtual copies cannot be exported to any host.

After the completion of the rollback to base volumes from the virtual copy, an Oracle ASCII control file `ascii_controlfile_for_rollback.sql` is created and stored at

`/etc/3par/solutions/<primaryhost>.<dbms>.<dbname>/<timestamp>`

to help recreate the binary control file and recover database for the primary database. In order to perform database recovery for the primary database, the `ascii_controlfile_for_rollback.sql` file has to be copied over and executed on the primary host.

Working with Third-Party Backup Tools

Read this section for general information regarding Recovery Manager functionality for working with third-party backup tools.

Backing Up a Database from a Virtual Copy

The Recovery Manager `backup` utility creates a new virtual copy for a database instance, if no virtual copy is specified. The virtual copy is then mounted to the backup host, which is the current host where this command is executed. If a backup tool is specified in the Recovery Manager

configuration file, the command invokes the backup tool to back up the mounted virtual copy.

If datafiles are symbolic links point to actual files, and the links do not reside on same file systems as the actual files, only the actual files are backed up. Otherwise, only the first links and the actual files are backed up. Intermediate links are not backed up.

This utility supports hot (online) and cold (offline) backup of an entire database instance, or archive log destination only backup.

When performing a hot backup, the involved database instance must be UP for this operation. All tablespaces are put in backup mode before a virtual copy is created. The tablespaces are taken out of backup mode after virtual copy creation is completed. The process of creating virtual copy usually takes only few seconds.

When performing a cold (offline) backup, the involved database must be DOWN for this operation. The database is started up using the mount option in order to retrieve lists of datafiles, online redo logs and control files. It then shuts down before a virtual copy of the database instance is created.

This utility also supports full and incremental backup of archive logs of the database instance. The involved database must be UP for this operation. The database instance is forced to switch logs before a virtual copy of archive logs is created.

Restoring a Database

The Recovery Manager `restore` utility restores datafiles from a virtual copy backup image to a specified common mount point on a specified host. The involved database must be offline (DOWN) for this operation to restore back to the original data location. Currently it only supports restoring from a backup image if the datafiles reside on file systems. If datafiles are raw devices, they can be restored manually using VERITAS NetBackup. Information regarding the original raw devices on the primary host and the corresponding raw devices in the virtual copy backup image are stored at:

`/etc/3par/solutions/<primaryhost>.ora.<dbid>>/<timestamp>/mapping.<backuphost>`

The restore operation is successful only if the specified virtual copy has a backup image. To determine if a virtual copy has a backup image, look at the Backup column of the virtual copy from the Recovery Manager `display` utility. If it shows N or `Backup key phrase`, there is no backup image for this virtual copy.

Depending on the type of the virtual copy backup image (cold, hot or archive log), other files are also restored appropriately.

When restoring from a cold backup image, only the datafiles are restored. Control files are not restored automatically. However, they can always be restored manually if needed using VERITAS NetBackup or with the `restore` command's `-c` option, which restores the control files as well.

When restoring from a hot backup image, datafiles and archive logs are restored. When restoring from an archive log backup image, only archive logs are restored.

The backup operation actually occurs on the backup host computer. Restoring a backup image from the backup host computer to the primary host computer is called alternate restore. NetBackup requires that a file name `/usr/openv/netbackup/db/altnames/primary_host_name` exists on the NetBackup master server.

Recovery Manager with Remote Copy

If Remote Copy is set up for a database, Recovery Manager's `rsync` utility can perform a periodic synchronization of Remote Copy volumes where the remote database resides.

This requires that Recovery Manger be configured for Remote Copy. See the *3PAR Recovery Manager Installation and Configuration Guide for Oracle on Redhat Linux* for instructions.

3 Verifying Recovery Manager Parameters

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Verifying Recovery Manager Installation

Recovery Manager must be installed on a primary host computer and a backup host computer. The primary host computer must be running Oracle8i, or Oracle9i Database. Database backups take place on the backup host computer.

If VERITAS® NetBackup[1] will be used, Recovery Manager must be installed on the NetBackup master server. To back up a virtual copy of a database instance from the backup host computer and to restore the backup to the

1 VERITAS NetBackup is a third-party software. 3PAR makes no representations or warranties with respect to such software.

primary host computer, you must install VERITAS NetBackup Client on both the backup and primary host computers.

Verify the Recovery Manager installation on both the primary and the backup host:

1. Log on as root.
2. Use the RPM command as follows:

```
[root@apex root]# rpm -qi VCDBAora
Name        : VCDBAora                      Relocations: (not relocatable)
Version     : 223 Vendor: 3PARdata, Inc.
Release     : 1                          Build Date: Fri 25 Aug 2006 09:44:47 PM PDT
Install Date: Mon 28 Aug 2006 10:58:21 AM PDT      Build Host: spinner
Group       : Applications/system           Source RPM: VCDBAora-223-1.src.rpm
Size        : 66528534                         License: 3PARdata, Inc.
Signature   : (none)
Packager    : John Smith <johnsmith@3pardata.com>
Summary     : Recovery Manager for Oracle on Linux
Description :
3PAR Recovery Manager for Oracle on Linux, it provides a set of utilities to perform
3PAR Virtual Copy administration for online backup, restore and off-host
processing.
```

3. Make sure that the following directories have proper permissions:
   - `/opt/3par/vcdbaora`
   - `/etc/3par/solutions`
   - `/etc/3par/solutions/log`
   - `/etc/3par/solutions/lock`

The default permissions of above directories and files allow only the root user to access Recovery Manager tools. To allow the Oracle administrator or a group of Oracle administrators of a database instance to access Recovery Manager, change the permissions of the above directories on all host computers, where Recovery Manager is installed. This must be done prior to creating any new database configurations.

To change the owner of the above directories to an Oracle database administrator, execute the following commands.

For example, the Oracle database administrator user name is `oracle` and group is dba.

```
#chown oracle.dba /opt/3par/vcdbaora
#chown oracle.dba /etc/3par/solutions
#chown oracle.dba /etc/3par/solutions/log
#chown oracle.dba /etc/3par/solutions/lock
chmod 550 /opt/3par/vcdbaora
```

If the `/etc/3par/solutions/<primaryhost>.ora.<oracle_sid>` directory exists, you must also change the owner and permission as follows:

```
# chown -R <user>:<group> /etc/3par/solutions/<primaryhost>.ora.<oracle_sid>
# chown root /etc/3par/solutions/<primaryhost>.ora.<oracle_sid>/config*
```

Verifying Recovery Manager Connection Method

Recovery Manager supports secure shell as the connection method.

Using Secure Shell as the Connection Method

This section describes the use of secure shell as the connection method.

Verifying Connection from the Primary Host to the InServ Storage Server

From the primary host, verify the connection from the primary host to the InServ Storage Server as follows.



NOTE: If you are prompted for a password, the setup is incorrect. See the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* for setting up a secure shell connection.

1 Log in to the primary host as root user.

2 Connect to InServ Storage Server system.

```
<primary host># ssh <username>@<ss_name>
```

where:

- <username> is the CLI user name.
- <ss_name> is the storage server system name having a connection to the primary host.

Verifying the Connection from the Backup Host to the InServ Storage Server

From the backup host, verify the connection from the backup host to the InServ Storage Server as follows.



NOTE: If you are prompted for a password, the setup is incorrect. See the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* for setting up a secure shell connection.

1 Log in to the backup host as root user.

2 Connect to InServ Storage Server system.

```
<back_host># ssh <username>@<ss_name>
```

where:

- <username> is the CLI user name.
- <ss_name> is the storage server system name having a connection to the backup host.

Verifying the Connection from the Backup Host to the Primary Host

From the backup host, verify the connection from the backup host to the primary host as follows.



NOTE: If you are prompted for a password, the setup is incorrect. See the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* for setting up a secure shell connection.

1. Log in to the backup host as root user.
2. Connect to the primary host.

```
<back_host># ssh root@<primary_host>
```

where <primary_host> is the primary host name where the database is located.

Verifying the Connection from the Primary Host to the Backup Host

From the primary host, verify the connection from the primary host to the backup host as follows.



NOTE: If you are prompted for a password, the setup is incorrect. See the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* for setting up a secure shell connection.

1. Log in to the primary host as root user.
2. Connect to the backup host.

```
<primary_host># ssh root@<backup_host>
```

where <backup_host> is the backup host name where the database is located.

Verifying the Connection from the Backup Host to the NetBackup Master Server

From the backup host, verify the connection from the backup host to the NetBackup master server as follows.



NOTE: If you are prompted for a password, the setup is incorrect. See the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* for setting up a secure shell connection.

1. Log in to the backup host as a root user.
2. Connect to the NetBackup master server.

```
<back_host># ssh root@<NBU_master>
```

where:

- <NBU_master> is the NetBackup master server name.

Verifying Recovery Manager Message Catalog Accessibility

1. Recovery Manager message catalog is installed in /opt/3par/vcdbaora/msg/en_US and the symbolic link is installed in /usr/lib/locale/C and /usr/lib/locale/en_US. To retrieve text messages properly, you must set the NLSPATH path.

```
# NLSPATH=$NLSPATH:/usr/lib/locale/%L/%N
# export NLSPATH
```

2 Verify locale setup, execute the following command:

```
#locale
      LANG=en_US
      LC_CTYPE="en_US"
      LC_NUMERIC="en_US"
      LC_TIME="en_US"
      LC_COLLATE="en_US"
      LC_MONETARY="en_US"
      LC_MESSAGES="en_US"
      LC_PAPER="en_US"
      LC_NAME="en_US"
      LC_ADDRESS="en_US"
      LC_TELEPHONE="en_US"
      LC_MEASUREMENT="en_US"
      LC_IDENTIFICATION="en_US"
      LC_ALL=
```

3 If LANG environment is not en_US, add the following lines to `.profile` or `.bashrc`.

```
LANG=en_US
LC_ALL=”en_US”
export LANG LC_ALL
```

or modify file `/etc/sysconfig/i18n`. Change LANG=en_US.

Verifying Recovery Manager Manual Pages

Recovery Manager provides manual pages in the `/opt/3par/vcdbaora/man` directory. To access the manual pages, you must define the environment variable MANPATH.

```
# echo $MANPATH/opt/3par/vcdbaora/man:
# export MANPATH
```

Verifying Recovery Manager Search Path

The Recovery Manager executables are stored in `/opt/3par/vcdbaora/bin`, and symbolic links are provided by Recovery Manager to `/usr/sbin`. You must add them to the search path.

```
# echo $PATH:/usr/sbin:/opt/3par/vcdbaora/bin:
# export PATH
```

4
Using Recovery Manager from the Menu-Driven Application

In this chapter

Starting Recovery Manager Menu-Driven Application 4.2

Creating a Recovery Manager Configuration File 4.2

Managing Virtual Copies 4.2

- Displaying Virtual Copies 4.4
- Creating a Virtual Copy 4.5
- Removing a Virtual Copy 4.7
- Mounting a Virtual Copy 4.8
- Unmounting a Virtual Copy 4.12
- Exporting a Virtual Copy 4.13
- Removing Virtual Copy's Repository 4.17
- Setting Virtual Copy Policy 4.18
- Performing Backup on Virtual Copies 4.19
- Performing Automatic Backup 4.21
- Performing a Restore on Virtual Copies 4.21
- Performing Periodic Remote Copy 4.24

Starting Recovery Manager Menu-Driven Application

```
<backup_host># /opt/3par/vcdbaora/bin/vcdba_main
```

Creating a Recovery Manager Configuration File

Refer to the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* on how to configure Recovery Manager.

Managing Virtual Copies

Recovery Manager provides tools to manage the virtual copies it creates. The tools allow for creating, removing, mounting and unmounting virtual copies.

To manage virtual copies:

1. Select menu option 2 (**Virtual Copy Management**).

```
3PAR Recovery Manager for Oracle

1. Configuration Administration
2. Virtual Copy Management
3. Backup Administration
4. Restore Administration
5. Remote Copy Administration

?. Help For Current Menu
X. Exit From Utility

Enter Selection -> 2
```

2 The **Virtual Copy Management** screen appears. Select a primary host and database configuration to work with.

```
3PAR Recovery Manager for Oracle

Virtual Copy Management: Select Host/Database Configuration

Primary Server Name              Database ID
-----------------------------    ------------
1.brydes                           PUB920
2.brydes                           PUB817


?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Select Configuration To Perform ->  [1 - 5 ,?,r,x]
1
```

3 The **Virtual Copy Management** screen appears.

```
 3PAR Recovery Manager for Oracle

 Virtual Copy Management: Host: minke Database: PROD

  1.  Display Virtual Copy
  2.  Create Virtual Copy
  3.  Remove Virtual Copy
  4.  Mount Virtual Copy
  5.  Unmount Virtual Copy
  6.  Remove Virtual Copy Repository
  7.  Virtual Copy Policy

  ?.  Help For Current Menu
  r.  Return To The Previous Menu
  x.  Exit From Utility

  Enter Selection ->
```

Displaying Virtual Copies

1 To display virtual copies, select menu option 1. (Display Virtual Copy)

```
3PAR Recovery Manager for Oracle

Virtual Copy Management: Host: minke Database: PROD

 1.  Display Virtual Copy
 2.  Create Virtual Copy
 3.  Remove Virtual Copy
 4.  Mount Virtual Copy
 5.  Unmount Virtual Copy
 6.  Remove Virtual Copy Repository
 7.  Virtual Copy Policy

 ?.  Help For Current Menu
 r.  Return To The Previous Menu
 x.  Exit From Utility

 Enter Selection ->
```

2 Select the Virtual Copy you want to display from the menu.

```
3PAR Recovery Manager for Oracle

Virtual Copy Management (Host: brydes, Database: PUB920)

Display Virtual Copy:

#  Name         Create Time                Type       Status       Backup?
 ============  ========================  ========  ==========  =======
1. 042805111341  Thu Apr 28 11:13:41 2005 Offline  Mounted     N
2. 042805104336  Thu Apr 28 10:43:36 2005 Offline  Removed     Y(Full)
3. 042705171113  Wed Apr 27 17:11:13 2005 Online   Available   Y(Full)
4. 042705163746  Wed Apr 27 16:37:46 2005 ArchLog  Available   Y(Incr)

?.  Help For Current Menu
r.  Return To The Previous Menu
x.  Exit From Utility

  Enter Selection ->
```

- Virtual copy 1, **042805111341**, indicates the virtual copy was taken while the database was offline. The virtual copy currently is **Mounted** but has not been backed-up to media.
- Virtual copy 2**, 042805104336**, indicates the virtual copy was taken while the database was offline and not accessible. The virtual copy has been **Removed** from the system but has been backed-up to media with full backup strategy **Y(Full)**.
- Virtual copy 3, **042705171113**, indicates the virtual copy was taken while the database was online. The virtual copy is currently online **Available** and is backed-up to media with full backup strategy **Y(Full)**.
- Virtual copy 4, **042705163746**, indicates the virtual copy was created on Wednesday, April 27 at 16:37:46 2005 with **Type** set to **ArchLog** (Archive Log Destination) when the back-up was created. The virtual copy is in a Status of online **Available** and has been backed-up to media as incremental backup strategy **Y(Incr)**.

