

3PAR Recovery Manager 4.1.0 for Microsoft SQL Server User's Guide

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1 Introduction

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This guide provides the information you need to install, deinstall, and use the 3PAR Recovery Manager 4.1.0 for Microsoft SQL Server on the Microsoft Windows operating system.

1.1 Audience

This guide is designed for System Administrators and Microsoft SQL Server Administrators who are responsible for backing up Microsoft SQL Server databases and who understand Microsoft™ Windows™ and Microsoft SQL Server™.

1.2 Related Documents

You can find additional information related to the InServ Storage Server in these documents:

For Information About...	Read the...
Using the InForm Command Line Interface (CLI) to configure and manage the InServ Storage Server	*3PAR InForm OS CLI Administrator's Manual*
Using the InForm Management Console to configure and administer InServ Storage Servers	*3PAR InForm OS Management Console Online Help*
Identifying InServ Storage Server components and fixing problems	*3PAR InForm OS Messages and Operator's Guide*
Understanding the InServ Storage Server and its features	*3PAR InForm OS Concepts Guide*
Shadow copies using 3PAR VSS Provider for Microsoft Windows	*3PAR VSS Provider for Microsoft Windows User Guide*

1.3 Organization

- This chapter provides an overview of this guide, including intended audience, related documentation, typographical conventions, and advisories.
- Chapter 2, *Overview of Recovery Manager*, provides an overview of virtual copies and how Recovery Manager interacts with Microsoft SQL Server.
- Chapter 3, *Installation and Deinstallation*, describes how to install, verify, and deinstall Recovery Manager.
- Chapter 4, *Configuring Recovery Manager*, contains instructions for configuring the 3PAR Recovery Manager for Microsoft SQL Server.
- Chapter 5, *Configuring NetBackup for Recovery Manager*, contains instructions for configuring Veritas NetBackup for use with the 3PAR Recovery Manager for Microsoft SQL Server.
- Chapter 6, *Using the Recovery Manager GUI*, contains procedures for working with Recovery Manager through the GUI (Graphical User Interface).
- Chapter 7, *Using the Recovery Manager CLI*, contains procedures for working with Recovery Manager through the CLI (Command Line Interface).
- Chapter 8, *Recovery for Microsoft SQL Server*, discusses methods for backing up data and performing recovery operations using virtual copies.
- Chapter 9, *Remote Copy for Recovery Manager*, contains procedures for configuring the Recovery Manager to work with the 3PAR Remote Copy solution.
- Appendix A, *Server Virtualization Environments*, describes support for VMWare and Egenera environments.
- Appendix B, *Troubleshooting*, lists some common issues that may arise and suggests solutions to help solve the problems.
- Appendix C, *Event Messages*, describes events and suggests possible actions.
- Appendix D, *Domain Set Support*, describes how to configure multiple database servers that belong to different virtual domains.
- This guide also contains an index and revision history.

1.4 Typographical Conventions

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

1.5 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

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2.1 System Requirements

- Microsoft Windows Server 2003 with SP2 or above, Windows Server 2008, or Windows Server 2008 R2.
- Microsoft SQL Server 2005 with SP2 or above, Microsoft SQL Server 2008, or Microsoft SQL Server 2008 R2.
- SQL Server client utilities must be installed on the backup server.

- All SQL instances must be TCP/IP enabled. In order to create snapshots for named SQL instances, the corresponding SQL Browser Service(s) must be turned on.
- Microsoft .NET framework 3.5 SP1 or above.
- 3PAR Recovery Manager for SQL license for the InServ Storage Server.
- Snapshot space must be available on 3PAR Virtual Volumes where the SQL server database resides.

  To take snapshots on 3PAR's base volume, you must associate snapshot space with the volume itself. For more information on creating a base volume with snapshot or assigning snapshot space after the base volume is created, see the *3PAR InForm OS Command Line Reference* manual.



NOTE: For platform-specific release levels, refer to the latest 3PAR InForm OS Configuration Matrix, which you can access through the 3PAR Document Control System (DCS).

2.2 Recovery Manager Requirements

- To perform snapshot creation and one-click backup, the Microsoft SQL Server database for which virtual copies are to be taken must be online.
- One backup server is required.
- Because Recovery Manager operates through VSS, the database must be online to perform a file copy restore at the database level. To restore a SQL database that is detached, you can either mount a previously created snapshot of this database to the production server and copy over the database files, or you can issue a volume restore at the database level. For more information about restoring volumes, see *Recovery Manager Commands* on page 7.3.
- Backup and production server(s) must be running the same level OS version and the same version of 3PAR Recovery Manager for SQL. Recovery Manager does not support cross-platform configurations.
- The same version of the InForm CLI must be installed on both the production and backup servers.
- The SQLServerWriter service must be running.
- Volumes exported to a host must be base volumes; you cannot export snapshot volumes.

- For 3PAR Remote Copy, Recovery Manager for SQL only supports periodic synchronization mode. In addition, 3PAR recommends that the period value to be set to zero for all involved remote copy groups to avoid conflict between synchronizations.

2.3 Features Supported

- Windows Enterprise Server - For detailed OS version support, see the *3PAR InForm OS Configuration Matrix*.
- Microsoft SQL Server - For detailed SQL server version support, see the *3PAR InForm OS Configuration Matrix*.
- Volume Shadow Copy Service **Full** backup type.
- Virtual copy creation using 3PAR VSS Provider for Microsoft Windows.
- Access 3PAR InServ Storage Server via 3PAR InForm CLI for Microsoft Windows.
- Mount virtual copies locally or remotely.
- Mount virtual copies in Read-Write mode.
- Unmount virtual copies.
- Delete virtual copies.
- Environment Report.
- File Copy Restore.
- Restore from virtual copies.
- Backups using Veritas NetBackup – both client and master.
- Restore using Veritas NetBackup.
- Recovery Manager GUI.
- Recovery Manager CLI.
- Volumes Analyze.
- Volume Restore.
- Virtual copy creation of local and remote Microsoft SQL Server.
- MSCS environment.

- Provides the 3PAR Remote Copy feature for the SQL Servers.
- Virtual copy operations on SQL instance and database level.



NOTE: Due to an SQL instance limitation, the recommended maximum number of databases for which you can create snapshot backups at the same time is 35. Please see Microsoft KB 943371: http://support.microsoft.com/kb/943471

2.4 Features Not Supported

- Microsoft SQL Server offline backup.
- VSS backup types "Incremental," "Differential," "Copy," and "Log".
- All backup tools, except for Veritas NetBackup.
- Access to 3PAR InServ Storage Server via SSH.
- Display of different versions of Microsoft SQL Server from the same Recovery Manager backup server.
- Interoperability between Windows Server 2003 and Windows Server 2008.

  In other words, you cannot mount a virtual copy created under Windows 2003 to a Windows 2008 target host, and you cannot mount a virtual copy created under Windows 2008 to a Windows 2003 target host.
- Taking a snapshot of the SQL servers created with the **SQL Server Authentication** setting.

  3PAR only supports SQL servers created with the **Windows Authentication** setting.
- Taking a snapshot of a database residing on a network mapped volume.
- Virtual copy ownership transferring. For example, you can only remove virtual copies if you created them, and you can only unmount virtual copies if you mounted them.
- Taking a snapshot of an instance or database residing on dynamic disks.
- Mounting snapshots to a Windows host that resides in virtual environment.
- Performing a restore in a virtualization environment.

2.5 Supported VSS Components

- Requestor:
  - Recovery Manager
  - Veritas NetBackup™ for Microsoft windows
- Writer:
  - Microsoft SQL Server 2005 and 2008 with SQL Server Writer



For platform-specific release levels, refer to the latest 3PAR InForm OS Configuration Matrix, which you can access through the 3PAR Document Control System (DCS).

2.6 Microsoft Volume Shadow Copy Service

Microsoft includes Volume Shadow Copy Service (VSS) in Windows 2003 and 2008 to simplify the enterprise's storage environment, which provides a framework for creating a point-in-time copy of either a single volume or multiple volumes.

Microsoft Windows Server 2003 and 2008 VSS works with VSS-aware applications that are in use to determine when a volume shadow copy (snapshot) can be made. (A snapshot is a copy of some data set—for example, a disk volume—at a point in time.) Before making a snapshot, VSS communicates with the operating system and applications to freeze computing tasks, which enables an application-consistent snapshot to be taken. The shadow copy volume is then used for the actual backup. After VSS saves the shadow copy volume on the backup device, it deletes the shadow copy.

The 3PAR VSS Hardware Provider coordinates between Requestors (backup applications; e.g., Recovery Manager), Writers (applications in windows services; e.g., Microsoft SQL Server) and Providers (components that create the shadow copies).

VSS Component	VSS Component Description
Requestor	The requestor is backup software that initiates the creation of the shadow copy.
Writer	The writer is any application software that participates in the shadow copy process and whose files and data are included in the process.
Provider	The provider is the storage technology that does the actual shadow copy.

2.7 How VSS Works with Microsoft SQL Server

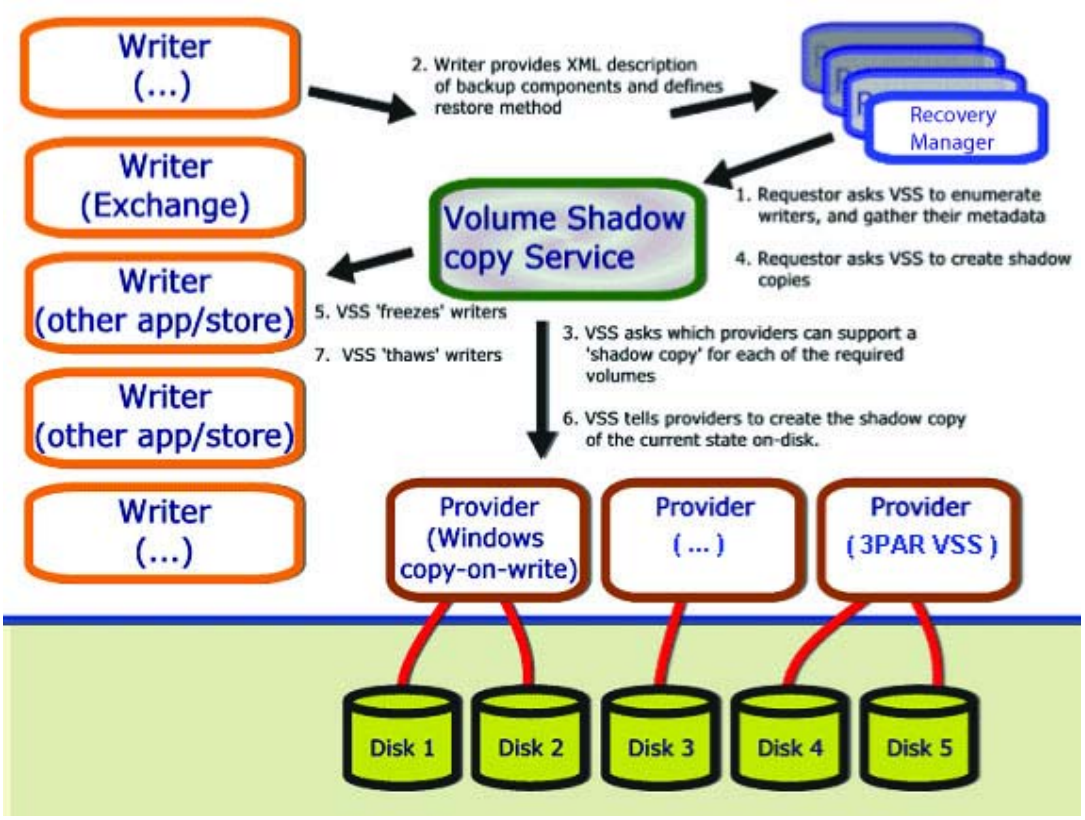


Figure 2-1. 3PAR VSS Provider for Microsoft Windows Operation Overview

1. The requestor (3PAR Recovery Manager) sends a command to the Volume Shadow Copy service to take a shadow copy of the selected Microsoft SQL Server database.
2. Volume Shadow Copy service communicates with SQL Writer on the Microsoft SQL Server to flush the current log files to disk and suspend any writes to the transaction log files and to the database file. However, VSS allows read-only access so the client can access any data that is already in the SQL Server database.
3. Volume Shadow Copy service communicates with the provider to initiate the shadow copy process for the disk volumes that contain the Microsoft SQL Server data.
4. VSS then communicates with the writers and providers to start creating the shadow copy. The provider actually creates the shadow copy.

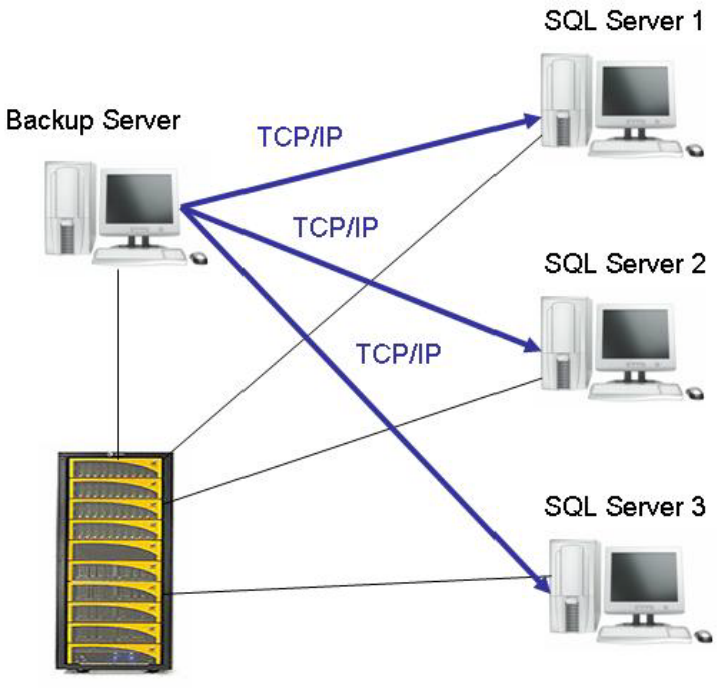
The shadow copy typically takes less than a minute.

5 After the shadow copy is created, Volume Shadow Copy service communicates with the Microsoft SQL Server with MSDE writer or SQL writer to let it know that it can resume writing to disk.

6 The queues of the SQL transactions are written to the logs.

The shadow copy is now available to the requestor for backing up.

2.8 Recovery Manager Layout



3PAR Recovery Manager 4.1.0 for Microsoft SQL provides off-host backup and mounting capabilities. These features reduce the impact on the production server and also provide centralized management for the backup and restore functions across all SQL servers.

- Backup Server

A backup server is the central control point for the Recovery Manager. It controls and manages the backup and restore on different SQL servers.

- SQL Server

  The SQL Server can be a standalone or clustered server. The release version of SQL server must be 2005 or 2008. Versions prior to SQL Server 2005 are not supported.

- Connectivity

  Both the backup server and SQL Server must be connected to the same InServ Storage Server.

3 Installation and Deinstallation

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3.3 Verifying the Installation **3.4**

3.4 Understanding the Registry **3.4**

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3.1 Pre-Installation Steps

Before installing 3PAR Recovery Manager, install the following:

- 3PAR InForm OS Command Line Interface (CLI) for remote clients. For more information, see the *3PAR InForm OS CLI Administrator's Manual*.
- 3PAR VSS Provider for Microsoft Windows. For more information, see the *3PAR VSS Provider User Guide*.

3.2 Installing Recovery Manager

To install 3PAR Recovery Manager on Windows 2003:

1 Log on as the system administrator to the Microsoft SQL Server host computer.



NOTE: You can perform the installation from a remote desktop connection, but 3PAR recommends that you install the application directly from the system console.



CAUTION: Do not install Recovery Manager on a clustered drive. If you do so, Recovery Manager allows you to proceed with the installation, but after the install is complete, the process hangs and evicts the clustered disk.

2 Insert the Recovery Manager CD.

3 Open a Windows Explorer window and click **Start** > **All Programs** > **Accessories** > **Windows Explorer**.

4 Click the CD-ROM drive to expand the files.

5 Select the corresponding package for your OS version.

Table 3-1. Operating System Packages

Operating System	Package
Win2003 32-bit	RMS_W2K3_x86.msi
Win2003 64-bit	RMS_W2K3_x64.msi
Win2008 32-bit	RMS_W2K8_x86.msi
Win2008 64-bit	RMS_W2K8_x64.msi
Win2008 R2 64-bit	RMS_W2K8_x64.msi

6 The 3PAR Recovery Manager for SQL Server Setup wizard opens. Click **Next**.

7 The license agreement appears. Select **I Agree** and click **Next**.

8 Select the type of server on which you are installing Recovery Manager:

- **Recovery Manager Backup Server** - Select this option if this server is your backup server. This option installs the Recovery Manager GUI on this server; you can use this GUI to manage your SQL production servers.



NOTE: You must install the SQL Server client utilities on the host on which the Recovery Manager Backup Server is installed.

- **Recovery Manager Agent for SQL Server** - Select this option if this server is one of your SQL production servers running Microsoft SQL Server.
- **All of above** - Select this option if this server is both your backup server and your SQL production server. This option installs the Recovery Manger GUI and all of the Recovery Manager agent components on this server.

9 Specify the installation directory for Recovery Manager.



NOTE: To check whether the server has enough space for Recovery Manager, click the **Disk Cost** button. The wizard analyzes the amount of available storage space and compares it to the amount required for the Recovery Manager installation.

10 Click **Next** to confirm the installation destination.

11 After the installation is complete, click **Close**.



NOTE: If you are installing Recovery Manager through a remote desktop session, log out of the session and log back in after installation is complete.

12 Recovery Manager for SQL runs a utility to scan for possible configuration errors.

13 After this utility completes, the results are automatically displayed in a Notepad file.

Carefully review the information displayed in the Notepad file. Pay special attention to any WARNING or ERROR messages and correct them before running Recovery Manager for SQL.



NOTE: If you are installing the application through a remote desktop session, the newly added environment variables do not become effective until you log off all connected remote sessions after the installation is complete.



NOTE: If you are installing Recovery Manager for SQL on a system that also has a NetBackup service running in the background, the NetBackup service must be restarted after the installation of Recovery Manager for SQL is complete in order for the environment path to be registered in the NetBackup service.

3.3 Verifying the Installation

1 Log on as the system administrator.

2 Depending on your operating system, do the following:

- In Windows 2003, click **Start > Control Panel > Add/Remove Programs**.
- In Windows 2008 or 2008 R2, click **Start > Control Panel > Programs > Programs and Features**.

3 Verify that Recovery Manager appears in the **Currently installed programs** column.

4 Verify that the **Recovery Manager for SQL** icon appears on the desktop.

3.4 Understanding the Registry

After Recovery Manager is successfully installed, information is written into the registry database under: `HKEY_LOCAL_MACHINE\SOFTWARE\3PAR\RM_SQL`



CAUTION: DO NOT try to edit the registry key value unless asked by your local service provider for support purposes.

Table 3-2. System Registry Values for Recovery Manager

Name	Value
AnalyzeInterval	Interval in minutes between automatic synchronizations of the repository with the InForm. The default interval is 60 minutes.
BackupTimeout	Backup process timeout value in minutes to confirm that NetBackup has received the backup request.
Build	Build number of the installed version of Recovery Manager for SQL.
DataFilePath	Location of the XML repository.
InstallPath	Recovery Manager for SQL installation path.
LogFilePath	Tracing log files.
TraceHistory	Number of trace files to keep before deleting.
TraceLevel	Trace level for the log file.
TraceLog	Information used to generate the trace file name.
TraceLogSize	Size of the log files.
PortNo	Port used by Recovery Manager for SQL. PortNo is set to 9932 by default.
PromoteTimeout	Time interval in seconds to monitor the status of volume restore operation.
Version	Current version of Recovery Manager for SQL Server.



NOTE: The DataFilePath field is created in the registry database only after you launch the Recovery Manager GUI for the first time.

3.5 Deinstalling Recovery Manager

1. Log on as the system administrator.
2. Depending on your operating system, do the following:
   - In Windows 2003, click **Start > Control Panel > Add/Remove Programs**.
   - In Windows 2008, click **Start > Control Panel > Programs > Programs and Features**.
3. Select **3PAR Recovery Manager for Microsoft SQL Server**.
4. Click **Remove.**



NOTE: After de-installing Recovery Manager, snapshots and scheduled tasks still reside locally in the Data folder as well as on the InServ. You can remove snapshots and/or scheduled tasks later, if desired.