Creating a Virtual Copy

1. To create a virtual copy, select menu option 2 (**Create Virtual Copy**).
2. Choose to create a virtual copy on the entire database (**d**) or only on the volume where the main archive log destination resides (**a**).

3 If you choose to create a virtual copy for the entire database, enter the database status, online (**o**) or offline (**f**).

```
 3PAR Recovery Manager for Oracle

 Virtual Copy Management: Host: minke Database: PROD

  1.  Display Virtual Copy
  2.  Create Virtual Copy
  3.  Remove Virtual Copy
  4.  Mount Virtual Copy
  5.  Unmount Virtual Copy
  6.  Remove Virtual Copy Repository
  7.  Virtual Copy Policy

  ?.  Help For Current Menu
  r.  Return To The Previous Menu
  x.  Exit From Utility

  Enter Selection -> 2

Do you want to create a virtual copy of entire
(d)atabase or (a)rchive log only? [d,a,q] d

Do you want to create a virtula copy while the database is
(o)nline or o(f)fline? [o,f,q]
```



NOTE: If a virtual copy is created offline, the database must be shutdown prior to creating the virtual copy. If you try to create an offline virtual copy with the database running, an error occurs.

Removing a Virtual Copy

1. To remove a virtual copy, select menu option 3 (**Remove Virtual Copy**).
2. Select the virtual copy to remove.

   The remove virtual copy utility only removes the virtual copy out from the system. It does not remove the repository information. Prior to being removed, if the repository still remains and the virtual copy is backed-up to media before being removed, you can restore to that point-in-time virtual copy from the backup image. The status of the virtual copy shows **Removed** after the virtual copy is removed.

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management: Server: brydes  Database: PUB920

1.      Display Virtual Copy
2.      Create Virtual Copy
3.      Remove Virtual Copy
4.      Mount Virtual Copy
5.      Unmount Virtual Copy
6.      Export Virtual Copy
7.      Remove Virtual Copy Repository
8.      Virtual Copy Policy

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection -> 3
```

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management (Host: brydes, Database: PUB920)

Remove Virtual Copy:

#  Name       Create Time               Type      Status      Backup?
============  ========================  ========  ========== =====
1. 042805111341  Thu Apr 28 11:13:41 2005 Offline Available  N
2. 042805104336  Thu Apr 28 10:43:36 2005 Offline Removed    Y(Full)
3. 042705171113  Wed Apr 27 17:11:13 2005 Online  Available  Y(Full)
4. 042705163746  Wed Apr 27 16:37:46 2005 ArchLog Available  Y(Incr)

        ?.      Help For Current Menu
        r.      Return To The Previous Menu
        x.      Exit From Utility

        Enter Selection -> 3

WARN: About to remove virtual copy '042705171113'. Continue?
[y,n,q] y
```

Mounting a Virtual Copy

1 To mount a virtual copy, select menu option 4 (**Mount Virtual Copy**).

```
      3PAR Recovery Manager for Oracle.

 Virtual Copy Management: Server: brydes  Database: PUB920

         1.      Display Virtual Copy
         2.      Create Virtual Copy
         3.      Remove Virtual Copy
         4.      Mount Virtual Copy
         5.      Unmount Virtual Copy
         6.      Export Virtual Copy
         7.      Remove Virtual Copy Repository
         8.      Virtual Copy Policy

         ?.      Help For Current Menu
         r.      Return To The Previous Menu
         x.      Exit From Utility

        Enter Selection -> 4
```

2 Select the virtual copy to be mounted.

```
            3PAR Recovery Manager for Oracle.

Virtual Copy Management (Host: brydes, Database: PUB920)

Mount Virtual Copy:

#  Name       Create Time                 Type   Status      Backup?
============  ======================  ========  ================
1. 042805111341  Thu Apr 28 11:13:41 2005 Offline Available  N
2. 042805104336  Thu Apr 28 10:43:36 2005 Offline Removed    Y(Full)
3. 042705171113  Wed Apr 27 17:11:13 2005 Online  Removed    Y(Full)
4. 042705163746  Wed Apr 27 16:37:46 2005 ArchLog Available  Y(Incr)

        ?.      Help For Current Menu
        r.      Return To The Previous Menu
        x.      Exit From Utility

        Enter Selection -> 4

Enter a mount point or press [Return] to mount it at default
location
[/etc/3par/solutions/brydes.ora.PUB920/042705163746]

Verifying read write virtual copy information...
Create read-write virtual copy and import to host 'minke' ...
Checking system configuration ...
Import VxVM diskgroup to host 'minke' ...
Mount all file systems ...
Virtual copy '042705163746' is mounted successfully at /etc/3par/
solutions/brydes.ora.PUB920/042705163746.

Press [Return] to continue
```



NOTE: Mounting a virtual copy is only available to the file system where the virtual copy resides.

For ASM managed databases, mounting a virtual copy starts up the +ASM instance on the backup host, and mounts all the ASM disk groups included in the virtual copy.

3 The Recovery Manager creates a read/write virtual copy from the read only virtual copy and provides a mount point to mount on, unless the

user changes to a different mount point. After the virtual copy is mounted to the host machine, the user can access the point-in-time image with any I/O transactions.

Mounting a Virtual Copy Using Egenera pServer as a Backup Host

1 Select menu option 4 (**Mount Virtual Copy**).

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management: Server: brydes  Database: PUB920

1.      Display Virtual Copy
2.      Create Virtual Copy
3.      Remove Virtual Copy
4.      Mount Virtual Copy
5.      Unmount Virtual Copy
6.      Export Virtual Copy
7.      Remove Virtual Copy Repository
8.      Virtual Copy Policy

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection -> 4
```

2 Select the virtual copy to mount.

```
   3PAR Recovery Manager for Oracle.

Virtual Copy Management (Host: brydes, Database: PUB920

        Mount Virtual Copy:

#  Name         Create Time               Type    Status     Backup?
============   ======================  ======== =================
1.042805111341  Thu Apr 28 11:13:41 2005 Offline Available  N
2.042805104336  Thu Apr 28 10:43:36 2005 Offline Removed    Y(Full)
3.042705171113  Wed Apr 27 17:11:13 2005 Online  Removed    Y(Full)
4.042705163746  Wed Apr 27 16:37:46 2005 ArchLog Available  Y(Incr)

        ?.      Help For Current Menu
        r.      Return To The Previous Menu
        x.      Exit From Utility

        Enter Selection -> 4
```

3 Select X to exit the Recovery Manager.



NOTE: At the end of step 4, the virtual copy is only partially mounted.

4 Follow the Egenera documentation for adding a new device to the Logical Processing Area Network (LPAN) and pServer.

5 Boot up the pServer.

6 Start Recovery Manager.

```
# /usr/bin/vcdba_main
```

7 Select menu option 4 (**Mount Virtual Copy**).

8 Select the same virtual copy again.

The virtual copy is mounted.

Unmounting a Virtual Copy

1. To unmount a virtual copy, select menu option 5 (**Unmount Virtual Copy**).
2. Select the virtual copy to unmount.

   This function unmounts the file system where the virtual copy is currently mounted. The read/write virtual copy is removed, as well as any components that was created during the **Mount Virtual Copy** stage.

   For ASM managed databases, unmounting a virtual copy shuts down the +ASM instance on the backup host, and unmounts all ASM disk groups included in the virtual copy.

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management: Server: brydes  Database: PUB920

1.      Display Virtual Copy
2.      Create Virtual Copy
3.      Remove Virtual Copy
4.      Mount Virtual Copy
5.      Unmount Virtual Copy
6.      Export Virtual Copy
7.      Remove Virtual Copy Repository
8.      Virtual Copy Policy

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

       Enter Selection -> 5
```

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management (Host: brydes, Database: PUB920

Unmount Virtual Copy:

#  Name         Create Time               Type    Status     Backup?
============   ======================  ======== =================
1.042805111341  Thu Apr 28 11:13:41 2005 Offline Available  N
2.042805104336  Thu Apr 28 10:43:36 2005 Offline Removed    Y(Full)
3.042705171113  Wed Apr 27 17:11:13 2005 Online  Removed    Y(Full)
4.042705163746  Wed Apr 27 16:37:46 2005 ArchLog Mounted    Y(Incr)

        ?.      Help For Current Menu
        r.      Return To The Previous Menu
        x.      Exit From Utility

        Enter Selection -> 3

WARN: About to unmount virtual copy '042705163746'. Continue?
[y,n,q] y

Verifying read write virtual copy information...
Un-mounting virtual copy ...
Unmount '/etc/3par/solutions/brydes.ora.PUB920/042705163746/PUB920/
PUB920_arch1' ... Success
Removing read-write virtual copy ...
Remove VLUN 'tpdsol0183_aw_042705163746' '1' from host 'minke'...
Success
Remove VLUN 'tpdsol0186_aw_042705163746' '2' from host 'minke'...
Success
Remove Virtual Copy tpdsol0183_aw_042705163746 ... Success
Remove Virtual Copy tpdsol0186_aw_042705163746 ... Success
Virtual copy '042705163746' is un-mounted successfully.

Press [Return] to continue
```

3 If using the Egenera pServer as a backup host, follow the Egenera documentation for removing a device from the PServer and LPAN.

Exporting a Virtual Copy

1 To export a virtual copy, select menu option 6 (**Export Virtual Copy**).

2 Select the virtual copy to be exported.

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management (Host: brydes, Database: PUB920)

Export Virtual Copy:

#  Name         Create Time               Type    Status     Backup?
============   ======================== ======== ================
1.042805111341  Thu Apr 28 11:13:41 2005 Offline Available N
2.042805104336  Thu Apr 28 10:43:36 2005 Offline Removed   Y(Full)
3.042705171113  Wed Apr 27 17:11:13 2005 Online  Removed   Y(Full)
4.042705163746  Wed Apr 27 16:37:46 2005 ArchLog Available Y(Incr)

        ?.      Help For Current Menu
        r.      Return To The Previous Menu
        x.      Exit From Utility

        Enter Selection -> 4


Do you want to export Virtual Copy '042705163746'? [y,n,q] y


Enter alternate backup host? bowhead

Do you want to mount Virtual Copy '042705163746'? [y,n,q] n

Do you want to Recovery Manager automatic detects and creates
virtual copy's repository at alternate backup host
or keep current time stamp configuration.
(a)uto or (k)eep config or (b)oth (n)one? n

Do you want to change the owner of current
virtual copy at alternate backup host? [y,n,q] n

WARN: About to export virtual copy '042705163746'. Continue?
[y,n,q] y
Verifying connection between 'minke' and 'nodeg34' ...
Verifying virtual copy '042705163746' ...
Backing up and updating virtual copy's repository...
Exporting virtual copy's repository ...
Exporting virtual copy's repository ...
Virtual copy '042705163746' is exported successfully to host 'bow-
head'.

Press [Return] to continue
```

The export virtual copy utility exports the modified virtual copy's repository out from the current backup host to an alternate backup host. Export virtual copy utility allows exporting a single virtual copy to multiple alternate backup hosts that connect to the same 3PAR InServ storage system.

3 Answer the following questions.

a **Enter alternate backup host.**

Provide host name where the virtual copy will be exported to.

b **Do you want to mount Virtual Copy** <name>**? [y,n,q]**

If you want to mount a virtual copy at an alternate backup host right after the virtual copy is exported, then type **y** and press ENTER.

If you only want to export the virtual copy, then type n and press ENTER.

- Enter a mount point or press Return to mount it at a default location.

  Provide the mount point, that will be used to mount the virtual copy at the alternate backup host.

c **Do you want Recovery Manager automatically....**

Export virtual copy options.

- **auto** creates current Recovery Manager's repository, `/etc/3par/solutions/<primary_host>.ora.<rdbms>`, at the alternate backup host if it does not exist. If current Recovery Manager's repository exists at the alternate backup host, it updates configuration information to reflect the alternate backup host's configuration.
- **keep Config** to avoid current time stamp configuration be overwritten when "auto" option is involved.
- **both** means "auto" and "keep config" options are involved.

- **none** means 3PAR Recovery Manager's repository, `/etc/3par/solutions/<primary_host>.ora.<rdbms>`, and its configuration files must exist (`config` and `config_exp.sh`) at the alternate backup host.

  Recovery Manager does not create Recovery Manager's repository on the alternate backup host and current time stamp's configuration modifies to reflect alternate backup host configuration.

d **Enter InServ Storage Server internal host name for the alternate backup host?**

Provides the 3PAR InServ Storage Server internal host name that represents the backup host on InServ Storage Server. The InForm CLI `showhost` command displays the list of host name defined in InServ Storage Server.

e **Enter 3PAR InServ user name who can access the InServ from the alternate backup host?**

Provides the InServ Storage Server's user name.

f **Do you want to change the owner of the virtual copy at the alternate backup host? [y,n,q]**

This option is enabled only if the current user is root. If you want to change the owner of the virtual copy's repository at the alternate backup host, then type **y** and press ENTER.