4 Configuring Recovery Manager

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4.1 Configuring the SQL Database

3PAR Recovery Manger for SQL Server only supports Microsoft SQL Server database files and transaction logs created on basic disks using the NTFS file system.



NOTE: 3PAR recommends that you allocate each database and its transaction log files to separate volumes. This configuration provides the greatest flexibility when you perform individual database backup and recovery and reduces the exposure to conflicts between databases. If multiple databases use the same volume, a volume restore from a virtual copy will overwrite the other databases on the volume.

4.2 Configuring Recovery Manager

4.2.1 Installation Location

By default, Recovery Manager installs in the following directory:
`C:\Program Files\3PAR\RM\SQL`

4.2.2 Search Path

After installation, you can instantly issue Recovery Manager commands through the CLI from any directory. Although the Recovery Manager executables are installed in a fixed location that is specified during installation, the location is automatically added to the Windows PATH environment variable.

4.2.3 Changing the Recovery Manager TCP/IP Port

By default, Recovery Manager for SQL uses port 9932 for cross-server communication. As long as port 9932 is available, no extra port configuration is necessary.

However, if port 9932 is not available or is occupied by another system process, the system administrator must change the Recovery Manager TCP/IP port.



NOTE: The TCP/IP port used by Recovery Manager for SQL must be the same on all servers.
If you decide to change the Recovery Manager port, the port numbers on the backup server and all the production servers must also be changed.

To change the Recovery Manager TCP/IP port:

1. Select an available port. The valid TCP/IP port range is 1024 to 65535.
2. To set your desired port number, run the Recovery Manager CLI `RMSql portconfig` command.

   For example, to change the port number to 9999, use: `RMSql portconfig -n 9999`
3. From the Windows Service console, restart the **Recovery Manager for SQL** service.

   Result: The Recovery Manager TCP/IP port on this server is updated.
4. Repeat these steps for all production servers and the backup server.

You can remotely change a production server's port from the backup server. To do so:

1. On the backup server, run the following CLI command:

   `RMSql portconfig -s <server_name> -n <port_number>`
2. On the production server, restart the **Recovery Manager for SQL** service.

4.2.4 Managing SQL Servers across Multiple Active Directory Domains

If you are configuring Recovery Manager to work with SQL Servers across multiple active directory domains, you must store the appropriate login and password in the Windows user account on the backup server.

1. Depending on the operating system, do the following on the backup server:

- On Windows 2003, click **Start** > **Control Panel** > **User Accounts**, click the **Advanced** tab, and click **Manage Passwords**.

  In the **Stored User Names and Passwords** dialog box, click **Add**.
- On Windows 2008, click **Start** > **Control Panel** > **Open User Accounts** and click **Manage your network passwords**.

  In the **Stored User Names and Passwords** dialog box, click **Add**.

- On Windows 2008 R2, click **Start** > **Control Panel** > **User Accounts** and click **Credential Manager** > **Add a Windows credential**.

2. In the **Log on to** field (or, for Windows 2008 R2, the **Internet or network address** field), enter the network location to which you want automatic access. You can use a wildcard if you want access to multiple computers on a domain. For example: ***.aztec.com**
3. Enter the appropriate login and password.
4. Repeat these steps for all SQL Server domains in the Recovery Manager configuration.

4.3 Testing SQL Connectivity

After 3PAR Recovery Manager for SQL Server is installed and configured on your backup server and all of your production servers, perform the following connectivity test to verify that your SQL instances are reachable.

1. Log onto the backup server as the system administrator.
2. Launch SQL Server Management Studio.
3. In the **Connect to Server** window, enter or select the following:

   Server type: **`Database Engine`**

   Server name: Enter the server and instance name as follows:

   For the default instance, enter the name of your SQL server. For example:

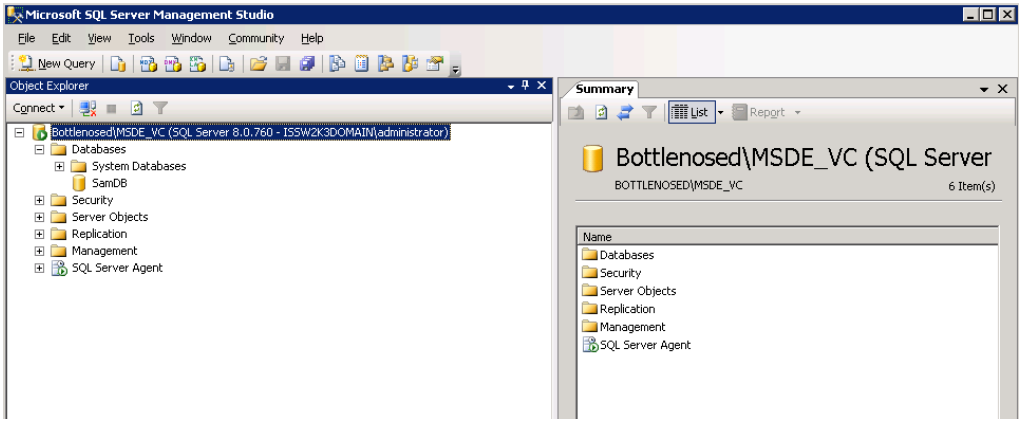
   Server name: **`Bottlenosed`**

   For a named instance, enter the name of your SQL server and the name of your SQL instance in the format: <*`SQLserverName`*>\<*`instanceName`*>. For example:

   Server name: **`Bottlenosed\MSDE_VC`**

   Authentication: **`Windows Authentication`**

4 Click **Connect**. SQL Server should display a screen similar to the following:



If you are able to connect, the installation and configuration is complete.

If the connection cannot be made, you must fix the SQL configuration.

4.3.1 Troubleshooting SQL Connectivity

As system administrator, log onto the SQL production server and check the following:

- From the SQL production server, launch SQL Server Management Studio to make sure the connection can be made locally.
- From Management Studio, right-click **SQL server** > **Properties** > **Connections.**

  Make sure the **Allow remote connections to this server** box is checked.
- Make sure the SQL server for that instance has a status of **started**.
- For named instances, make sure the SQL server browser has a status of **started**.
- Double-check the settings under **Properties** > **Security**.
- Double-check the settings under **Properties** > **Permissions**.

After you have fixed the SQL configuration, log back onto the backup server and run the SQL connectivity test again.



NOTE: Your backup server must pass this SQL connectivity test before you can use Recovery Manager for SQL Server.

4.4 Configuring the Host Computer and the 3PAR InServ Storage Server

For information about configuring the 3PAR InServ Storage Server to communicate with the host computer, see the *3PAR InForm OS Concepts Guide* and the *3PAR InForm OS CLI Administrator's Manual*.



NOTE: The InServ Storage Server source volumes used by Recovery Manager must be base volumes. Recovery Manager cannot use physical copies or virtual copies as source volumes.

4.5 Formatting Partitions on a New 3PAR VLUN

When you create 3PAR VLUNs for use with SQL Server, you must consider partition alignments.

4.5.1 Windows Server 2003

Before formatting a partition on a new 3PAR VLUN, use the `diskpart.exe` tool, included with Windows, to align the starting partition offset. Align the offset to 64KB, as recommended in the following article:

http://msdn.microsoft.com/en-us/library/dd758814.aspx

To check the current offset value, use the Microsoft System Information utility, included with Windows, as follows:

1. Launch the System Information utility. To do so, select **Start > Programs > Accessories System Tools > System Information** or, at the command prompt, run the command: `msinfo32.exe`
2. Select **System Summary > Components > Disks**. The offset for each disk in the system is displayed in bytes in the **Partition Starting Offset** field.

4.5.2 Windows Server 2008

Before writing data to the 3PAR VLUN, use the **Quick Format** option to format new NFTS partitions.

5 Configuring NetBackup for Recovery Manager

In this chapter

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5.2 Before You Begin 5.2

5.3 Defining a NetBackup Policy 5.2

5.4 Update the System 5.4

5.1 Overview

3PAR Recovery Manager can be used with Veritas NetBackup to back up and restore virtual copies created by Recovery Manager. The following sections describe setting up NetBackup for use with Recovery Manager.



NOTE: NetBackup has a known limitation regarding case sensitivity. When mounting a virtual copy for backup with NetBackup, the `–m` parameter is case-sensitive and must match the `–m` option in the Windows OS environment. For example, if the mount point you want to use appears as `C:\NoticeMyCAPS` in Windows, you must use the same combination of uppercase and lowercase (NoticeMyCAPS) in your NetBackup `–m` parameter.

5.2 Before You Begin

Ensure that you have set up a NetBackup storage unit for storing virtual copy backups. For more information, see the Veritas NetBackup documentation.

5.3 Defining a NetBackup Policy

1. Launch the Veritas **NetBackup Administration Console** from the NetBackup master server.
2. Right-click the **Policies** node in the left pane and select **New Policy**.
3. Enter a name for the policy.
4. Click **OK**.

   Result: The **Change Policy** dialog box appears.
5. On the **Attributes** tab of the **Change Policy** dialog box do the following:
   a. From the **Policy type** drop-down list, select **MS-Windows-NT**.
   b. From the **Policy storage unit** drop-down list, select the storage unit on which to store the virtual copy backups.
   c. In the right pane, ensure the **Collect disaster recovery information for Bare Metal Restore** check box is unchecked.
   d. Select the **Schedules** tab and click **New.**

      Result: The **Change Schedule Attributes** dialog box appears.
6. In the **Change Schedule Attributes** dialog box do the following:
   a. In the **Name** text box, enter a name for the schedule.

b From the **Type of backup** drop-down list, select the appropriate backup type for the NetBackup interface running on the backup server:

- If the backup server is running the client interface, select **User Backup**.
- If the backup server is running the master interface, select **Full Backup**.



NOTE: Recovery Manager supports full backups when running on a NetBackup master server. Recovery Manager also supports user-defined backups when running on a NetBackup client machine.

c Click **OK**.

7 Select the **Start Window** tab.

a To activate the entire time window, thus allowing Recovery Manager to create backups with NetBackup at any time, select the following options:

- **Modify Day**: Mon
- **Start time**: 12:00:00AM
- **End day**: Sun
- **End time**: 12:00:00AM
- **Duration**: 7

b Click **OK**.

Result: NetBackup displays the **Change Policy** window.

8 In the **Change Policy** window do the following:

a Select the **Clients** tab.

b Select the machine on which Recovery Manager is installed.

c Click **OK**.

Result: Veritas NetBackup is ready for use by 3PAR Recovery Manager.



NOTE: If the backup server is running the NetBackup client interface, NetBackup cannot validate the policy.

5.4 Update the System

3PAR recommends that you reboot the system after installing NetBackup so the system immediately adds the NetBackup path to the PATH environment variable.



NOTE: If you do not reboot the system, backups might result in Windows API call errors.

1. Reboot the system.
2. Ensure that the NetBackup binary path entry appears in the PATH environment variable.



NOTE: If you add the NetBackup path to the system's PATH environment variable after you install Recovery Manager for SQL Server, you must also restart Recovery Manager for your changes to take effect.

6 Using the Recovery Manager GUI

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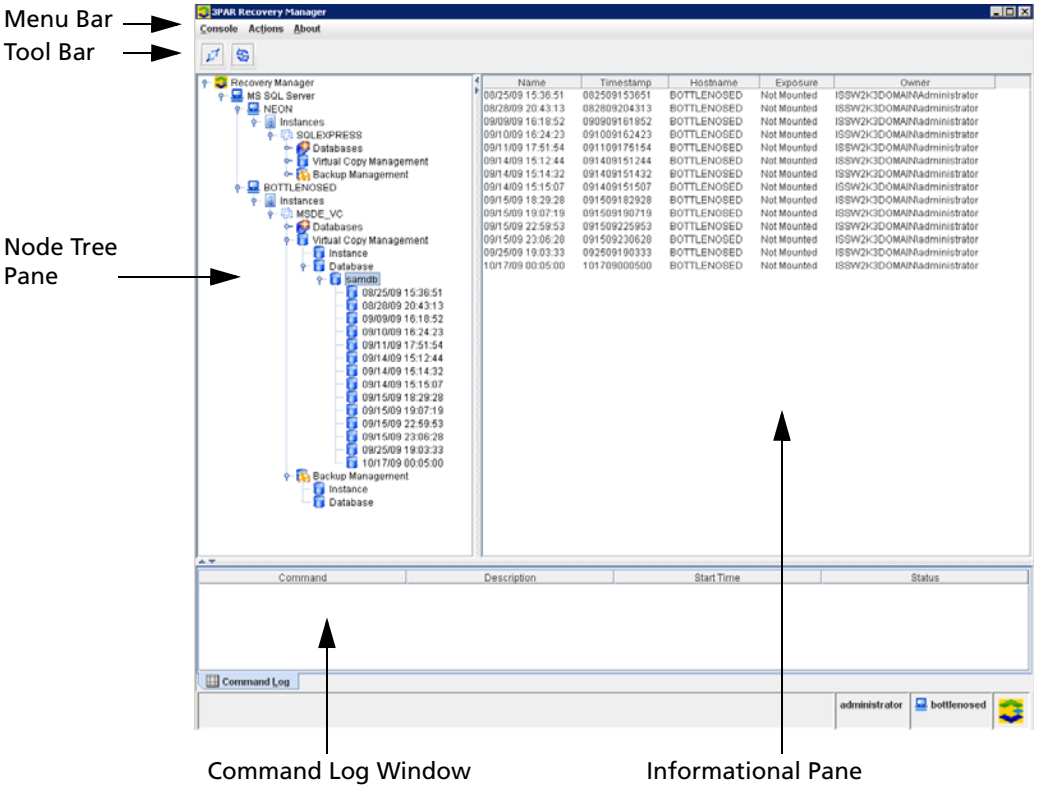
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6.1 Overview of the Recovery Manager GUI

3PAR Recovery Manager for SQL Server provides a Graphical User Interface (GUI) for managing SQL servers.

The Recovery Manager GUI enables you to create, remove, mount, unmount, back up, and restore a virtual copy of an individual database or an entire instance (i.e., all databases within an instance). In addition, the Recovery Manager GUI enables you to configure automatic email notifications, schedule automatic creation and backup of virtual copies, view event messages, and sync the backup repository.

The Recovery Manager GUI contains a menu bar, a node tree pane on the left, an informational pane on the right, and a command log window.



6.1.1 Menu Bar

The menu bar consists of the following menu options:

- **Console** - allows you to exit the GUI.
- **Actions** - provides access to virtual copy functionality, including: backup, create, email notification, mount, policies, register, remove, rescan, restore, refresh, remote copy, and unmount.
- **About** - allows you to access event message descriptions, version information, and the task manager.

6.1.2 Node Tree Pane

After you register the SQL server, the node tree pane displays the SQL server's instances, databases, virtual copies, and backup records as a nested tree. Servers configured in a non-cluster environment are represented by blue icons; servers configured in a cluster environment are represented by orange icons. For more information about registering SQL servers, see *Registering the Server* on page 6.4.

6.1.3 Informational Pane

When a tree node is selected, the informational pane displays detailed information about the node.

6.2 Opening the Recovery Manager GUI

To open the 3PAR Recovery Manager GUI, double-click the **3PAR Recovery Manager for SQL Server** icon on your desktop or, in the taskbar, click **Start** > **3PAR Recovery Manager for SQL Server**.

6.3 Closing the Recovery Manager GUI

To close the Recovery Manager GUI, either close the entire window or select **Console** > **Exit**.

6.4 Registering the Server

In order for the Recovery Manager GUI to manage your SQL servers, you must register the SQL Server instances.

To register a SQL instance:

1 Right-click the **MS SQL Server** node and select **Register Server**.

Result: The **Recovery Manager for SQL Server Register** window appears, displaying a list of SQL servers and their instances.



NOTE: If your backup server and SQL production servers reside on different networks, the **Recovery Manager for SQL Server Register** window might not display all of the available SQL servers.
In addition, the displayed list of SQL servers can vary depending on factors such as network traffic, timeouts, routers, lost broadcasted packets, and other network issues.

2 Depending on whether Recovery Manager displays the SQL server you want to register, do the following:

- If the list displays the SQL server you want to register, Recovery Manager discovered the server instance. Continue as follows:

a Click the **Register** checkbox for the server instance.

b Click **OK**.

- If the list does not display the SQL server you want to register, you must manually register the instance. To do so:

a In the **Server Name** text box, enter the SQL server name and instance name. Use the format *SQLServerName**instanceName* as follows:

- If you are registering the default instance, either enter the SQL server name only, or enter the SQL server name and **default**, separated by a backslash. For example, **Aztec** or **Aztec\default**.
- If you are registering a named instance, enter the SQL server and instance name, separated by a backslash. For example: **Aztec\Bld2**.

b Click **Add**.

Result: Recovery Manager adds the new SQL server and instance to the list and automatically selects the **Register** checkbox for the entry.

c Click **OK** to start the registration.



NOTE: Depending on your network traffic, it may take up to several minutes for the Recovery Manager GUI to register a SQL server instance.

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3 Depending on the success of the registration, do one of the following:

- If Recovery Manager displays **Update Success** in the entry's **Status** column, Recovery Manager successfully registered the instance. Click **OK**; you can now use the Recovery Manager GUI to manage the instance.
- If Recovery Manager displays **Update Failed** in the entry's **Status** column, Recovery Manager was not able to connect to the instance. Continue as follows:

a To fix any connectivity issues, see *Troubleshooting SQL Connectivity* on page 4.5. The instance must pass the SQL connectivity test before the Recovery Manager GUI can successfully register the instance.

b Repeat the registration steps for the SQL server until Recovery Manager successfully registers the instance.

6.4.1 Updating Registration after Server Modification

If you modify a registered instance's configuration (e.g., you create a new database under that instance), you must rescan the instance to update the registration.

To rescan an instance:

1 Right-click the **MS SQL Server** node.

2 Select **Rescan Server Configuration**.

6.5 Unregistering a SQL Server Instance

To remove a server instance from the list of registered servers:

1 Right-click the instance.

2 Select **Delete SQL Server Registration**.

6.6 Setting the Recovery Manager Policy Configuration

3PAR Recovery Manager provides a policy-setting feature that allows you to specify either a numeric-based or expiration-based policy for each instance and database on a selected SQL server.



NOTE: The expiration-based policy option is only available if your InServ is running InForm OS 2.3.1 or above.

The numeric-based policy is configured by default to allow a maximum of 10 virtual copies per instance and per database, and does not allow you to create additional copies. If you want to continue to create virtual copies after you have reached the maximum number of virtual copies allowed, you can configure the policy to automatically delete the oldest existing virtual copy when you attempt to create a new virtual copy after the maximum number of copies has been created. (If you do not configure the policy to automatically delete the oldest existing virtual copy after the maximum number of copies has been reached, you must manually remove an old virtual copy in order to create a new virtual copy.)

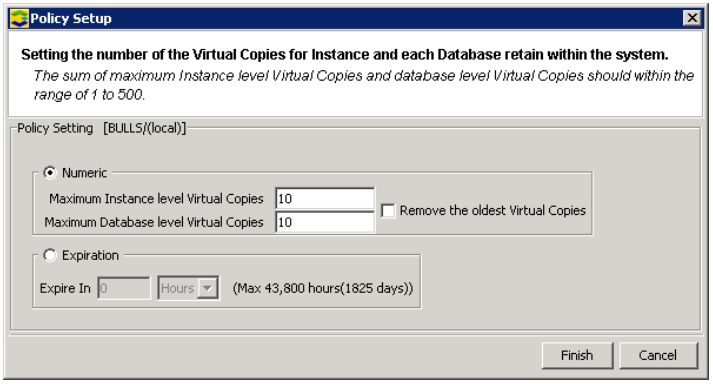
The expiration-based policy enables you to configure the policy to automatically remove virtual copies after a specified period of time has elapsed.

To set Recovery Manager policies:

1. In the node tree pane, locate the instance you want to configure.
2. To set the policy, do one of the following:
   - Right-click the instance and select **Policy.**
   - Select the instance and click the **Policy** icon.
   - Select the instance and select **Actions** > **Policy** from the menu bar.

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Result: The **Policy Setup** dialog box appears.



3 Depending on whether you want to set a maximum number of copies or you want to set an expiration time frame, do the following:

- To set a maximum number of virtual copies:

a Select the **Numeric** radio button.

b In the **Maximum Instance level Virtual Copies** and **Maximum Database level Virtual Copies** text boxes, enter the desired maximum for each as a number between 1 and 500.

c To remove the oldest virtual copy each time a copy above the maximum is created, check the **Remove the oldest Virtual Copies** checkbox.
To keep the oldest virtual copy (and therefore prevent new virtual copies from being made after the maximum number is reached), uncheck the **Remove the oldest Virtual Copies** checkbox.