If **y** is selected, then:

- Enter the user name

  The user must exist on both the backup host and the alternate backup host.

- Enter a group name

  The group must exist on both the backup host and the alternate backup host.

Removing Virtual Copy's Repository

1 To remove a virtual copy repository, select menu option 7 (**Remove Virtual Copy Repository**).

```
3PAR Recovery Manager for Oracle.

Virtual Copy Management: Server: brydes Database: PUB920

1.      Display Virtual Copy
2.      Create Virtual Copy
3.      Remove Virtual Copy
4.      Mount Virtual Copy
5.      Unmount Virtual Copy
6.      Export Virtual Copy
7.      Remove Virtual Copy Repository
8.      Virtual Copy Policy

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection -> 7
```

2 Select the virtual copy repository to remove.

```
          3PAR Recovery Manager for Oracle.

    Virtual Copy Management (Host: brydes, Database: PUB920)

        Remove Virtual Copy' s repository:

#  Name         Create Time               Type     Status     Backup?
============   ======================== ======== ========== ================
1.042805111341  Thu Apr 28 11:13:41 2005 Offline Available N
2.042805104336  Thu Apr 28 10:43:36 2005 Offline Removed   Y(Full)
3.042705171113  Wed Apr 27 17:11:13 2005 Online  Removed   Y(Full)
4.042705163746  Wed Apr 27 16:37:46 2005 ArchLog Available Y(Incr)

        ?.      Help For Current Menu
        r.      Return To The Previous Menu
        x.      Exit From Utility

        Enter Selection -> 2
```

3 Confirm that the virtual copy is no longer needed before removing the repository on the virtual copy that displays the status as **Removed**.

Setting Virtual Copy Policy

1 To set the virtual copy policy, select menu option 8 (**Virtual Copy Policy**).

```
          3PAR Recovery Manager for Oracle.

 Virtual Copy Management: Server: brydes  Database: PUB920

 1.      Display Virtual Copy
 2.      Create Virtual Copy
 3.      Remove Virtual Copy
 4.      Mount Virtual Copy
 5.      Unmount Virtual Copy
 6.      Export Virtual Copy
 7.      Remove Virtual Copy Repository
 8.      Virtual Copy Policy

 ?.      Help For Current Menu
 r.      Return To The Previous Menu
 x.      Exit From Utility

Enter Selection -> 8
```

2 Enter the desired maximum number of virtual copies, 0 indicates unlimited.

3 The system now asks you to remove the oldest virtual copy when the maximum number of virtual copies is reached. Enter y or n.

4 Save this new policy. Enter y, n or q.



NOTE: If you do not wish to remove the oldest virtual copy while creating the new virtual copy, and the system contains the maximum number of virtual copies allowed, the virtual copy creation will fail.

Performing Backup on Virtual Copies

Performing Immediate Backup.

1 Select menu option 3 (**Backup Administration**) from main menu. .

```
3PAR Recovery Manager for Oracle.

1.      Configuration Administration
2.      Virtual Copy Management
3.      Backup Administration
4.      Restore Administration
5.      Remote Copy Administration

?.      Help For Current Menu
x.      Exit From Utility

Enter Selection ->
```



NOTE: The next screen brings up the configuration selection, select the desired primary target primary host and database to work with. After the configuration is selected, the program prompts to backup the existing virtual copy or by creating a new virtual copy before the backup to media.

2 Select the database to back up.

```
3PAR Recovery Manager for Oracle.

Backup Administration: Perform backup operation from backup
host

Primary Server Name                    Database ID
----------------------------     -----------------
1.      brydes                            PUB920
2.      brydes                            PUB817

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Select Configuration To Perform ->  [1 - 2 ,?,r,x] 1
Do you want to backup existing virtual copy? [y,n,q]
```

3 Do you want to backup existing virtual copy (y, n, q)?

If you answered n to backup existing virtual copy to media, the program creates the new virtual copy, and the next screen to appear allows selection of either Backup Entire Database or Backup Archive Logs Destination. .

```
3PAR Recovery Manager for Oracle.

Backup Administration: Perform backup operation from backup
host
1.      Backup Database
2.      Backup Archive Logs

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection ->
```



NOTE: If Veritas NetBackup is defined as the backup tool, and remove *the virtual copy* flag has been set after the virtual copy backup has completed, the virtual copy is removed automatically by 3PAR Recovery Manager after the Veritas NetBackup completes the task.

- Option 1. Backup Entire Database.

  Select this option to create a virtual copy of a database instance. If an online full backup is chosen, virtual copy contains all datafiles and archive logs. If offline full backup is chosen, the virtual copy contains only datafiles. A confirmation for a configuration file appears, that should have been already created. (See *Configuring Recovery Manager* on page 2.7). If NetBackup is specified in the configuration file, the virtual copy will be backed up to media by NetBackup.

  Each virtual copy is associated with a timestamp. The timestamp is when the virtual copy was created. Information about the virtual copy is saved in a timestamp directory under the 3PAR Recovery Manager repository directory. The saved information is used to manage the virtual copy or to restore a backup image of the virtual copy.

- Option 2. Backup Archive Logs Destination.

  Select this option to create a virtual copy of the archive log destination only. A prompt for a configuration file appears, that should have already created. (See *Configuring Recovery Manager* on page 2.7). If NetBackup is specified in the configuration file, a prompt to select a full or incremental backup of the virtual copy appears.

  Each virtual copy is associated with a timestamp. The timestamp is when the virtual copy was created. Information about the virtual copy is saved in a timestamp directory under the 3PAR Recovery Manager repository directory. The saved information is used to manage the virtual copy or to restore a backup image of the virtual copy.

Performing Automatic Backup

1. If NetBackup policies and a configuration file for a database instance are already created, NetBackup triggers a backup automatically..



NOTE: When configuring NetBackup policies to trigger automatic backups, specify a backup window for each schedule in each policy.



NOTE: If an Egenera server is used as a backup host, Recovery Manager does not support automatic backup.

Performing a Restore on Virtual Copies

It is possible to automatically restore a database only if the backup was created using NetBackup.

Notes on Restore:

- The backup operation occurs on the backup host computer. Restoring a backup image from the backup host computer to the primary host computer is called alternate restore. NetBackup requires that a file name `/usr/openv/netbackup/db/altnames/primary_host_name` exists on the NetBackup master server.

For example, to restore a backup image to brydes, the primary host computer creates an empty file named brydes in `/usr/openv/netbackup/db/altnames` on the NetBackup master server.

To perform restores:

1 Select menu option 4 (**Restore Administration**) from main menu.

```
3PAR Recovery Manager for Oracle.

1.      Configuration Administration
2.      Virtual Copy Management
3.      Backup Administration
4.      Restore Administration
5.      Remote Copy Administration

?.      Help For Current Menu
x.      Exit From Utility

Enter Selection -> 4
```

2 The Restore Administration screen appears. Select menu option 1 (**VERITAS NetBackup**).

```
3PAR Recovery Manager for Oracle.

Restore Administration: Perform restore operation from
backup host

1.      VERITAS NetBackup

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection -> 1
```

3 Select a database to back up.

```
3PAR Recovery Manager for Oracle.

Backup Administration: Perform backup operation from backup
host

Primary Server Name                    Database ID
----------------------------     -----------------
1.      brydes                          PUB920
2.      brydes                          PUB817

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Select Configuration To Perform ->  [1 - 2 ,?,r,x] 1
Do you want to backup existing virtual copy? [y,n,q]
```

Result: Recovery Manager displays a list of virtual copies. Each virtual copy is represented by virtual copy timestamp, actual backup timestamp, backup type, status and a flag to backup to media.

4 Choose a virtual copy to restore the database from its associated backup image.

```
3PAR Recovery Manager for Oracle.
Virtual Copy Management (Host: brydes, Database: PUB920)

Restore Virtual Copy:
#  Name        Create Time              Type    Status     Backup?
============   ======================== ======== =================
1.042805111341  Thu Apr 28 11:13:41 2005 Offline Available  N
2.042805104336  Thu Apr 28 10:43:36 2005 Offline Removed    Y(Full)
3.042705171113  Wed Apr 27 17:11:13 2005 Online  Removed    Y(Full)
4.042705163746  Wed Apr 27 16:37:46 2005 ArchLog Available  Y(Incr)

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection -> 2

Enter target client host name for restoring the backup image
[brydes] ?
```

5 Choose whether to restore the backup image that is associated with the selected virtual copy to its original location or to a common mount point on the primary or backup host computer.

Performing Periodic Remote Copy

1 Select menu option 5. (**Remote Copy Administration**)

```
3PAR Recovery Manager for Oracle.

1.      Configuration Administration
2.      Virtual Copy Management
3.      Backup Administration
4.      Restore Administration
5.      Remote Copy Administration

?.      Help For Current Menu
x.      Exit From Utility

Enter Selection -> 5
```

2 Select menu option 1, Periodic Synchronization.

```
3PAR Recovery Manager for Oracle.

Remote Copy Administration: Perform Remote Copy operation
from remote/backup host

1.      Periodic Synchronization

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Enter Selection -> 1
```

3 Select database to begin synchronization.

```
3PAR Recovery Manager for Oracle.

Backup Administration: Perform backup operation from backup
host

Primary Server Name                Database ID
-----------------------------     -----------------
1.brydes                           PUB920
2.brydes                           PUB817

?.      Help For Current Menu
r.      Return To The Previous Menu
x.      Exit From Utility

Select Configuration To Perform ->  [1 - 2 ,?,r,x] 1
```

4 When prompted, select o for online synchronization of the database.

```
Do you want to synchronize while the database is (o)nline or
o(f)fline? [o,f,q]
```

5 The periodic synchronization is started. A new periodic synchronization cannot start until the current one finishes. If another synchronization is attempted before the current operation completes, Recovery Manager returns an error. Issue the `showrcopy` command from the local InServ Storage Server to check the synchronization status (see the *InForm OS Command Line Interface Reference* for details). The time to finish the synchronization varies depending on data changes, IO, and network traffic.

5 Running Recovery Manager from the Command Line

In this chapter

vcdba_backup 5.3

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vcdba_display 5.11

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vcdba_umount 5.28

VCDBA_BACKUP

Backs up an existing virtual copy of a database instance, or creates and backs up a new virtual copy.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_backup -s oracle_sid -p
  primary_host [-t timestamp] [-o full|incr] -v
  ```

  Or

  ```
  /opt/3par/vcdbaora/bin/vcdba_backup -s oracle_sid -p
  primary_host [-o hotbkup|coldbkup|archonly[,full|incr]] -v
  ```

- DESCRIPTION

  The vcdba_backup command create a backup of a virtual copy of a database instance. If no virtual copy is specified, a new virtual copy is created for the database instance. The virtual copy is then mounted to the backup host, which is the current host where this command is executed. If a backup tool is specified in the configuration file, the command invokes the backup tool to back up the mounted virtual copy.

  If datafiles are symbolic links point to actual files, and the links do not reside on same file systems as the actual files, only the actual files are backed up. Otherwise, only the first links and the actual files are backed up; intermediate links are not backed up.

  This command supports hot (online) and cold (offline) backup of an entire database instance, or archive log destination only backup.

  When performing hot backup, the involved database instance must be UP for this operation. All tablespaces are put in backup mode before a virtual copy is created. The tablespaces are taken out of backup mode after virtual copy creation is completed. The process of creating virtual copy usually takes only few seconds.

  When performing cold (offline) backup, the involved database must be DOWN for this operation. The database is started up using the mount option in order to retrieve a list of datafiles, online redo logs and control files. It is then shutdown before a virtual copy of the database instance is created.

  The command also supports full and incremental backup of archive logs of a database instance. The involved database must be UP for this

operation. The database instance is forced to switch logs before a virtual copy of archive logs is created.



NOTE: vcdba_nbuconfig must be run at least once prior to the execution of the vcdba_backup command.



NOTE: If Egenera Pserver is used as the backup host, the vcdba_backup command must be performed on a mounted virtual copy.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host name, on which Oracle database instance is running.
  - `-t timestamp` - The timestamp of a virtual copy. It is also the name of the virtual copy. The virtual copy name can be obtained using `vcdba_display` command.
  - `-o hotbkup` - Creates a virtual copy of a database instance while it is online (UP). The created virtual copy contains all datafiles and archive logs. If VERITAS NetBackup is specified as the backup tool in the configuration file, the virtual copy is backed up along with the Oracle `init.ora` file, Oracle password file, Oracle configuration file, ascii and binary format of Oracle control files. The default behavior is to perform a hot backup of entire database.
  - `-o coldbkup` - Creates a virtual copy of a database instance while it is offline (DOWN). The created virtual copy contains all datafiles, and control files. If VERITAS NetBackup is specified as the backup tool in the configuration file, the virtual copy is backed up along with Oracle init, Oracle password, ascii and binary control files. The default behavior is to perform hot backup of entire database.

- `-o archlog[,full|incr]` - Creates a virtual copy of the main archive log destination only. If VERITAS NetBackup is specified in the configuration file, the created virtual copy is fully or incrementally backed up. The default behavior is to perform full backup of archive logs.
- `-v` - Run the command in verbose mode to display useful messages.

VCDBA_CONFIG

Creates a configuration file per database instance.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_config
  ```

- DESCRIPTION

  The `vcdba_config` command creates a configuration file per database instance. All operations, that are available from Recovery Manager, are based on information in the configuration. After a configuration is created for a database instance, it is stored at:

  ```
  /etc/3par/solutions/<PRIMARYHOST>.<DBMS>.<DBNAME>/config
  ```

  An environment file is created for each configuration file. It contains all configuration options, that are specified in configuration file. The Recovery Manager uses the environment file instead. The environment file is also stored at the same location as the configuration file.

  ```
  /etc/3par/solutions/<PRIMARYHOST>.<DBMS>.<DBNAME>/
  config_exp.sh
  ```

  If a configuration file of a database instance exists, it is overwritten. The permission of the configuration file is set to the owner.

  See *Configuring Recovery Manager* on page 2.7 for more information about how to configure Recovery Manager.

VCDBA_CREATE Creates a virtual copy of a database instance.

- SYNOPSIS

```
/opt/3par/vcdbaora/bin/vcdba_create -s oracle_sid -p
primary_host [-o hotbkup|coldbkup|archonly] [-v]
```

- DESCRIPTION

The `vcdba_create` command creates a virtual copy of a database instance on the primary host, where the database instance is running. The virtual copy then stays online and can be exported (and mounted if it contains file systems) to the backup host, which is the current system where this command is executed.

If datafiles are links point to actual files, and the links do not reside on same file systems as the actual files, only the actual files are backed up. Otherwise, only the first links and the actual files are backed up; intermediate links are not backed up.

This command supports hot (online) and cold (offline) backup of an entire database instance, as well as only on the archive log destination.

When performing hot backup, the involved database instance must be UP for this operation. All tablespaces are put in backup mode before a virtual copy is created. The tablespaces are put out of backup mode after virtual copy creation is completed. The process of creating virtual copy usually takes only few seconds.

When performing cold (offline) backup, the involved database must be DOWN for this operation. The database is started up using mount option in order to retrieve list of datafiles, online redo logs and control files. It is then shutdown before a virtual copy of the database instance is created.

The command also supports taking virtual copy for the archive logs of a database instance. The involved database must be UP for this operation. The database instance is forced to switch logs before a virtual copy of archive logs is created.

To make a cold backup for a RAC database, all instances have to be shut down, otherwise, the virtual copy backup might not be usable.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance. An environment variable to represent database identification.
  - `-p primary_host` - The host machine where Oracle database instance is running.
  - `-o coldbkup` - Create a virtual copy of a database instance while it is offline (DOWN). The created virtual copy contains all datafiles. If VERITAS NetBackup is specified as the backup tool in a configuration file, the virtual copy is backed up along with Oracle init, Oracle password, Oracle configuration, ascii and binary control files.
  - `-o hotbkup` - Create a virtual copy of a database instance while it is online (UP). The created virtual copy contains all datafiles and archive log files. If VERITAS NetBackup is specified as the backup tool in a configuration file, the virtual copy is backed up along with Oracle init, Oracle password, Oracle configuration, ascii and binary control files. The default behavior is to perform hot backup of entire database.
  - `-o archonly` - Create a virtual copy of archive log destination only.
  - `-v` - Run the command in verbose mode to display useful message.

VCDBA_CREATEDB Creates a new database instance from a virtual copy.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_createdb -s oracle_sid
  -p primary_host -t timestamp -n oracle_sid -h oracle_home [-
  d dir] [-v]
  ```

- DESCRIPTION

  The `vcdba_createdb` command creates a point-in-time database instance from an existing virtual copy. The virtual copy must be mounted on the current system where this command is executed.

  The virtual copy, which is used for creating the database instance, must be created with either online or offline option, can not be created with an archive log only option.

  The point-in-time database is created with minimal configurations. It has only one archive log destination if any, one control file, two online redo logs (each per group). A new Oracle parameter file is created to reflect the changes in the new location of the controlfile and archive log destination. The new parameter file and control file is placed under `$ORACLE_HOME/dbs`. All other parameters in the `init.ora` file that have path values are removed and, therefore, Oracle assigns default locations for them.

  Each virtual copy has a saved Oracle parameter file. The saved file is located at:

  `/etc/3par/solutions<primary_host>.ora.<oracle_sid>/<timestamp>`

  Users should modify this file to adjust parameters that depend on system resources to fit available resources of the current system before running this command.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host name, on which Oracle database instance is running.

- `-t timestamp` - The timestamp of a virtual copy. It is also the name of the virtual copy. The virtual copy name can be obtained using the `vcdba_display` command.
- `-n oracle_sid` - The new Oracle SID for the point-in-time database created in the current system.
- `-h oracle_home` - The Oracle home directory on the current system.
- `-d dir` - The directory used to store new online redo logs of a cloning database. If not specified, the new online redo logs are created at the location where the virtual copy is mounted. The `dir` directory must have enough available space to hold new online redo logs. Users who run this command must have write permission to this directory.
- `-v` - Run the command in verbose mode to display useful messages.

VCDBA_DISPLAY

Displays virtual copies.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_display -s oracle_sid -p
   primary_host [-t timestamp]
  ```

- DESCRIPTION

  The `vcdba_display` command displays all virtual copies created by the `vcdba_create` command for the specified Oracle instance name and the primary host name. With the extra optional timestamp information, it displays the detail information for the specific virtual copy.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID. An environment variable to represent the database identification.
  - `-p primary_host` - The host machine where the Oracle database instance is running.
  - `-t timestamp` - The timestamp of the virtual copy, it can be determined by running `vcdba_display` without the timestamp option.
  - `-o hist|orig` - `hist` option shows history of a virtual copy if it has been exported and the `orig` option shows the original host where the virtual copy was created.

- EXAMPLE

  ```
  vcdba_display -s TEST920 -p pilot.
  ```

```
  #Name          Create Time              Type           Backup?
 ============================================================
1. 012403154751 Fri Jan 24 15:47:51 2003 Offline Available  N
2. 012403154650 Fri Jan 24 15:46:50 2003 ArchLog Available  N
3. 012403153912 Fri Jan 24 15:39:12 2003 Online  Available  N
4. 012303174743 Thu Jan 23 17:47:43 2003 ArchLog Available  N
5. 012303171935 Thu Jan 23 17:19:35 2003 ArchLog Available  N
```

- EXAMPLE

```
vcdba_display -s TEST920 -p pilot -t 012405154751.
```

```
#Name                  Create Time                    Type       Status
Backup?
=============  ==================== ======    ======= =========
1. 012405154751     Fri Jan 24 15:47:51 2005     Offline      Available    N

Virtual Copy's Content:
       /demo/data/system01.dbf
       /demo/data/tools01.dbf
       /demo/data/rbs01.dbf
       /demo/data/temp_df.dbf
       /demo/data/users01.dbf
       /demo/data/users02.dbf
       /demo/arch
```

- EXAMPLE

```
vcdba_display -s TEST920 -p pilot -t 012405154751 -o hist
```

```
 Orig host      Export host  export#   Export options   Export time
========   ========  ======  ===========  =================
     minke --> bowhead      1            rconf                Fri Apr 29 15:24:20 PDT 2005
     minke --> bowhead      2            auto,kconf         Fri Apr 29 15:25:36 PDT 2005
```

- Orig host is original host name where virtual copy was created.
- Export host is host where virtual copy is being exported to.
- Export# is export serial number. This number is used in read-write virtual copy timestamp.
- Export Options is options that applied when virtual copy is exported.
- Export time is time when virtual copy is exported.

VCDBA_EXPORT

Export a virtual copy to an alternate backup host.

- SYNOPSIS

```
/opt/3par/vcdbaora/bin/vcdba_export -s oracle_sid -p
primary_host -t timestamp [-m mountpoint] -r alt_host [-u
alt_username -g alt_group] [-o mount] [-v]
```

Or

```
/opt/3par/vcdbaora/bin/vcdba_export -s oracle_sid -p
primary_host -t timestamp [-m mountpoint] -r alt_host [-u
alt_username -g alt_group] -o [mount,][auto[,kconf] -l
alt_tpd_hostname -e alt_tpdpwfile|alt_tpdusername]
```

- DESCRIPTION

The `vcdba_export` command can export a virtual copy created by the `vcdba_create` command to multiple alternate backup hosts that connect to the same 3PAR InServ storage system as the current backup host. The exported virtual copy can then be mounted, backed up or cloned at the alternate backup host.

Only a super user or the owner of a virtual copy can export it.

The virtual copy must have 'Available' status in order to be exported.

The alternate backup host must have the same file system and volume manager as the current backup host has. When mount option is involved, make sure mountpoint at the alternate backup host exists and Recovery Manager has full access to the mountpoint.

If '-m' option is specified, '-o mount' option can be omitted and current Recovery Manager repository must exist at the alternate backup host.

Current 3PAR InServ name is used to execute 3PAR InForm CLI command from the alternate backup host.

If an Oracle Database Administrator invokes this command then an identical Oracle Database Administrator user's ID and group's ID must exist on the alternate backup host.

If secure shell is currently the connection method from the backup host to the primary host and the InServ Storage Server, then secure shell

connection must be set up between the backup host and the alternate backup host prior to executing this command.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host name, on which the Oracle database instance is running.
  - `-t timestamp` - The timestamp of a virtual copy. It is also the name of the virtual copy. The virtual copy name can be obtained using vcdba_display command.
  - `-m mountpoint` - The destination location where the virtual copy is mounted. The current user must have permission to write to this location.
  - `-u username` - User who will own exported virtual copy's repository at the alternate backup host. Only super user can assign an owner to a virtual copy. Default user is the current user who invokes this command.
  - `-g group` - User Group who will own the exported virtual copy's repository at the alternate backup host. Only a super user can assign a group owner to a virtual copy. Default group is the current group which invokes this command.
  - `-o specific_options` - Specify mount, auto and kconf options in a comma separated (without spaces) format. If 'auto' or 'kconf' option is specified, '-l' and '-e' are required.
  - "mount" will mount the virtual copy at the alternate backup host. If '-m' option is not specified, default mount point is applied. Default mount point located at:
    `/etc/3par/solutions/<primary_host>.ora.<rdbms>/<timestamp>`
  - "auto" creates a current Recovery Manager repository `/etc/3par/solutions/<primary_host>.ora.<rdbms>` at the alternate backup host if it does not exist. If current Recovery Manager repository exists on the alternate backup host, it will update configuration information to reflect the alternate backup host

configuration. Current config and config_exp.sh files are modified using alternate backup host's config and config_exp.sh information.

- "kconf" is used to avoid current time stamp configuration be overwritten when "auto" option is involved.
- `-r alt_host` - The alternate backup host name.
- `-l alt_tpd_hostname` - TPD hostname is the hostname defined in InServ which represents the alternate backup host. InForm OS CLI command "showhost" will list all available TPD host names.
- `-e alt_tpdusername` - A 3PAR InServ user name that connects to the InServ from the alternate backup host.
- `-v` - Run the command in verbose mode to display useful messages.

VCDBA_HBA_UPDATE Updates HBA information for specified configuration files.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_hba_update -s oracle_sid -p
  primary_host [-t timestamp] [-r dryrun]
  ```

- DESCRIPTION

  The `vcdba_hba_update` command updates HBA information of specified Recovery Manager configuration files. This command is used to change HBA information in the Recovery Manager repository if the HBA card has been replaced with a different type or model.

- OPTION

  The following options are supported:

  `-s oracle_sid` - The Oracle database instance ID.

  `-p primary_host` - The host name, on which the Oracle database instance is running.

  `-t timestamp` - The timestamp of a virtual copy. It is also the name of the virtual copy. The virtual copy name can be obtained using the `vcdba_display` command.

  `-r dryrun` - Dry run only, no configuration files get updated.

VCDBA_MOUNT

Mount a virtual copy.

- SYNOPSIS

```
/opt/3par/vcdbaora/bin/vcdba_mount -s oracle_sid -p
primary_host -t timestamp [-m mountpoint] [-h
asm_orahome_bkup] -v
```

- DESCRIPTION

The vcdba_mount command mounts a virtual copy, created by the vcdba_create command, to a backup host, that is the current host where this command is executed. The mounted virtual copy can then be backed up or cloned. The virtual copy must have **Available** status in order to be mounted. After the virtual copy is mounted successfully, its status becomes **Mounted**.

The contents of the virtual copy must be the regular file in order to be mounted on the file system. The program accepts an alternate mount point with -m option, otherwise the default mount point is provided at:

```
/etc/3par/solutions/${PRIMARYHOST}.ora.${ORACLE_SID}/$
{TIMESTAMP}
```

Only a root user and the owner of the virtual copy can mount the virtual copy to the system, plus the write permission of the mount point is required.

For systems running the Egenera Blade Frame OS, shutdown the pServer prior to adding or removing devices. To mount a virtual copy, perform the following procedure.

If Egenera pServer is the backup host, perform the following steps.

1. Run the vcdba_mount command.

   The vcdba_mount command exits after creating a read-write virtual copy and exporting LUNs to the Control Blade.

2. Log on to the Control Blade and follow the Egenera documentation for scanning and adding devices to the pServer and Logical Processing Area Network (LPAN).

3 Run the vcdba_mount command again, this time with the -r option.

The vcdba_mount command continues mounting the virtual copy to the designated mount point.

- OPTIONS

The following options are supported:

- -s oracle_sid - The Oracle database instance ID.
- -p primary_host - The host machine where Oracle database instance is running.
- -r - Remounts the selected virtual copy.
- -t timestamp - The timestamp of the virtual copy, it can be determined by running vcdba_display command.
- -m mountpoint - The destination on the backup host where the virtual copy will be mounted.
- -c Active host bus adapter number - This option is for a QLogic failover HBA. If you have more then one controller, ensure you enter the active HBA number. The directory where the HBA numbers are located is /proc/scsi/qla2300. Check for the active HBA number.

  This option is used if the HBA number in Recovery Manager's configuration file: /etc/3par/solutions/<primary_host>.<rdbms>.<oracle_sid>/config or in configuration of time stamp repository: /etc/3par/solutions/<primary_host>.<rdbms>.<oracle_sid>/<timestamp>/config is different from the current active host HBA number. This case might happen when one of the path fails and the system is being rebooted or HBA is being re-allocated to a different adapter. The -c option is only a temporary change to the Recovery Manager's configuration.

  Use of the vcdba_ctmod command changes the HBA number in Recovery Manger's configuration permanently.
- -h asm_orahome_bkup – The ASM Oracle home on the backup host.
- -v Runs the command in verbose mode to display useful messages.

VCDBA_NBUCONFIG

Creates bpstart_notify and bpend_notify scripts for VERITAS NetBackup policies.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_nbuconfig -s oracle_sid -p
  primary_host
  ```

- DESCRIPTION

  The vcdba_nubconfig command creates bpstart_notify and bpend_notify scripts for VERITAS NetBackup policies, that are specified in the configuration files.