- To set an expiration time frame:

a Select the **Expiration** radio button.

b In the **Expire In** text box, enter the number of hours or days after which you want Recovery Manager to remove each virtual copy. The maximum expiration period is 43800 hours / 1825 days (5 years).

c In the drop-down list, select either **Hours** or **Days**.

4 Click **Finish**.



NOTE: The virtual copy policy is effective immediately for all future virtual copies. Any modifications you make to an existing policy are not retroactive; virtual copies created under a previous policy (whether numeric or expiration-based) retain the policy setting under which they were created.



NOTE: You can also use the CLI command `RMSql policy` to set Recovery Manager policies. In addition, you can use the CLI command `RMSql timeconfig` to modify the interval between analyses of the repository against the InServ. For more information, see Chapter 7, *Using the Recovery Manager CLI*.

6.7 Configuring Email Notifications

You can configure 3PAR Recovery Manager to automatically send an email when:

- You create a virtual copy or remote virtual copy, or Recovery Manager automatically creates a virtual copy or remote virtual copy according to the task schedule.
- You create a backup or Recovery Manager automatically creates a backup according to the task schedule.
- You restore a volume, instance, or database.

In addition, you can configure the email to notify you only when an operation completes, only when an error message displays, or when either occurs.



NOTE: For more information about scheduling automatic virtual copies and remote virtual copies, see *Scheduling Automatic Virtual Copies* on page 6.13. For more information about scheduling automatic backups, see *Scheduling Automatic Backups of an Instance or Database* on page 6.20.

To configure email notifications:

1. Under **Instances** in the node tree pane, locate the instance for which you want to configure email notifications.

2 To configure email notifications, do one of the following:

- Right-click the instance and select **Email Configuration**.
- Select the instance and click the **Email Configuration** icon.
- Select the instance and select **Actions** > **Email Configuration** from the menu bar.

Result: The **Email Configuration** dialog box appears.

3 In the **Email Configuration** pane, enter the appropriate information in the following text boxes:

- **Email Type** - Type of email server (e.g., SMTP)
- **SMTP Host Name** - Name of the email server
- **Port** - Port of the email server
- **Sender Email Address** - Email address of the sender
- **Password** - Password for the sender's email address
- **Receiver Email Address** - Email address of the person to be notified of task activity and/or errors

4 To send email notifications via the Secure Sockets Layer protocol, check the **SSL** checkbox.

5 To make sure the email configuration works, click the **Test Connection** button.

6 In the **Operations** pane, check the desired checkboxes in the tab for each type of task (**Create Virtual Copy**, **Backup**, and/or **Restore**) for which you want emails:

- **Info** - Recovery Manager sends informational emails for successful operations.
- **Error** - Recovery Manager sends informational emails for operations that were not completed successfully.

Both informational and error emails contain the result of the operation and the related CLI output.

7 Click **Finish**.

Result: Recovery Manager encrypts the password and saves the configuration as an XML file with the filename ***servername_instancename*_EmailConfig.xml**. Each time a virtual copy or backup is created or a restoration is performed on this instance, Recovery Manager checks the XML file and, if email is configured for the task, sends an email with the task information and/or error messages.

6.8 Deleting Email Configurations

To permanently stop all email notifications for an instance:

1. Select the instance for which you do not want to receive any email notifications.
2. Select **Actions** > **Delete Email Configuration**.

6.9 Creating a Virtual Copy

You can use 3PAR Recovery Manager to manually create virtual copies for Microsoft SQL Server at the instance and database level. You can also schedule Recovery Manager to automatically make virtual copies of instances and/or databases.



NOTE: You can configure Recovery Manager to automatically send email notifications when virtual copies are manually or automatically created. For more information, see *Configuring Email Notifications* on page 6.9.

When Recovery Manager creates a virtual copy for an instance, it creates a virtual copy of all databases under that instance, including the instance's system databases. Similarly, when Recovery Manager creates a virtual copy for a database, it creates a virtual copy of all volumes where the database and log files reside.



NOTE: Because virtual copies include all databases or volumes relevant to the instance or database you are copying, 3PAR recommends that you store only instance- or database-related data files in instance and database volumes.

To create a virtual copy:

1. In the node tree view, locate the instance or database for which you want to create a virtual copy.
2. To create a virtual copy, do one of the following:
   - Right-click the instance or database and select **Create Virtual Copy**.
   - Select the instance or database and click the **Create Virtual Copy** icon.

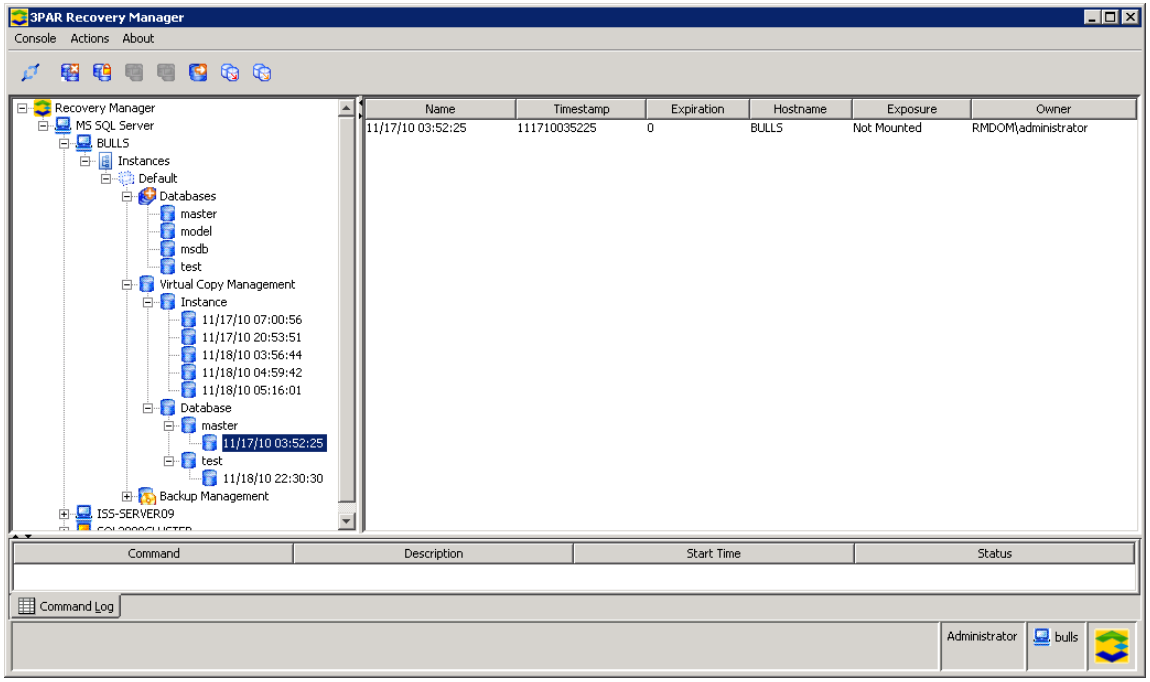
- Select the instance or database and select **Actions** > **Create Virtual Copy** from the menu bar.

  Result: The **Create Virtual Copy** dialog box appears, displaying the policy set for this instance or database. You can immediately create a virtual copy, or you can schedule virtual copies for this instance or database.

6.9.1 Manually Creating a Virtual Copy

To immediately create one virtual copy, click **Finish** in the **Create Virtual Copy** dialog box.

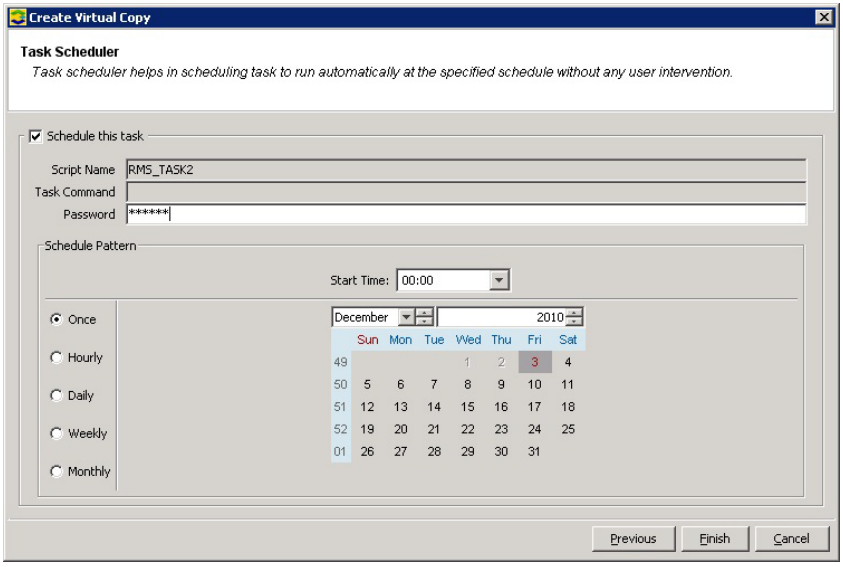
Result: Recovery Manager creates the virtual copy and names it as its timestamp. The node tree view displays the new virtual copy under the **Virtual Copy Management** node under the relevant instance or database name.



6.9.2 Scheduling Automatic Virtual Copies

1 To schedule automatic virtual copies for this instance or database, click **Next** in the **Create Virtual Copy** dialog box.

Result: The **Task Scheduler** appears.



2 Check the **Schedule this task** checkbox.

3 In the **Password** text box, enter a local user password for the backup server.

4 From the **Start Time** drop-down list, select the hour at which you want Recovery Manager to start creating automatic virtual copies.

5 To specify the frequency with which the automatic virtual copies are to be created, select the appropriate radio button in the left pane of the **Schedule Pattern** area.

Result: The right pane of the **Schedule Pattern** area displays a calendar with which you can specify exactly when Recovery Manager is to automatically create virtual copies. The type of calendar displayed depends on the frequency of the automatic virtual copies selected in the left pane of the **Schedule Pattern** area.

- **Once** - Schedules one automated virtual copy.

  In the right pane, select the month and year in which to create the virtual copy from the drop-down list above the calendar view, then select the day on the calendar.

- **Hourly** - Schedules automated virtual copies multiple times a day at the interval you specify.

  From the drop-down list in the right pane, select the number of hours you want to pass between automated copies.