  The bpstart_notify and bpend_notify scripts will then be copied to /usr/openv/netbackup/bin directory on the backup host, which must also be a NetBackup client.

- OPTION

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host machine where the Oracle database instance is running.

VCDBA_REMOVE

Removes a virtual copy.

- SYNOPSIS

```
/opt/3par/vcdbaora/bin/vcdba_remove -s oracle_sid -p
primary_host -t timestamp [-v]
```

- DESCRIPTION

  The `vcdba_remove` command removes a virtual copy created by `vcdba_create` command by specifying the timestamp.

  When performing `vcdba_remove` to remove virtual copy, the program will check to see if the virtual copy has been mounted to a host machine. Virtual copy must be in "Available" status before it can be removed.

  If the virtual copy has been backed up to media, even after it has been removed, the virtual copy repository used by Recovery Manager will remain. This is to provide the restore capability even after the virtual copy has been removed from the system.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host machine where the Oracle database instance is running.
  - `-t timestamp` - The timestamp of the virtual copy, it can be determined by running `vcdba_display` command
  - `-v` - Run the command in verbose mode to display useful message.

VCDBA_REMOVEDB

Removes a database instance created from a virtual copy (via the `vcdba_createdb` command).

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_removedb -s oracle_sid
  -p primary_host -t timestamp -n oracle_sid -h oracle_home
  [-v]
  ```

- DESCRIPTION

  The `vcdba_removedb` command removes a point-in-time database instance that is created from a virtual copy using the `vcdba_createdb` command.

  When using the `vcdba_removedb` command to remove a point-in-time database, the program will shutdown the cloned database instance with the shutdown immediate option and remove the common files created by `vcdba_createdb`. The virtual copy will remain mounted so the virtual copy can be reused to create the database.

  While working on the point-in-time database, the changes will not affect the original database, both databases can be running at the same time.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host name, on which Oracle database instance is running.
  - `-t timestamp` - The timestamp of a virtual copy. It is also the name of the virtual copy. The virtual copy name can be obtained by using the `vcdba_display` command.
  - `-n oracle_sid` - The cloned Oracle SID for the point-in-time database in the current system.
  - `-h oracle_home` - The Oracle home directory of the cloned database instance in current system.
  - `-v` - Run the command in verbose mode to display useful messages.

VCDBA_RESTORE Restores datafiles from a virtual copy backup image.

- SYNOPSIS

```
/opt/3par/vcdbaora/bin/vcdba_restore -s oracle_sid -p
primary_host -t timestamp [-h <hostname>] [-m <mountpoint>]
[-c] [-v]
```

- DESCRIPTION

  The vcdba_restore command restores datafiles from a virtual copy backup image to a specified common mount point on a specified host.

  The restore operation is successful only if the specified virtual copy has a backup image. To determine if a virtual copy has a backup image, look at the *Backup* column of the virtual copy from the `virtual_display` command. If it shows **N**, then there is no backup image for this virtual copy.

  Depending on the type of the virtual copy backup image (offline, online, or archive log), files will also get restored appropriately.

  When restoring from an offline backup image, only datafiles are restored. Online redo logs and control files are not restored automatically. However, they can always be restored manually if needed using VERITAS NetBackup, or run the command with the `-c` option to restore the control file.

  When restoring from an online backup image, datafiles and archive logs are restored.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host machine where Oracle database instance is running.
  - `-t timestamp` - The timestamp of the virtual copy, it can be determined by running `vcdba_display` command
  - `-v` - Runs the command in verbose mode to display useful messages.
  - `-c` - Restores the control file.

- `-h` - Host machine where the backup image is restored to.
- `-m` - Mount point where the backup image is restored to.

VCDBA_RMREP

Removes a virtual copy repository.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_rmrep -s oracle_sid -p
  primary_host -t timestamp [-f] [-v]
  ```

- DESCRIPTION

  The `vcdba_rmrep` command removes a virtual copy repository which created by `vcdba_create` and `vcdba_config` commands. The virtual copy must have 'Removed' status in order for Recovery Manager to remove the repository. Status of a virtual copy can be obtained by using `vcdba_display` command. If the virtual copy has been backed up through a third party backup tool, `vcdba_rmrep` will fail unless `-f` option is used.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host name, on which Oracle database instance is running.
  - `-t timestamp` - The timestamp of a virtual copy. It is also the name of the virtual copy. The virtual copy name can be obtained using the `vcdba_display` command.
  - `-f` - Forces the removal of the virtual copy repository even though the virtual copy has been backed up through a third-party backup tool.
  - `-v` - Run the command in verbose mode to display a useful message.

VCDBA_ROLLBACK Rolls back database volumes from an online virtual copy.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_rollback -s oracle_sid -p
  primary_host -t timestamp [-o data|arch] [-v] [-w]
  ```

- DESCRIPTION

  The `vcdba_rollback` command rolls back datafiles from a virtual copy backup image to the base virtual volumes. The involved database virtual volumes must be offline, unmounted from file system and cannot be exported to any hosts for this operation. The involved virtual copies cannot be exported to any host. After the completion of the roll-back to the base volume from the virtual copy, an Oracle ASCII control file `ascii_controlfile_for_rollback.sql` is created and stored at:

  ```
  /etc/3par/solutions/<primaryhost>.<dbms>.<dbname>/
  <timestamp>
  ```

  This is to help re-create a binary control file and recover the database for the primary database. In order to perform database recovery for the primary database, the `ascii_controlfile_for_rollback.sql` file has to be copied over and executed on the primary host.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host machine where the Oracle database instance is running.
  - `-t timestamp` - The timestamp of the virtual copy. It can be determined by running the `vcdba_display` command.
  - `-v` - Run the command in verbose mode to display useful message.
  - `-w` - Run the command with read-write virtual copy, the default is rollback with read-only virtual copy.

- `-o data` - Only rollback virtual volumes where database data files are located.
- `-o arch` - Only rollback virtual volumes where database archive logs are located.

VCDBA_RSYNC

Perform periodic synchronization from volumes in local InServ to corresponding volumes in remote InServ for the primary database which is configured.

- SYNOPSIS

  ```
  /opt/3par/vcdbaora/bin/vcdba_rsync -s oracle_sid -p
  primary_host -o [hotbkup|coldbkup|checkonly] [-v]
  ```

- DESCRIPTION

  The `vcdba_rsync` pushes the changed data over to the remote InServ from volumes in the local InServ used by the primary database. It can be used when the database is online, with archive log enabled (hotbkup), or when the database is offline (coldbkup). Hotbkup pushes changed data for all volumes used by datafiles and archive log destination; coldbkup pushes changed data for all volumes used by datafiles only.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host machine where Oracle database instance is running.
  - `-o hotbkup` - Perform the synchronization when database is up and archive log mode is enabled.
  - `-o coldbkup` - Perform the synchronization when database is down.
  - `-o checkonly` - Verify Remote Copy configuration only.
  - `-v` - Runs the command in verbose mode to display useful messages.

VCDBA_UMOUNT Unmounts a virtual copy.

- SYNOPSIS

```
/opt/3par/vcdbaora/bin/vcdba_umount -s oracle_sid -p
primary_host -t timestamp [-c HBA_number] [-f ] [-v]
```

- DESCRIPTION

  The vcdba_umount command unmounts a currently mounted virtual copy, that is specified as a timestamp. The contents of the virtual copy must contain the file system, or ASM information.

  When performing vcdba_umount to unmount a virtual copy, the program checks if the virtual copy was mounted to a host machine. Virtual copy must be in the mounted stage before it can be unmounted.

  The program can accept the force unmount with `-f` option.

  For systems running the Egenera Blade Frame OS, shutdown the pServer prior to adding or removing devices. To unmount a virtual copy, perform the following steps.

  If Egenera pServer is the backup host, perform the following steps.

1. Run the vcdba_umount command or select menu option 5 (Unmount Virtual Copy) from the Recovery Manager menu-driven application. The vcdba_umount command unmounts the virtual copy and cleans up 3PAR® LUNs and read-write virtual copy that is exported to the Control Blade.
2. Log on to the Control Blade and follow the Egenera documentation for removing devices from the pServer and LPAN.

- OPTIONS

  The following options are supported:

  - `-s oracle_sid` - The Oracle database instance ID.
  - `-p primary_host` - The host machine where Oracle database instance is running.
  - `-t timestamp` - The timestamp of a virtual copy, it can be determined by running vcdba_display command.

- `-d Active host bus adapter number` - Use this option to unmount a virtual copy if the HBA number has been changed since the virtual copy was mounted. This option is only for the QLogic failover driver.
- `-f` - Forcibly unmounts a virtual copy. Without this option, unmount does not allow a virtual copy to be unmounted if a file on the file system is busy. Using this option can cause data loss for open files; programs that access files after the file system has been unmounted gets an error.
- `-v` - Runs the command in verbose mode to display useful messages.

6 Using the Recovery Manager GUI Interface

In this chapter

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- Stopping the GUI 6.3

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Modifying Configuration Files 6.3

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Starting and Stopping the Recovery Manager GUI

The Recovery Manager graphical user interface (GUI) is installed when the VCDBAora package is installed.

Starting the GUI

1. Ensure the VCDBAora package is installed.

```
/bin/rpm -q -i VCDBAora
```

2. Ensure the DISPLAY environment variable is set.
3. Ensure the X11 server is running on the destination host where the GUI is displayed. If the X11 server is not running, enter the following command:

```
/usr/X11R6/bin/xhost +
```

4 Type the following command in an open terminal:

```
/opt/3par/vcdbaora/bin/vcdbagui
```

5 Press **Enter**.

Stopping the GUI

1 Select **Console** from the menu bar.

2 Select the **Exit** menu item from the pull-down **Console** menu.

Creating Configuration Files

Recovery Manager relies on configuration files for most of its operations. There are two types of configuration files, one for off host backup and one for Remote Copy.

If ASM is being used, all volumes that are in the same ASM disk group as the data files or archive log destinations, must be assigned to the appropriate Remote Copy groups.

Refer to *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Red Hat Linux* for details on how to create configuration files with or without Remote Copy features.



NOTE: If the repository already exists before a new configuration is created, you cannot continue. Use the existing configuration, modifying it as needed, removing the existing directory if it is no longer used, or renaming the `.dbms.` portion to anything else, so that Recovery Manager ignores it.

Modifying Configuration Files

Configuration files can only be modified from the host node level. Modifications are made in the `config` and `config_exp.sh` files in the repository. This does not affect the existing virtual copies because the two configuration files that are in the virtual copy timestamp directory are not changed.

Removing Configuration Files

Configuration files can be removed if virtual copies for the configuration are no longer needed.

When removing the configuration, if virtual copy timestamp directories exist under the repository directory, Recovery Manager removes all other files and directories except the timestamp directories. NBU backup or restore can still be run for those virtual copies. However, no new virtual copies can be created.

If there are no time stamp directories, Recovery Manager will remove the entire repository directory.

Using Virtual Copies

Creating a Virtual Copy

You can create a virtual copy of a database instance on the primary host at any time. This feature supports hot (online) and cold (offline) backup of an entire database instance as well as only on the main archive log destination.

Creating a virtual copy requires database type, primary host name and database identification. Perform this function through menu, tool bar and popup menu.

- Hot (Online) backup option - The involved database instance must be up for this operation. All tablespaces are put in backup mode before virtual copy is created. After the virtual copy creation is completed, tablespaces are taken out of backup mode.
- Cold (Offline) backup option - The involved database instance must be down for this operation. The database information like online redo logs, list of datafiles and control files are collected.
- Archive Log Only option - The involved database instance must be up for this operation. The database instance is forced to switch logs before a Virtual Copy of archive logs is created.

To create a virtual copy, perform the following procedure:

1. Select **Virtual Copy Management** from the navigation view.

2 Select **Create Virtual Copy** from the **Virtual Copies** pull-down menu.

Or:

Right click on **Virtual Copy Management** from the navigation view and select **Create Virtual Copy** from the popup menu.

3 Select the desired options (online, offline, entire database, or archive log only) from the dialog box.

4 Select **Finish**.



NOTE: The process of creating a virtual copy will take a few minutes depending on your database instance.

Setting up Virtual Copy Policy

This feature allows the control of the number of virtual copies on a 3PAR InServ Storage Server. When the maximum number of virtual copies is reached, the oldest copy can either be removed or retained.

- Remove the oldest virtual copy option - If the maximum number of virtual copies is reached, the oldest virtual copy is removed before the new virtual copy is created.
- Retain the oldest virtual copy option - If the maximum number of virtual copies is reached, the oldest virtual copy is retained and the new virtual copy is created.

To create a virtual copy policy, perform the following procedure:

1 Select **Virtual Copy Management** from the navigation view.

2 Select the **Virtual Copy Policy** menu from the **Virtual Copies** pull-down menu.

or:

Right-click on **Virtual Copy Management** from the navigation view and select **Refresh** from the popup menu.

3 Enter the maximum number of virtual copies to be kept, in the text field.

4 If you want to remove the oldest virtual copy, select **Remove oldest virtual copy** option. If you want to keep the oldest virtual copy, select **Retain oldest virtual copy** option.

5 Click **Finish**.



NOTE: The virtual copy policy is effective immediately.

Refreshing Virtual Copy Information

You can update virtual copy information that includes Backup Type, Backup Key, Mount point and Virtual Volume State. If a new virtual copy is created outside of the Recovery Manager GUI, it is added to the navigation view.

1 Select **Virtual Copy Management** from the navigation view.

2 Select **Refresh** from the **Virtual Copies** pull-down menu.

or:

Right click on **Virtual Copy Management** from the navigation view and select **Virtual Copy Policy** from the popup menu.



NOTE: The refresh process begins immediately. It will take a few minutes depending on the number of virtual copies in the Recovery Manager repository.

Mounting a Virtual Copy

After a virtual copy is created, it can be mounted on the backup host where the Recovery Manager GUI is running. At any time, only one virtual copy for the same database can be mounted.

To mount a virtual copy, perform the following procedure:

1 Right click the virtual copy name, for example: 022603172047.

2 Select the **Mount** button in the menu.

Result: A screen appears showing the virtual copy name, creation time and asking for the mount point where you want the virtual copy being mounted on the backup host, the default mount point is:
`/etc/3par/solutions/<primaryhost>.ora.<dbid>/virtualcopyname`

Example: `/etc/3par/solutions/pilot.ora.TEST920/022603150246`

If databases are managed using ASM, the ASM Oracle home on the backup host is required during `vcdba_mount`.

3 The mount point might be changed. Select **Finish**.

Result: Recovery Manager starts mounting all the file systems for you.

Result: When the mounting of the file systems is done, a screen displays the successful message.

4 Click **OK**.



NOTE: The **Virtual Volume State** column, for this virtual copy, displays **Mounted**, indicating the virtual copies are mounted on the backup host. The mount point is also displayed indicating the location of the mounted file systems.

After a virtual copy is in the *Mounted* state, a database instance can be created on the backup host by *Cloning a Database* on page 6.12.

Unmounting a Virtual Copy

After a virtual copy is in the *Mounted* state, an *Unmount* operation can be executed.

To unmount a virtual copy:

1 Right click a virtual copy name, for example: 022603150246.

2 Select **Umount** to start unmounting the file systems.

3 Select **Yes** on the confirmation message to continue.

Result: Wait for Recovery Manager to unmount the file systems. A successful message will show on screen after it is finished.

4 Select **OK**. The **Virtual Volume State** column for this virtual copy changes to **Available**.

Removing a Virtual Copy

After the **Virtual Volume State** column displays **Available**, the virtual copy can be removed.



CAUTION: "Remove" means the virtual copy is permanently removed from the InServ.

To remove a virtual copy:

1. Right click the virtual copy name, for example: 022603172047.
2. Select **Remove Virtual Copy**.

   Result: A confirmation message appears asking to confirm the removal of the virtual copy.
3. Select **Yes**.

   Result: Wait until Recovery Manager finishes removing the virtual volumes from the InServ. A confirmation success screen appears.
4. Select **OK**.
5. **Result:** The virtual copy is removed from the virtual copy management list.

Backing Up a Virtual Copy

If a virtual copy is in the **Available** state, it can be backed up. If a virtual copy is in the **Mounted** or **Database** state, it needs to be to unmounted first prior to being backed up.

To backup a virtual copy:

1. Right click the virtual copy to be backed up to media using Veritas NetBackup.
2. Select **Backup to Media**.



NOTE: For an entire database backup, Recovery Manager performs a full backup instead of an incremental backup. For archive log destination backups, there are two choices; either perform a full backup or perform a differential backup.

3 Select **Finish**.

Result: Recovery Manager starts the backup process. NetBackup is running in the background. If NetBackup is started, a successful start message displays.

Removing a Virtual Copy Repository

Removing a repository means removal of the entire timestamp repository, including all the files under it, on the backup host, for a specific virtual copy.

Normally, when the virtual copy is removed, the repository is deleted. But, if you have already backed up the virtual copy using NetBackup, the repository will not be automatically removed. It will be kept to apply the NBU restore operations if necessary or checks other information related to this virtual copy. After it is removed, all information related to this virtual copy set is lost.

1 Right click the virtual copy name to be removed from the entire repository.

2 Select **Remove Virtual Copy Repository**.

Result: A confirm message appears.

3 Select **Yes**.

Result: The removed repository is no longer shown on the virtual copy management screen.

Restoring Datafiles

If Veritas NetBackup is used to back up datafiles, NetBackup can be used to restore datafiles to the primary host, backup host or any other hosts where the NBU clients for the same NBU master server are configured.

If the virtual copy is being backed up using NetBackup, the backup key has the format: `dbid_primaryhost_virtualcopyname`, the backup method is NBU.

1 Right click the virtual copy.

2 Select **Restore**.

Result: A screen appears showing this virtual copy set information and asks for the host name and mount point to where to restore the

datafiles. If the mount point is left blank, files are restored to their original paths as on the primary host on the host name provided.

3 Select **Finish**.

Result: Recovery Manager starts the restoring process using NBU restore.

Refreshing Database Information

On the left hand tree, when **Tablespace**, **Datafiles**, **Archive Log** or **Virtual Volumes** is selected, they can all be refreshed by right clicking the node or selecting the **Refresh** image from the tool bar. Recovery Manager retrieves all the information from the primary database. This might take a while depending on the network speed, whether or not using volume management, etc. All mappings are only for informational purposes, they cannot be modified. All mappings reflect the current database and virtual volumes information if the primary database is accessible.

Exporting a Virtual Copy to an Alternate Backup Host

After a virtual copy is created, it can be exported to an alternate backup host (see also *Exporting a Virtual Copy* *on page 2.9*).

Export a virtual copy as follows:

1 Right-click the virtual copy name and choose **Export**.

The **Export Virtual Copy** screen appears.

2 On the **Export Virtual Copy** screen, provide the following information:

- **Alternate Backup Host Name**: the name of the host to which the virtual copy will be exported.
- **User Name**: the user who will own the exported virtual copy's repository on the alternate backup host. Only super user can assign an owner to a virtual copy. The default user (owner) is the user who invokes the command. This text field is only enabled if you are logged in as the root user.
- **Group Name**: The User group name that owns the exported virtual copy's repository on the alternate backup host. Only super user can assign a group owner to a virtual copy. The default group is the group that invokes the command. This text field is only enabled if you are logged in as the root user.

- **Mount Virtual Copy**: Select this checkbox if you want to mount the virtual copy after it is exported.
  - **InServ Name**: Name of the storage server connected to the alternate backup host.
  - **InServ User Name**: storage server user name for the alternate backup host.
  - **Backup Host Name in InServ**: storage server internal host name for the alternate backup host.
- **Mount Point**: (Optional). If you want to export the virtual copy on a specific directory on the alternate backup host, specify a mount point. If the Mount Virtual Copy checkbox is checked and this text field is empty, the virtual copy is mounted on the default mount point on the alternate backup host:

  `/etc/3par/solutions/<primary_host>.ora.<dbid>/<timestamp>`
- **Configuration Options** (select options using radio buttons):
  - **Remote Configuration**: Requires an existing virtual copy repository for the current database on the alternate backup host. After the virtual copy is exported, its configuration is overwritten by the alternate backup host configuration.
  - **Keep Configuration**: Requires an existing virtual copy repository for the current database on the alternate backup host. Choose this option to avoid the current time stamp configuration from being overwritten.
  - **Auto, Remote Configuration**: Creates the Recovery Manager repository (`/etc/3par/solutions/<primary_host>.ora<dbid>`) on the alternate backup host if it does not already exist. If the repository exists, this option updates configuration information to reflect the alternate backup host configuration. The current `config` and `config_exp.sh` files in the timestamp directory is modified by using alternate backup host's configuration information.

- **Auto, Keep Configuration**: Creates the Recovery Manager repository (`/etc/3par/solutions/<primary_host>.ora<dbid>`) on the alternate backup host if it does not already exist. If the repository exists, this option does not update the configuration information. The current `config` and `config_exp.sh` files in the timestamp directory will not be modified.

3 Click **Finish** to start exporting the virtual copy.

Viewing the Exporting Virtual Copy History

After a virtual copy is exported, its export history will be maintained.

To view export information for a virtual copy:

1 Right-click the virtual copy name and choose **Export history**.

Result: The **Exported History Properties** tab appears.

The **Properties** tab displays the following information:

- **From**: the original host name where the virtual copy was created.
- **To**: the host to which the virtual copy is exported.
- **ID**: export serial number. This number is used in read-write virtual copy timestamps.
- **User**: the user who owns the exported virtual copy on the alternate backup host.
- **Options**: the options that were applied when the virtual copy was exported.
- **Date**: time when the virtual copy was exported.

2 When finished, click **OK**.

Cloning a Database

Each online virtual copy created by Recovery Manager represents the point-in-time database image. Recovery Manager can then use virtual copy, not only to help restore the database, it also provide the database cloning capability for testing, decision support, and report generating out from the primary database to reduce the performance impact.

In order to create the cloning database from virtual copies, these virtual copies must be created by Recovery Manager with entire database option either online or offline.

The database cloning function can be executed by command line utility or Graphic User Interface, the cloned database will be created on the backup host.

1. Select a virtual copy with the **Virtual Volume** status displaying **Available**.
2. Right-click on the virtual copy to be cloned and select the **Mount** button.
3. Modify the Oracle parameter file of the virtual copy to fit available resources of the current system. The parameter file is located at:

   ```
   /etc/3par/solutions/
   <primary_host>.<rdms>.<oracle_sid>/<timestamp>/
   ```

4. Select **Finish**.
5. Select a mounted virtual copy. Right-click on the mounted virtual copy and select the **Create database** button.
6. Provide the new database ID and the database home directory where the database binary and resource files located.
7. Select **finish** to submit.

   Result: After the cloned database operation has completed, the **Virtual Volume** column will be changed from **Mounted** to **Database** to indicate the cloned database is up and running.

Destroying a Cloned Database

After the cloned database is no longer needed, it can be destroyed with the following procedure.

1. Select a virtual copy where the Virtual Volume status shows **Database**.
2. Right-click on the selected virtual copy and select the **Remove database** button.
3. Click **Finish**.

Periodic Database Synchronization

The periodic synchronization process is an asynchronous process. Synchronization will take minutes to hours for the synchronized process to finish depending on data changes, network speed, and load on servers. When the synchronized process completes, Recovery Manager creates a virtual copy on the remote/secondary InServ server, updates the navigation view, and informs the user.

Starting Periodic Synchronization

To start periodic synchronization on a Remote Copy node:

1. Right-click on a **Remote Copy** node and select **Periodic Sync Virtual Volumes**.

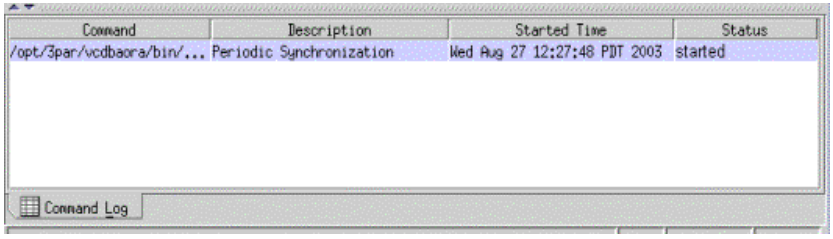
   Result: The **Periodic Synchronization virtual volumes** screen appears.



NOTE: Recovery Manager does not allow more than one periodic synchronization process for the same database at the same time.

2. Depending on the setup of your database, select either **Online Backup (Hot Backup)** or **Offline Backup (Cold Backup)** and then click **Finish**.

   After the periodic synchronization process is started, the command log view of the Recovery Manager GUI will display a status of **started**.



Verifying the Periodic Synchronization Process

When starting periodic synchronization on a Remote Copy node, you might want to verify that the synchronization process is occurring.

To verify the periodic synchronization on a Remote Copy node, right-click on the **Remote Copy** node where synchronization has started and select **Periodic Sync Status**. An Information window appears displaying the status of the synchronization process.

Removing the Recovery Manager Periodic Sync Lock

Periodic synchronization in Recovery Manager synchronizes the remote database as a whole. Because Recovery Manager does not permit more than one periodic synchronization process for the same database at a time, Recovery Manager uses the Periodic Sync Lock, which prevents simultaneous synchronization processes to occur on a single database. The Periodic Sync Lock prevents the execution of another periodic synchronization of a database if a synchronization process has not completed on that database.

If Recovery Manager prevents you from performing a periodic synchronization of your database when no other synchronization processes are occurring, the Periodic Sync Lock can be removed.

To remove the **Periodic Sync Lock**, right-click the **Remote Copy** node on which you wish to synchronize and select **Remove Periodic Sync Lock**.

Refreshing Remote Copy Information

After performing periodic synchronization on a Remote Copy node, you need to refresh the Recovery Manager GUI so that the most current information is displayed.

To refresh Remote Copy information, right-click the **Remote Copy** node on which synchronization was performed and select **Refresh**.

7 Using Remote Copy with Recovery Manager

In this chapter

Overview 7.1

System Configuration 7.3

- Installation and Setup of Recovery Manager for Remote Copy 7.3

Verifying Remote Copy Settings 7.4

- Verifying the Primary/Local Remote Copy Setting 7.4
- Verifying the Secondary Remote Remote Copy Setting 7.6

Using Remote Copy 7.8

Overview

3PAR Recovery Manager provides three methods to utilize 3PAR Remote Copy for periodic synchronization:

- Graphic user interface (GUI)
- Menu-driven application
- Command line interface (CLI)

Each method of Remote Copy is implemented by calling the utility `/opt/3par/vcdbaora/bin/vcdba_rsync`.

The following figure illustrates the relationship between the primary and the backup Linux servers, local and remote InServ Storage Servers:

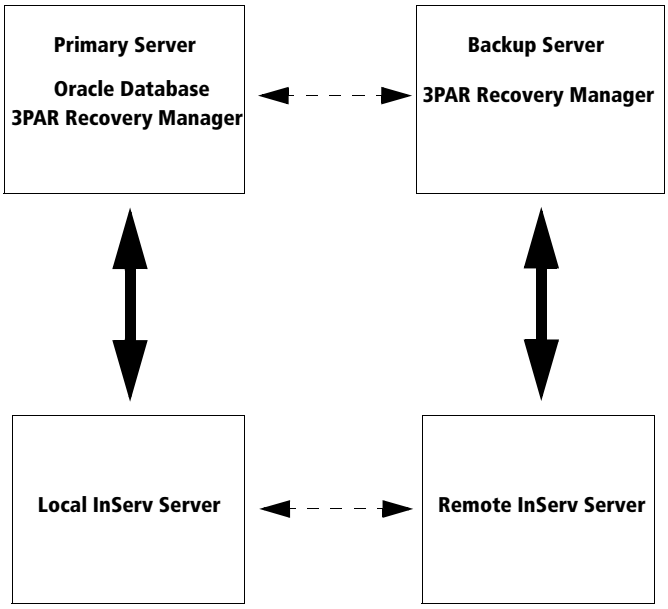


Figure 7-1. Relationship between Linux Servers and 3PAR InServ Servers

`vcdba_rsync` uses the CLI command `syncrcopy` to periodically push the changed data from the local InServ Storage Server to the remote InServ server. The time required for this process depends on the data volume changed in the primary database from the last synchronization, I/O load on both InServ servers, and the network speed.

Each time `vcdba_rsync` is executed, with either the `hotbkup` or `coldbkup` option, Recovery Manager synchronizes the volumes on the remote InServ server with changes from the database on the local InServ server. After the synchronization process is finished, Recovery Manager creates virtual copies for volumes on the remote InServ server. Those virtual copies constitute a consistent point-in-time backup image for the primary database. The primary database related files and information, such as `init.ora`, `config.ora`, Oracle password file, binary control file(compressed format), ASCII control file, data file information, and tablespace information are saved in a backup repository on a backup server. A backup repository directory is conformed as `/etc/3par/solutions/<primaryhost>.ora.<dbid>/<timestamp>`

For example