- **Daily** - Schedules automated virtual copies on a daily basis at the interval you specify.

  - To schedule copies at regular intervals during the week, select the radio button for **Every day** in the right pane and enter the number of days between copies.

  - To schedule copies on a daily basis, select the radio button for **Every weekday** in the right pane and, in the **Start Date** text box, enter the start date or use the **Calendar** icon to select a start date.

- **Weekly** - Schedules automated virtual copies by the day of the week.

  In the right pane, enter the number of weeks you want to pass between automated copies and check the checkbox for each day of the week on which a virtual copy is to be created.

- **Monthly** - Schedules automated virtual copies by day or date of the specified months.

  - **Day** - To schedule copies on a specific date at a specific monthly interval, enter the date (as a number) and the number of months between copies. For example, if you enter **Day 24 of every 2 months**, Recovery Manager automatically creates a virtual copy every 24th day of every other month.

  - **The (first Sunday)** - To schedule copies on a specific day and in specific months, use the drop-down lists to specify the day and the checkboxes to specify the exact months to create copies. For example, if you enter **The first Sunday of every month** and check the **Jan**, **Apr**, and **Aug** checkboxes, Recovery Manager automatically creates a virtual copy the first Sunday in January, the first Sunday in April, and the first Sunday in August.

6 Click **Finish**.

Result: Recovery Manager automatically creates virtual copies according to schedule and names each as its timestamp. The node tree view displays each new virtual copy under the **Virtual Copy Management** node under the relevant instance or database name.



NOTE: You can use the **Task Manager** to edit, run, delete, and view details of scheduled tasks. For more information, see *Managing Automated Tasks with Task Manager* on page 6.17.



NOTE: All tasks created in Task Scheduler and their associated script files are not automatically removed when you deinstall Recovery Manager. Retention of tasks allows you to upgrade your version of Recovery Manager without losing scheduling information.

6.10 Creating a Remote Virtual Copy

You can use 3PAR Recovery Manager to manually create remote virtual copies for Microsoft SQL Server at the instance and database level. You can also schedule Recovery Manager to automatically create remote virtual copies of instances and/or databases.

When you create remote virtual copies, Recovery Manager uses 3PAR Remote Copy to send the virtual copies to the target server. Therefore, before creating a remote virtual copy, you must ensure that the Remote Copy license is installed and Remote Copy groups are configured. For more information, see Chapter 9, *Remote Copy for Recovery Manager*.

To create a remote virtual copy for an instance or database:

1. In the node tree view, locate the instance or database for which you want to create a remote virtual copy.
2. To create a remote virtual copy, do one of the following:
   - Right-click the instance or database and select **Create Remote Virtual Copy**.
   - Select the instance or database and click the **Create Remote Virtual Copy** icon.
   - Select the instance or database and select **Actions** > **Create Remote Virtual Copy** from the menu bar.

   Result: The **Create Remote Virtual Copy** dialog box appears.

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3 In the **Target Server Name** field, enter the name of the Remote Copy target server (i.e., the remote backup server).



NOTE: The Remote Copy target server is a remote server that is a Recovery Manager backup server. Both servers must be running the same version of Recovery Manager for SQL.

6.10.1 Manually Creating a Remote Virtual Copy

To immediately create one remote virtual copy, click **Finish** in the **Create Remote Virtual Copy** dialog box.

Result: Recovery Manager creates the remote virtual copy and names it as its timestamp.

6.10.2 Scheduling Automatic Remote Virtual Copies

To use the **Create Remote Virtual Copy** dialog box to schedule automatic remote virtual copies, see *Scheduling Automatic Virtual Copies* on page 6.13.

6.10.3 Displaying Remote Virtual Copies

The Recovery Manager GUI on the backup server does not automatically display remote virtual copies. To view a remote virtual copy, you can use the Recovery Manager GUI on the Remote Copy target server to mount the virtual copy, or you can use a CLI command on the Remote Copy target server to display the virtual copy.

- To use the Recovery Manager GUI, mount a virtual copy at the instance or database level on the Remote Copy target server. For more information, see *Mounting a Virtual Copy* on page 6.17.
- To use a CLI command, enter the CLI `RMSql display` command with the `-rc` option on the local backup server. For more information, see Chapter 7, *Using the Recovery Manager CLI*.

6.11 Managing Automated Tasks with Task Manager

You can use the Task Manager to manage all your scheduled virtual copies and backups for all 3PAR Recovery Manager products running on your servers.

1. In the node tree pane, select any node under **Recovery Manager**.
2. Select **About** > **Task Manager**.

   Result: The **Task Manager** dialog box appears. Recovery Manager lists all scheduled tasks in the **Task Name** column, prefixing Recovery Manager for SQL Server tasks with **RMS**.
3. To manage a scheduled task, select it and click one of the following buttons:
   - **Edit** - Opens the **Task Scheduler**, with which you can modify the task. To save your changes, you must enter your password. For more information, see *Scheduling Automatic Virtual Copies* on page 6.13.
   - **Detail** - Displays task information in the **Task Detail** dialog box.
   - **Delete** - Deletes the task and its associated script file.
   - **Edit Script** - Displays the task script and enables you to modify it.
   - **Run Now** - Performs the selected task immediately (in addition to its scheduled run time).
   - **Stop** - If the task is currently running, stops it.
   - **Refresh** - Updates the list and status of scheduled tasks.
4. To exit the **Task Manager** dialog box, click **OK**.

6.12 Mounting a Virtual Copy

You can use 3PAR Recovery Manager to mount a virtual copy at the instance or database level.

1. In the node tree pane, locate the timestamp for the virtual copy you want to view.
2. To mount the virtual copy, do one of the following:
   - Right-click the timestamp and select **Mount**.
   - Select the timestamp and click the **Mount** icon.

- Select the timestamp and select **Actions** > **Mount** from the menu bar.

  Result: The **Mount Virtual Copy** dialog box appears.

3 Ensure the **Target Server** text box displays the server name to which you want the virtual copy mounted.

4 In the **Mount Point Only** text box, enter the mount point or select it using the browser.



NOTE: Recovery Manager does not support mounting a virtual copy to a drive letter.

5 Click **OK**.

Result: Recovery Manager does the following:

- Adds the mounted virtual copy to the list view in the informational pane.
- Displays the server to which the copy is mounted in the **Exposure** column.
- Displays the absolute path on which the copy is mounted in the **Mount Point** column.
- Displays the icon for the mounted virtual copy in green.

6.13 Unmounting a Virtual Copy

1 In the node tree pane, locate the timestamp for the virtual copy you want to unmount.

2 To unmount the virtual copy, do one of the following:

- Right-click the timestamp and select **Unmount**.
- Select the timestamp and click the **Unmount** icon.
- Select the timestamp and select **Actions** > **Unmount** from the menu bar.

3 Recovery Manager displays a dialog box asking you to confirm the unmount. Click **OK**.

Result: The Recovery Manager GUI does the following:

- Removes the mounted virtual copy from the list view in the informational pane.
- Displays **Not Mounted** in the **Exposure** column.
- Displays the icon for the mounted virtual copy in blue.

6.14 Backing Up a Virtual Copy Using Veritas NetBackup

To back up a virtual copy using Veritas NetBackup, you must first configure Veritas NetBackup as described in Chapter 5, *Configuring NetBackup for Recovery Manager*.

You can create a backup of an instance or database on the instance or database level or at the timestamp level. When you create a backup on either the instance or database level, 3PAR Recovery Manager creates a new virtual copy, and NetBackup backs it up. When you create a backup at the timestamp level, Recovery Manager mounts the existing virtual copy, and NetBackup backs it up using the same timestamp.

6.14.1 Creating Backups at the Instance or Database Level

You can use 3PAR Recovery Manager to manually create backups for Microsoft SQL Server at the instance and database level. You can also schedule Recovery Manager to automatically create backups of instances and/or databases.



NOTE: You can configure Recovery Manager to automatically send email notifications when backups are manually or automatically created. For more information, see *Configuring Email Notifications* on page 6.9.

When you create a backup of a virtual copy for an instance or database, Recovery Manager automatically creates a virtual copy and mounts it, NetBackup backs it up to the media, and Recovery Manager unmounts it. You can also choose to have Recovery Manager automatically remove the newly created virtual copy.

To create a backup at the instance or database level:

1. In the node tree pane, locate the instance or database you want to back up.
2. To create a backup, do one of the following:
   - Right-click the instance or database and select **Backup to Media**.
   - Select the instance or database and click the **Backup to Media** icon.
   - Select the instance or database and select **Actions** > **Backup to Media** from the menu bar.

   Result: The **Recovery Manager NBU Configuration** dialog box appears:

3 In the **Master Server Name**, **NBU Policy Name**, and **NBU Full Schedule Name** text boxes, enter the appropriate information. Ensure that the policy and schedule names match the names of the policy and schedule set up for use with Recovery Manager. For more information, see Chapter 5, *Configuring NetBackup for Recovery Manager*.



NOTE: Recovery Manager saves the master server name, the policy name, and the schedule name and displays them as the default values the next time you create a backup.

4 To automatically remove the newly created virtual copy after backup, ensure the **Remove Virtual Copy from InServ after NBU backup** checkbox is checked.

6.14.1.1 Manually Backing Up an Instance or Database

To immediately create one backup, click **Finish** in the **Recovery Manager NBU Configuration** dialog box.

Result: Depending on the Recovery Manager policy, Recovery Manager does the following:

- If you are using a numeric-based policy and the policy is not configured to remove the oldest virtual copies (i.e., the **Remove the oldest Virtual Copies** checkbox is not checked), and you have reached the maximum number of virtual copies allowed, Recovery Manager prevents you from creating a new virtual copy (and therefore prevents you from creating a backup). For more information, see *Setting the Recovery Manager Policy Configuration* on page 6.7.
- If you are using an expiration-based policy, or you are using a numeric-based policy but either have not reached the maximum number of virtual copies allowed or the policy is configured to remove old copies as necessary (i.e., the **Remove the oldest Virtual Copies** checkbox is checked), Recovery Manager creates the new backup, named as its timestamp, and adds it to the **Backup Management** node under the relevant instance or database in the node tree view.

6.14.1.2 Scheduling Automatic Backups of an Instance or Database

To use the **Recovery Manager NBU Configuration** dialog box to schedule automatic backups, see *Scheduling Automatic Virtual Copies* on page 6.13.