```
/etc/3par/solutions/right.ora.ISS920/032103170642
```

Virtual copies exist on the remote InServ server where they can later be mounted and used to clone the primary database. In addition, the virtual copies can also be backed up to a tape library or other inexpensive storage devices to keep a consistent point-in-time image of the primary database.

System Configuration



NOTE: Before using this utility, ensure that all 3PAR Recovery Manager requirements are met, the Remote Copy licenses are installed on both the remote InServ server and local InServ server, and Remote Copy is properly set up on both InServ servers.

Installation and Setup of Recovery Manager for Remote Copy

Install and configure Recovery Manager following the instructions in the *3PAR Recovery Manager Installation and Configuration Guide for Oracle on Red Hat Linux*. The following must be set up:

- Permission settings
- Secure shell settings

Before using the Recovery Manager Remote Copy utility, the following must be set up:

- Local and remote InServ servers must be correctly configured.
- Links among nodes within two InServs must be set up and targets related to the two InServ servers must be created.
- Remote Copy groups must be created, one group contains all virtual volumes used by datafiles, another group contains the main archive log destination.
- If volume manager is being used, all volumes that are in the same disk group as the datafiles or archive log destinations, must be assigned to the appropriate Remote Copy groups.

- If ASM is being used, all volumes that are in the same ASM disk group as the data files or archive log destinations, must be assigned to the appropriate Remote Copy groups.
- Remote copy groups must be started and in synchronized status.
- Refer to the *3PAR Remote Copy User's Guide* to set Remote Copy targets, links and groups.

After the above has been set up, a Recovery Manager configuration file must be created. There are two ways to create a configuration file.

On the backup Linux server

- Run `vcdbagui` to start the Recovery Manager graphical user interface (GUI).

  or:

- Run `/opt/3par/vcdbaora/bin/vcdba_main` to start the Recovery Manager menu-driven utility.

Refer to the *3PAR Recovery Manager 2.2.3 Installation and Configuration Guide for Oracle on Red Hat Linux* to setup the configuration file for Remote Copy.

Verifying Remote Copy Settings

Verifying the Primary/Local Remote Copy Setting

To verify the primary/local Remote Copy setting:

1. Log in to the primary host as root user.
2. For a secure shell connection.:

```
<primary_host># ssh <username>@<ss_name>
```

where:

- <username> is the CLI user.
- <ss_name> is the system name of the primary/local InServ server, which is attached to the primary host.

3 Verify the Remote Copy ports.

```
<primary_host># showport -rcip
```



NOTE: Ensure the ports are in the **ready** state.

The following is sample output from `showport -rcip` command:

```
N:S:P State HW Address IP Address Netmask Gateway MTU
0:5:1 ready 0002B3C03DF2 193.1.1.1 255.255.255.0 - 1500
1:5:1 ready 0002B3C03E94 194.1.1.1 255.255.255.0 - 1500
```

4 Verify the Remote Copy primary/local groups (datafile group and archive log group).

```
<primary_host># showrcopy groups <datafile group name>
```

where <datafile group name> is the Remote Copy group name of the virtual volumes where the datafiles of the database reside.

```
<primary_host># showrcopy groups <archive logs group
name>
```

where <archive log group name> is the Remote Copy group name of the virtual volumes where the archive logs of the database reside.



NOTE: Ensure the group is in the **Start** state and in **Periodic** mode.

5 Verify the Remote Copy targets.

```
<primary_host># showrcopy targets <target name>
```

where <target name> is the name of the remote target that has been created using createcopytarget.



NOTE: Ensure the target status is **Ready**.

6 Verify the Remote Copy links.

```
<primary_host># showrcopy links
```



NOTE: Ensure the link status is **Up**.

Verifying the Secondary Remote Remote Copy Setting

To verify the secondary/remote Remote Copy setting:

1 Log in to the backup host as the root user.

2 For a secure shell connection.:

```
<backup_host># ssh <username>@<ss_name>
```

where:

- <username> is the CLI user.
- <ss_name> is the system name of the secondary/remote InServ server, which is attached to the backup host.

3 Verify the Remote Copy ports.

```
<backup_host># showport -rcip
```

The following is sample output from `showport -rcip` command:

```
N:S:P State HW Address IP Address Netmask Gateway MTU
0:5:1 ready 0002B3C03DF2 193.1.1.1 255.255.255.0 - 1500
1:5:1 ready 0002B3C03E94 194.1.1.1 255.255.255.0 - 1500
```

4 Verify the Remote Copy secondary/remote groups (datafile group and archive log group).

```
<backup_host># showrcopy groups <datafile group name>
<backup_host># showrcopy groups <archive log group
name>
```

where:

- `<datafile group name>` is the name of the Remote Copy group which contains all virtual volumes used by database datafiles.
- `<archive log group name>` is the name of the Remote Copy group which contains all virtual volumes used by the archive log destinations.



NOTE: Ensure the groups are in the **Start** state and in **Periodic** mode.

5 Verify the Remote Copy targets.

```
<backup_host># showrcopy targets <target name>
```

where `<target name>` is the name of the remote target that has been created using `createcopytarget`.



NOTE: Ensure the target status is **Ready**.

6 Verify the Remote Copy links.

```
<backup_host># showrcopy links
```



NOTE: Ensure the link status is **Up**.

Starting and Synchronizing Remote Copy Groups

Before using Recovery Manager with Remote Copy, groups in both the local InServ server and remote InServ server should be started and in synchronized state. Starting and synchronizing the groups can be achieved by executing the following CLI commands from the primary host:

- `startrcopygroup <datafile group name>`

  where `<datafile group name>` is the name of the Remote Copy group which contains all virtual volumes used by database datafiles.

- `startrcopygroup <archive log group name>` where `<archive log group name>` is the name of the Remote Copy group which contains all virtual volumes used by the archive log destinations.



NOTE: The CLI command `showrcopy` on the primary site can be used to check the synchronization status.

Using Remote Copy

3PAR Remote Copy can be used to backup the primary database and clone the primary database.

Cloned databases can be used for testing, generating reports, or development purpose. The primary database can be cloned from the remote server or any other server which connects to the remote InServ server.

Recovery Manager provides the utility to mount the virtual copies and further clone the primary databases on the Linux host.

8
Using the Recovery Manager Rollback Utility

In this chapter

vcdba_rollback Usage **8.2**

Rollback with Read-Only Virtual Copies **8.2**

Rollback with Read-Write Virtual Copies **8.3**

Recovery Manager provides a way to rollback a database to a point-in-time stage with a read-only or read-write virtual copy.

The rollback utility requires the data volumes be offline without being exported to any giving host. Therefore it is very important to keep the original volume numbers in check, so Recovery Manager can use them to create LUNs and export them to the original host with same disk numbers.

vcdba_rollback Usage

```
vcdba_rollback –s oracle_sid –p primaryhost –t timestamp
[-o data|arch] [-w] [-v]
```



NOTE: If no `-o` option is specified, recovery Manager will roll back all volumes in the specified virtual copy.

- `-s oracle_sid` - The Oracle database instance ID.
- `-p primary_host` - The host machine where the Oracle database instance is running.
- `-t timestamp` - The timestamp of the virtual copy. This can be determined by running `vcdba_display`.
- `-v` - Run the command in verbose mode to display useful messages.
- `-w` - Roll back with a read-write virtual copy. The default is to rollback with a read-only virtual copy.
- `-o data` - Only rollback virtual volumes where database data files are located.
- `-o arch` - Only rollback virtual volumes where the main database archive log destination is located.

Rollback with Read-Only Virtual Copies

1. Shutdown the database from the primary host if database is up and running. If ASM is being used, dismount all involved ASM disk groups.
2. Unmount all file systems where database volumes are mounted on the primary host.
3. Remove the VLUNs on all involved data volumes by using `removevlun`:

   `removevlun <vvname> <lun> <host>`

   Example: `removevlun oracle_data1 101 pilot`
4. Keep the list of the VLUN numbers, which are removed by the previous command(s). The VLUN numbers will be used to re-export the LUNs with the same disk IDs.

5 **From the backup host,** execute the `rollback` command to roll back the read-only copy:

```
/opt/3par/vcdbaora/bin/vcdba_rollback -s ORACLE_SID -p
PRIMARYHOST -t TIMESTAMP -v
```

Example: `/opt/3par/vcdbaora/bin/vcdba_rollback -s TEST920 -p pilot -t 042903142921 -v`

6 Export all of the data volumes with the same VLUN numbers saved in step 4 to the primary host by issuing `createvlun` CLI command:

```
createvlun <vvname> <lun> <host>
```

Example: `createvlun oracle_data1 101 pilot`

7 Run the `fsck` command on all mount points and then mount disks to the original mount points. If ASM is being used, dismount all involved ASM disk groups.

8 Apply database recovery to the database.

Rollback with Read-Write Virtual Copies

The difference between read-only and read-write is that virtual copy depends on whether the read-write virtual copy has been exported and I/O operations were applied on it or not.

1 For the cloned database on the backup host, be sure to archive all online redo logs, then shut down the database. All read-write virtual volumes have to be manually unmounted using the `umount` command, and they have to remain offline with the `removelun` command until the rollback has completed.



NOTE: Do **not** use the `vcdba_umount` command utility to dismount file systems here, which not only dismounts the file systems, but also removes the read-write virtual copies in the InServ system.

2 In addition to performing the *Rollback with Read-Only Virtual Copies* on page 8.2, use the `<-w>` option to specify a read-write virtual copy in step 5.

A
Support for Oracle 9i/10g RAC with OCFS/OCFS2

In this appendix

Supported Platforms **A.2**

Installation and Configuration **A.2**

Backup **A.3**

Restoration **A.3**

Example of Cloning a RAC Database on Backup Host **A.4**

Rollback with Read-Only Virtual Copies for RAC **A.7**

This chapter describes requirements for supporting Oracle 9i/10g RAC with OCFS/OCFS2.

Supported Platforms

Supported platforms for Oracle 9i/10g RAC with OCFS/OCFS2 include:

- Egenera
- Red Hat EL 3 (OCFS)
- Red Hat EL 4 (OCFS2)
- Oracle 9i/10g

Installation and Configuration

The Oracle 9i/10g RAC datafiles must be installed and configured on a shared 3PAR virtual volume(s), including archived log files. In addition, the archived log destination must be on a separate 3PAR virtual volume from the datafiles.

All the instances that are part of the RAC database must be running in archive log mode with automatic archival enabled.

3PAR recommends putting all archive log destinations for all instances on the same 3PAR virtual volume to take advantage of the single virtual copy operation. If you do not share the archive log destination, Recovery Manager must be used to back up archived logs on each host in the RAC environment. For recovery, you must have access to all the archive logs created by all the hosts in the RAC environment.

On the backup host, in order to mount the OCFS/OCFS2 file systems, you need to get the OCFS/OCFS2 ready just as you would for the primary host, the only difference is that you need only one node for your OCFS2 cluster.



NOTE: At this time, Recovery Manager only supports the OCFS/OCFS2 file systems and not raw devices.

Backup

If all archived redo log destinations for all instances in a RAC environment are on a shared 3PAR volume, Recovery Manager backs up all the archived logs from the shared archive log destination in a single virtual copy operation.

For offline backup, shut down all instances in the RAC environment before using Recovery Manager to create the virtual copy backup.

Restoration

Recovery Manager does not support automatic media recovery on the production server, you can mount the virtual copy and manually restore the damaged file following related Oracle RAC documentation.

Alternately, the Recovery Manager rollback feature can be used to recover the RAC database to the point when the virtual copy was taken. Refer to the *Rollback with Read-Only Virtual Copies for RAC* on page A.7 section in this chapter for further detailed instructions.

Recovery Manager supports cloning a RAC database to a single instance on the backup host. Recovery Manager only creates the single instance in the mounted state. Depending on the number of instances in the RAC environment, you must apply the first archived log manually for each thread in the RAC environment, then open the database with RESETLOGS option. Refer to the *Example of Cloning a RAC Database on Backup Host* on page A.4 section of this chapter for further detailed instructions.

Example of Cloning a RAC Database on Backup Host

The following example illustrates cloning a RAC database to a single database on a backup host. You must manually apply the first archived log from thread 1 and thread 2. Query the v$archived_log view for further details after the first archived log from thread 2 has been applied. Enter **auto** and Oracle automatically applies the rest of the archived logs from thread 1 and thread 2 to the point when the virtual copy was taken.

1 After the virtual copy is created and mounted use the following command to clone a RAC to single database on the backup host. Notice the newly created control file is in mounted state.

```
$ vcdba_createdb -s OCFS1 -p eg04 -t 092204182421 -n newdb -h /oracle/product/
9.2.0 -v
Generating new Oracle parameter file for database 'newdb' ...
Creating new control file for database 'newdb' ...
Connected to an idle instance.
ORACLE instance started.

Total System Global Area  219223120 bytes
Fixed Size                   451664 bytes
Variable Size             201326592 bytes
Database Buffers           16777216 bytes
Redo Buffers                 667648 bytes

Control file created.

Database instance 'newdb' has been started in MOUNTED state.
Database Instance requires to be manually recovered.
```

2 Login to Oracle on the backup host and manually recover the single database. Open it with **RESETLOGS** option. Notice the highlighted steps are manually entered.

```
$ sqlplus "/ as sysdba"

SQL*Plus: Release 9.2.0.4.0 - Production on Wed Sep 22 19:28:21 2004

Copyright (c) 1982, 2002, Oracle Corporation.  All rights reserved.

Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, Real Application Clusters, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production

SQL> recover database using backup controlfile until cancel;
ORA-00279: change 561497 generated at 09/22/2004 18:24:36 needed for thread 1
ORA-00289: suggestion :
/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/1_19.dbf
ORA-00280: change 561497 for thread 1 is in sequence #19

Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/1_19.dbf
ORA-00279: change 561497 generated at 09/22/2004 18:24:36 needed for thread 2

Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/2_9.dbf
ORA-00279: change 562072 generated at 09/22/2004 18:24:54 needed for thread 1
ORA-00289: suggestion :
/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/1_20.dbf
ORA-00280: change 562072 for thread 1 is in sequence #20
ORA-00278: log file
'/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/1_19.dbf' no
longer needed for this recovery

Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
auto

ORA-00279: change 562073 generated at 09/22/2004 18:24:54 needed for thread 2
ORA-00289: suggestion :
/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/2_10.dbf
ORA-00280: change 562073 for thread 2 is in sequence #10
ORA-00278: log file
'/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/
{...
'
/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/2_13.dbf' no
longer needed for this recovery
ORA-00308: cannot open archived log
'/etc/3par/solutions/eg04.ora.OCFS1/092204182421/oracle/oradata/ocfsa1/OCFS/2_14.dbf'
ORA-27037: unable to obtain file status
Linux Error: 2: No such file or directory
Additional information: 3

SQL> alter database open resetlogs;

Database altered.
```

3 This step shows how to obtain the next required system change number (SCN) for thread 2. Notice the directory path of this query is running from the primary host different from the path that the Recovery Manager mounted the virtual copy above.

```
SQL> select NAME, THREAD#, NEXT_CHANGE# from v$archived_log
  2  order by NEXT_CHANGE#;

NAME                                     THREAD# NEXT_CHANGE#
---------------------------------------- ------- ------------
/oracle/oradata/ocfsa1/OCFS/2_7.dbf            2     510967
/oracle/oradata/ocfsa1/OCFS/1_17.dbf           1     510970
/oracle/oradata/ocfsa1/OCFS/2_8.dbf            2     510975
/oracle/oradata/ocfsa1/OCFS/1_18.dbf           1     510978
/oracle/oradata/ocfsa1/OCFS/1_19.dbf           1     562072
/oracle/oradata/ocfsa1/OCFS/2_9.dbf            2     562073
/oracle/oradata/ocfsa1/OCFS/1_20.dbf           1     562186
/oracle/oradata/ocfsa1/OCFS/1_21.dbf           1     562193
/oracle/oradata/ocfsa1/OCFS/2_10.dbf           2     562193
/oracle/oradata/ocfsa1/OCFS/1_22.dbf           1     562196
/oracle/oradata/ocfsa1/OCFS/2_11.dbf           2     562196

NAME                                     THREAD# NEXT_CHANGE#
---------------------------------------- ------- ------------
/oracle/oradata/ocfsa1/OCFS/2_12.dbf           2     562197
/oracle/oradata/ocfsa1/OCFS/1_23.dbf           1     562199
/oracle/oradata/ocfsa1/OCFS/2_13.dbf           2     562199

36 rows selected.

SQL>
```

Rollback with Read-Only Virtual Copies for RAC

This section describes how the Recovery Manager rollback feature restores the datafiles to the base volume from the backed up virtual copy in the RAC environment.

1. Shutdown all databases in the RAC environment.
2. Unmount the OCFS/OCFS2 file systems for all databases in the RAC environment including the archive log destination.
3. Remove all involved VLUNs in the RAC environment by using the InServ CLI `removevlun` command.

   ```
   removevlun <vvname> <lun> <host>
   ```

   Example: `removevlun ocfs_data1 101 eg06`
4. Keep a list of the VLUN numbers associated with LUNs removed by the previous command(s). The VLUN numbers will be used to re-export LUNs with the same disk IDs.
5. From the backup host, execute the `rollback` command to roll back the read-only copy.

   ```
   $ /opt/3par/vcdbaora/bin/vcdba_rollback -s ORACLE_SID –p
   PRIMARYHOST -t TIMESTAMP -v
   ```

   Example: `/opt/3par/vcdbaora/bin/vcdba_rollback -s TEST920 –p eg06 -t 042903142921 -v`
6. Export all of the data volumes with the same set of VLUN numbers to each host in the RAC environment by issuing the `createvlun` CLI command.

   ```
   createvlun <vvname> <lun> <host>
   ```

   Example: `createvlun ocfs_data1 101 eg6`
7. Mount the OCFS/OCFS2 file systems for all databases in the RAC environment.
8. Perform media recovery and open databases.

B

Backup and Restore ASM Using Oracle RMAN and 3PAR Recovery Manager

In this appendix

Oracle RMAN and 3PAR Recovery Manager **B.2**

Backing Up ASM Managed Databases Using Oracle RMAN and 3PAR Recovery Manager **B.2**

Restoring ASM Managed Databases Using Oracle RMAN and 3PAR Recovery Manager **B.3**

Backing Up ASM Managed Databases Using Oracle RMAN and 3PAR Recovery Manager Case Study **B.3**

Recovery Manager for Oracle Release 2.2.3 does not support automatic RMAN backup through virtual copies. However, this section describes the procedure on how you can use Oracle RMAN and 3PAR Recovery Manager to manually backup and restore an ASM Managed Database.

Oracle RMAN and 3PAR Recovery Manager

- RMAN and Virtual Copy Backup for ASM Managed Database
- RMAN and Virtual Copy Restore for ASM Managed Database
- RMAN and Virtual Copy Backup/Restore Case Study

With database growing in size, taking backups from the production database server can cause significant performance impact. Also, the time database in backup mode can exceed the acceptable backup window. Utilizing 3PAR Recovery Manager's Virtual Copy reduces the time database in backup mode to a minimum (few seconds) and reduces the load from the production server. The following section describes the manual procedure to use Oracle RMAN and 3PAR Recovery Manager for backup and restoration.

Backing Up ASM Managed Databases Using Oracle RMAN and 3PAR Recovery Manager

Instead of connecting to the primary database on the production server to perform Oracle RMAN backup, you can connect to the cloned database from a 3PAR virtual copy on a backup server. The cloned database is started up in mounted mode using the backup `controlfile` from the created virtual copy. If the block change tracking is enabled, the block change tracking file should reside on the same ASM disk group(s) used by the datafiles. The following is the procedure for database backup using Oracle RMAN and 3PAR Recovery Manager.

1. Make sure a TNS connection to the Oracle RMAN catalog database exists from both the primary database and the cloned database (which is in mounted status).
2. On the primary host, configure Oracle RMAN recovery catalog and register the primary database (see Oracle documentation).
3. On the backup host, create (`vcdba_create`) and mount (`vcdba_mount`) a database virtual copy using 3PAR Recovery Manager.
4. On the primary host, use Oracle RMAN client to connect to the primary database as the target database and Oracle RMAN recovery catalog, then resynchronize the catalog.
5. On the backup host, start up a clone database in mounted mode (startup mount) using the Oracle parameter file (some parameters might need to be changed to reflect the available resources on the backup host) and the backup `controlfile` from the virtual copy.

6 On the backup host, connect to the clone database as the target database and the Oracle RMAN recovery catalog and perform RMAN backup.

Restoring ASM Managed Databases Using Oracle RMAN and 3PAR Recovery Manager

Restoring from an RMAN backup image does not actually involve 3PAR Recovery Manager. You should follow Oracle documentation on how to restore using RMAN.

The following is the general procedure you should follow:

- Make sure the backup image is accessible from the primary host.
- On the primary host, connect to the primary database as the target Database and Oracle RMAN recovery catalog
- Follow Oracle documentation to perform RMAN restore.

Backing Up ASM Managed Databases Using Oracle RMAN and 3PAR Recovery Manager Case Study

The following is the case study on how to perform database backup using Oracle RMAN and 3PAR Recovery Manager. It is assumed that recovery catalog has been created and configured.

Configuration:

Primary Host:

- Host Name: bowhead
- OS: Solaris 5.10
- Oracle Version: 10.2.0.1
- Database name: ASM1020 (ASM managed database)
- RMAN recovery catalog connection string: `rman/rman@catdb`

Backup Host:

- Host Name: pilot
- OS: Solaris 5.10
- Oracle version: 10.2.0.1

- RMAN recovery catalog database: `catdb`
- RMAN recovery catalog connection string: `rman/rman@catdb`.

1. On the primary host (bowhead), connecting the primary database as the target and the recovery catalog.

```
$ export ORACLE_SID=ASM1020
$ rman TARGET / CATALOG rman/rman@catdb
RMAN> register database;
```

2. On the backup host (pilot), create a virtual copy of the primary database and mount it using 3PAR Recovery Manager's command line interfaces.

```
$ vcdba_create –s ASM1020 –p bowhead –o hotbkup -v
$ vcdba_mount –s ASM1020 –p bowhead –h /oracle_base/
product/10.2.0.1 –v
```

Where:

- ASM1020 is the ORACLE_SID of the primary database.
- bowhead is the primary host name.
- `/oracle_base/product/10.2.0.1` is Oracle Home of an ASM instance on backup host.

3. On the primary host (bowhead), use Oracle RMAN client to connect to the primary database as the target and the Oracle RMAN recovery catalog, then resynchronize the catalog.

```
$ export ORACLE_SID=ASM1020
$ rman target / catalog rman/rman@catdb
RMAN> resync catalog;
```

4. On the backup host (pilot), starting up a clone database in mounted mode using the Oracle parameter file and backup `controlfile` from the virtual copy's repository. The Oracle parameter file and backup `controlfile` are saved in the repository when the virtual copy is created. Depending on where the backup `controlfile` is copied to, you need to modify the Oracle parameter file to reflect the new location of the backup `controlfile`.

- Copy the Oracle parameter file and backup `controlfile` to a temporary location.

```
$ cp /etc/3par/solutions/bowhead.ora.ASM1020/
012507140526/initASM1020.ora /oracle_base/product/
10.2.0.1/dbs

$ cp /etc/3par/solutions/bowhead.ora.ASM1020/
012507140526/controlfile.Z /oracle_base/product/
10.2.0.1/dbs

$ cd $ORACLE_HOME/dbs #unzip controlfile.Z

$ chown oracle:dba initASM1020.ora

$ chown oracle:dba controlfile.Z
```

- Make another copy of backup `controlfile`. This copy will be backed up by RMAN.

```
$ cd $ORACLE_HOME/dbs

$ cp controlfile backup_controlfile
```

- Modify the Oracle parameter file (`initASM1020.ora`)as shown `previously`, to reflect the new location of the backup `controlfile`. If the primary database is a Real Cluster Application database, all cluster parameters must be also removed from the Oracle parameter file.

```
Control_files=/oracle_base/product/10.2.0.1/dbs/
controlfile
```

- Startup the clone database

```
$ export ORACLE_SID=ASM1020

$ sqlplus "/as sysdba"

SQLPLUS> startup mount;
```

5 On the backup host (pilot), perform the RMAN backup.

Connect to the clone database as the target database and the RMAN recovery catalog.

```
$ export ORACLE_SID=ASM1020

$ rman TARGET / CATALOG rman/rman@catdb
```

Catalog the copy of the `controlfile`.

```
RMAN> catalog controlfilecopy '/oracle_base/product/
10.2.0.1/dbs/backup_controlfile';
```

Perform a full backup:

```
RMAN>
Run {
     allocate channel t1 type disk;
     backup
     format '/backup_dest/controlfile_%d_%s_%p_%t'
     controlfilecopy '/oracle_base/product/10.2.0.1/dbs/
     backup_controlfile';
     backup full
     format '/backup_dest/datafile_%d_%s_%p_%t' database;
     backup
     format '/backup_dest/archlog_%d_%s_%p_%t' archivelog
     all;
     release channel t1;
}
```

Perform incremental backup:

```
RMAN>
Run {
     allocate channel t1 type disk;
     backup
     format '/backup_dest/controlfile_%d_%s_%p_%t'
     controlfilecopy '/oracle_base/product/10.2.0.1/dbs/
     backup_controlfile';
     backup incremental level 1
     format '/backup_dest/datafile_%d_%s_%p_%t' database;
     backup
     format '/backup_dest/archlog_%d_%s_%p_%t' archivelog
     all;
     release channel t1;
}
```

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Revision History

Release level	Revision summary
320-1314-01 July 2005	Initial release of this document to support product release 2.2.
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