6.14.2 Creating Backups at the Timestamp Level

When you create a backup of a virtual copy at the timestamp level, Recovery Manager copies the existing virtual copy, and NetBackup backs the copy up to the media using the same timestamp as the original copy. Recovery Manager does not create a new virtual copy for timestamp backups.

To create a backup at the timestamp level:

1. In the node tree pane, locate the timestamp for the virtual copy you want to back up.
2. To create a backup, do one of the following:
   - Right-click the timestamp and select **Backup to Media**.
   - Select the timestamp and click the **Backup to Media** icon.
   - Select the timestamp and select **Actions** > **Backup to Media** from the menu bar.

   Result: The **Recovery Manager NBU Configuration** dialog box appears. Because timestamp backups do not create virtual copies, the **Remove Virtual Copy from InServ after NBU backup** checkbox is disabled.



NOTE: Creating a timestamp backup does not change the status of the backed-up virtual copy.

3. In the **Master Server Name**, **NBU Policy Name**, and **NBU Full Schedule Name** text boxes, enter the appropriate information. Ensure that the policy and schedule names match the names of the policy and schedule set up for use with Recovery Manager. For more information, see Chapter 5, *Configuring NetBackup for Recovery Manager*.



NOTE: Recovery Manager saves the master server name, the policy name, and the schedule name and displays them as the default values the next time you create a backup.

4. Click **Finish**.

   Result: Recovery Manager adds the new backup, named as its timestamp, to the **Backup Management** node under the relevant timestamp in the node tree view.



NOTE: Recovery Manager does not support scheduling automated timestamp backups.

6.15 Removing a Backup from the Repository

To use Recovery Manager to remove a backup from the repository, do one of the following:

- Right-click the backup and select **Remove**.
- Select the backup and click the **Remove** icon.
- Select the backup and select **Actions** > **Remove** from the menu bar.

Result: Recovery Manager removes the backup from the repository.

6.16 Restoring Instances, Databases, and Volumes

You can use 3PAR Recovery Manager to restore an instance or a database from a virtual copy using volume restore or file copy, or you can perform a media restore from a backup.



NOTE: If your servers are configured in a shared volume environment such as a Microsoft cluster environment, see the following sections for more information on performing a restore in an MSCS environment:

- *Restoring a SQL Instance in an MSCS Environment Using File Copy Restore* on page 8.4
- *Restoring a Volume in an MSCS Environment Using Volume Restore* on page 8.4

Alternatively, you can use InForm CLI commands to promote the virtual copy to its parent base volume. For more information, see the *3PAR InForm OS CLI Administrator's Manual*.

6.16.1 Restoring an Instance or Database from a Virtual Copy with Volume Restore



WARNING: When you use the volume restore feature to restore an instance or database, Recovery Manager promotes the virtual copy to the base volume and overwrites all data on the volume. Before using the volume restore feature, you must make sure the base volume to which you are promoting the virtual copy does not contain files for other instances or databases.

The volume restore feature enables you to quickly restore an instance or a database from a virtual copy.

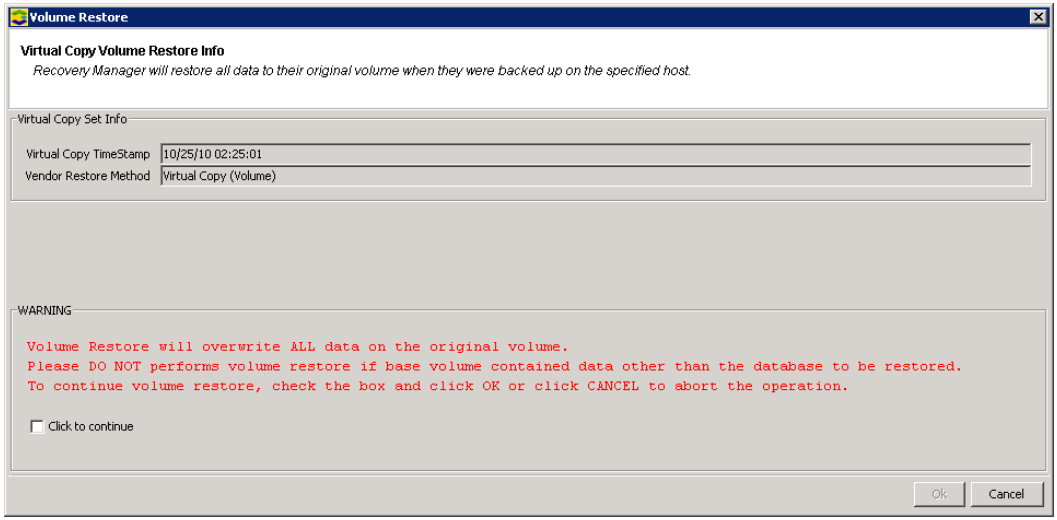


NOTE: If you are restoring a volume that is part of a Remote Copy target system, you must restore the virtual copy to the Remote Copy volume group that is associated with the same Remote Copy target system as the virtual copy you are using for the restore.

To use the volume restore feature to restore an instance or database from a virtual copy, do the following:

1. Stop the SQL Server service.
2. Under the **Virtual Copy Management** node in the node tree pane, locate the timestamp for the virtual copy you want to use for the restore.
3. To restore the instance or database, do one of the following:
   - Right-click the timestamp for the virtual copy and select **Restore Using** > **Volume**.
   - Select the timestamp for the virtual copy and click the **Volume Restore** icon.
   - Select the timestamp for the virtual copy and select **Actions** > **Restore Using** > **Volume** from the menu bar.

Result: The **Volume Restore** dialog box appears.



4 To confirm you understand the warning and the ramifications of proceeding with the restore, check the **Click to continue** checkbox.

Result: The **OK** button is enabled.

5 Click **OK**.

Result: The virtual copy completely overwrites the instance or database. The instance or database is now restored.

6 Start the SQL Server service.

6.16.2 Restoring an Instance or Database from a Virtual Copy with File Copy Restore

The file copy restore feature enables you to restore a specific instance or a database from a virtual copy. Unlike the volume restore feature, the file copy restore feature does not overwrite the entire volume.

To use the file copy restore feature to restore an instance or database from a virtual copy:

1 If you are restoring an instance, stop the SQL Server service for that instance.

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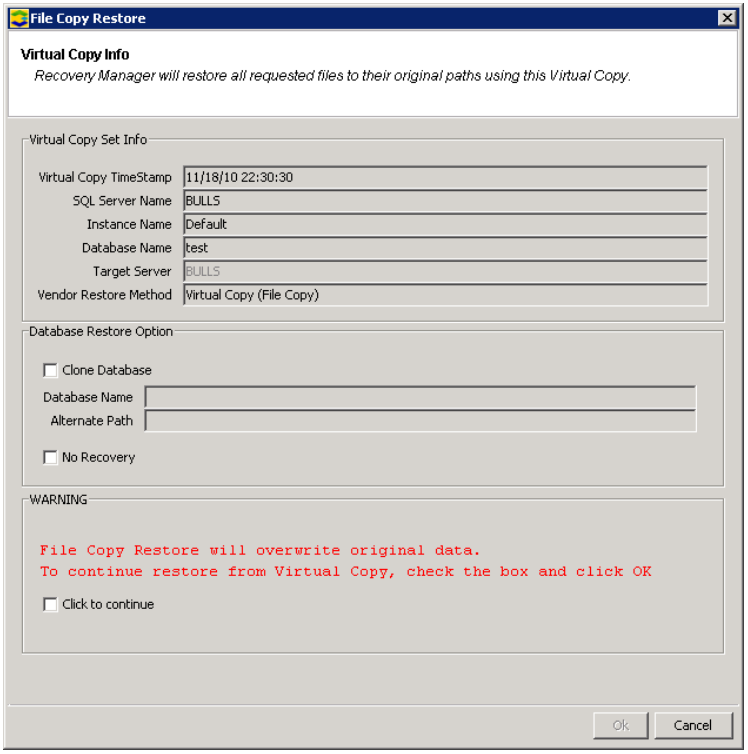
NOTE: If you are restoring a database, do NOT stop the SQL Server service. The SQL Server service must be running for the file copy restore feature to successfully restore a database from a virtual copy.

2 Under the **Virtual Copy Management** node in the node tree pane, locate the timestamp of the virtual copy you want to use for the restore.

3 To restore the instance or database, do one of the following:

- Right-click the timestamp of the virtual copy and select **Restore Using** > **File Copy**.
- Select the timestamp of the virtual copy and click the **File Copy Restore** icon.
- Select the timestamp of the virtual copy and select **Actions** > **Restore Using** > **File Copy** from the menu bar.

Result: The **File Copy Restore** dialog box appears**.**



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NOTE: The **Vendor Restore Method** text box automatically displays **Virtual Copy (File Copy)**.

4 By default, Recovery Manager restores the virtual copy to its parent instance or database (specified in the **Target Server** field).

To restore a virtual copy of a database to a database different from its parent database, you can specify an alternate database as the target of the restore. To do so:

a In the **Database Restore Option** area of the **File Copy Restore** dialog box, check the **Clone Database** checkbox.

b In the **Database Name** text box, enter the name of the database to which you want the virtual copy restored.

c If you want to restore the clone database to a location other than its parent location, enter the directory path to the alternate database In the **Alternate Path** text box. Note that if you enter an alternate location, you must enter an alternate name in the **Database Name** text box.

If you leave this text box blank, the clone database is restored to the parent location of the original virtual copy.

d To use the point-of-failure recovery method to restore the database, check the **No Recovery** checkbox. For more information about completing a point-of-failure recovery, see *Recovering All Data with Point-of-Failure Recovery* on page 8.9.

5 To confirm you understand the warning and the ramifications of proceeding with the restore, check the **Click to continue** checkbox.

Result: The **OK** button is enabled.

6 Click **OK**.

Result: Depending whether you restored the virtual copy to its parent location or created a clone database, Recovery Manager does the following:

- If you restored the virtual copy to its parent location, Recovery Manager completely overwrites the instance or database with the virtual copy. The instance or database is now restored.

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- If you restored the virtual copy with an alternate database name but you did not specify an alternate database path, Recovery Manager copies the virtual copy to the specified clone database name (at the parent location) and attaches the database.
- If you restored the virtual copy with an alternate database name with an alternate database path, Recovery Manager copies the virtual copy to the specified clone database name at the alternate location and attaches the database.

7 If you restored an instance, start the SQL Server service for the instance.

6.16.3 Restoring an Instance or Database from a Backup

You can restore backups to their original location (i.e., to the instance or database location of the virtual copy that was used to create the backup, not to the original SQL database or instance location), or you can specify an alternate location.

When you restore an instance or database with a media backup, Recovery Manager uses NetBackup to perform a media restore of the virtual copy backup that was created with NetBackup.

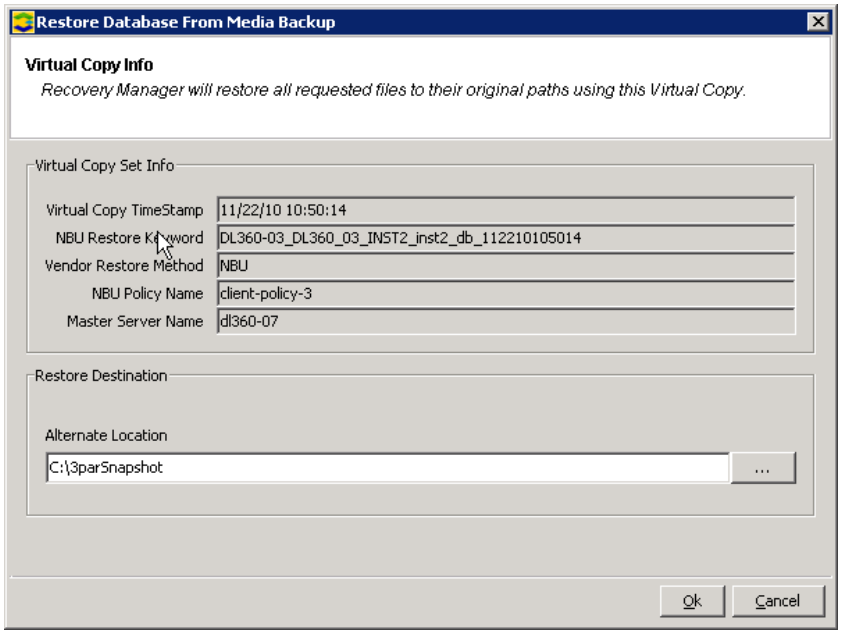
To perform a media restore of an instance or database from a virtual copy backup:

1 Under the **Backup Management** node in the node tree pane, locate the timestamp for the backup you want to use for the restore.

2 To restore the instance or database, do one of the following:

- Right-click the timestamp for the backup and select **Restore**.
- Select the timestamp for the backup and click the **Restore** icon.
- Select the timestamp for the backup and select **Actions** > **Restore** from the menu bar.

Result: The **Restore from Media Backup** dialog appears.



3 By default, the **Alternate Location** text box displays the directory **C:\3parSnapshot** (or **F:\3parSnapshot**, depending on your system drive).
To restore the virtual copy to a different location, enter the alternate location in the **Alternate Location** text box or select a location from the file chooser.

4 Click **OK**.

Result: NetBackup mounts the backup to the specified location as a virtual copy. To complete the instance or database restore, move the virtual copy to the volume or database.

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6.17 Analyzing and Synchronizing the Repository

You can use 3PAR Recovery Manager to compare and synchronize virtual copies in the Recovery Manager repository with the InServ.

1. In the node tree pane, select the SQL production server.
2. To compare the repository and the InServ, do one of the following:
   - Right-click the production server and select **Analyze**.
   - Select the production server and click the **Analyze** icon.
   - Select the production server and select **Actions** > **Analyze** from the menu bar.

   Result: The **Analyze Repository** dialog box appears.
3. To automatically synchronize the InServ and the repository (if necessary), check the **Synchronize result with Repository** checkbox.
   To analyze the repository without synchronizing it, leave the **Synchronize result with Repository** checkbox unchecked.
4. Click **Yes**.

   Result: Depending on whether you are both analyzing and synchronizing the repository or just analyzing the repository, Recovery Manager does the following:
   - If you opt to automatically synchronize the results, Recovery Manager analyzes the repository, synchronizes the repository and the InServ (if necessary), and updates the list of virtual copies under the **Virtual Copy Management** node in the node tree pane.
   - If you opt to only analyze the repository, Recovery Manager displays the **Analyze Repository** dialog box and performs the analysis. To view the list of virtual copies not in the repository, if any, click the **Detail** button in the **Analyze Repository** dialog box.

     To synchronize the results (if necessary), repeat the above steps to launch the **Analyze Repository** dialog box. Be sure to check the **Synchronize result with Repository** checkbox before continuing.

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6.18 Removing a Virtual Copy



NOTE: You cannot remove a virtual copy if it is mounted. To remove a virtual copy, it must display **Not Mounted** in the **Exposure** column in the information pane.

To remove a virtual copy, do one of the following:

- Right-click the virtual copy and select **Remove**.
- Select the virtual copy and click the **Remove** icon.
- Select the virtual copy and select **Actions** > **Remove** from the menu bar.

  Result: Recovery Manager removes the virtual copy from both the InServ storage server and the Recovery Manager repository.

6.19 Viewing Event Message Descriptions

You can view a description of all 3PAR Recovery Manager error messages (aka event messages), including tips for troubleshooting each event.

To access event message descriptions:

1. In the node tree pane, select any node under **Recovery Manager**.
2. Select **About** > **Event Messages** from the menu bar.

   Result: Recovery Manager uses your default browser to display the **Event Messages** file. The file contains all the events for Recovery Manager for SQL Server in order of event ID.

7 Using the Recovery Manager CLI

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7.1 Recovery Manager for SQL Server Command Line Interface (CLI)

3PAR Recovery Manager for Microsoft SQL Server provides a Command Line Interface (CLI). The CLI allows users to manage Recovery Manager functionality using commands rather than through the graphical user interface (GUI).

To do the following:	Use this CLI command:
Create virtual copies	`RMSql create`
Remove unmounted virtual copies	`RMSql remove`
Mount virtual copies	`RMSql mount`
Unmount virtual copies	`RMSql unmount`
Backup virtual copies to media using Veritas NetBackup	`RMSql backup`
Restore from virtual copies	`RMSql restore`
Display virtual copies currently in the repository	`RMSql display`
List backup entries currently in the backup pool	`RMSql listbackup`
Delete backup entries currently in the backup pool	`RMSql deletebackup`
Query and change repository location	`RMSql repository`
Query and change the port location	`RMSql portconfig`
Change the wait time for backup, volume restore, and analysis	`RMSql timeconfig`

Gather the environmental statistics and create a log file for diagnosis	`RMSql report`
Analyze and synchronize the volumes in the Inserv and the virtual copies in the repository	`RMSql analyze`
Set Recovery Manager policies	`RMSql policy`
Set policy for specified virtual copy	`RMSql setvc`

7.2 Recovery Manager Commands

The following sections describe how to administer Recovery Manager from the Command Line Interface.

COMMAND

`RMSql analyze`

SYNTAX

```
RMSql analyze -s <SQL server> [-sync] [-f]
```

DESCRIPTION

The `RMSql analyze` command validates all virtual copy records by matching virtual copies in the InServ Storage Server against records in the Recovery Manager repository. If any existing virtual copies in the InServ are missing from the repository, Recovery Manager displays them as out-of-sync records. Likewise, if any existing virtual copies in the repository are missing from the InServ, Recovery Manager also displays them as out-of-sync records.

PARAMETERS

The following options are supported:

`-s <SQL Server>`

SQL server to which the database belongs.

`-sync`

Remove out-of-sync virtual copies from the repository.

Optional: If not defined, out-of-sync virtual copies remain in the repository.

`-f`

Forcefully remove out-of-sync records from the repository. You must use this option in conjunction with the `-sync` option.

Optional: If not defined, the system requires you to confirm the removal of out-of-sync virtual copies.



NOTE: When you use the `-f` option, Recovery Manager automatically removes out-of-sync records without prompting for confirmation.

EXAMPLES

The following example validates all virtual copies under the specified SQL server.

```
RMSql analyze -s <SQLserver>
```

COMMAND

`RMSql backup`

SYNTAX

```
RMSql backup -s <SQL server> [-i <SQL instance>]
[-d <database>] [-t <timestamp> | -r ] [-ts <target server>]
-p <policyName> -u <ScheduleName> -M <masterServer>
[-noemail]
```

DESCRIPTION

The `RMSql backup` command backs up a virtual copy to the specified media. The backup can be an existing virtual copy, or it can be a new virtual copy created by this command.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server associated with the database.

`-i <SQL instance>`

SQL server instance associated with the database.

Optional: If not specified, MSSQLSERVER (local) is used as the default value.

`-d <database>`

The database for the virtual copy.

Optional: If not specified, the instance for the virtual copy is used as the default value.

`-t <timestamp>`

The timestamp of the virtual copy to back up.

Optional: If not specified, the system creates a point-in-time virtual copy, uses it to create the backup, and then removes this virtual copy after the backup is complete. If specified, the system retains this timestamp value after the backup is complete.

`-r`

Retain the virtual copy. Valid only if you do not use the -t option.

Optional: If not specified, the virtual copy is deleted after backup is complete.

`-ts <target server>`

Target Server for the backups if the `-r` option is not specified. To use this option, the following must be located at the secondary site:

- Recovery Manager Backup Component server, with Recovery Manager for SQL Server installed
- Veritas NetBackup client

Optional: If not specified, the local system is used as the default value.

`-p <policyName>`

Veritas NetBackup policy name.

`-u <ScheduleName>`

Name of the NetBackup backup schedule.

`-M <masterServer>`

NetBackup master server name.

`-noemail`

Do not send an email notification even if configured for this operation.

Optional: If not specified, Recovery Manager sends an email notification of the backup if configured. For more information, see *Configuring Email Notifications* on page 6.9.

EXAMPLE:

The following command performs a backup of virtual copy 020405162103 with the necessary Veritas NetBackup parameters.

```
RMSql backup -s inst1 -d test_db -t 020405162103 -p test -u full -M host1
```



NOTE: Use quotes ("") when an option value includes spaces.



NOTE: During backup, snapshot volumes of the virtual copy are surfaced to the operating system with a default mount point under the `%SystemDrive%\3parsnapshot` directory. Therefore, `%SystemDrive%` must use NTFS in order to support the volume mount point.

COMMAND

`RMSql create`

SYNTAX

```
RMSql create -s <SQL server> [-rc <target server> [-w <waittime>]]
[-i <SQL instance>] [-d <database>] [-noemail] [-exp <time> {unit}]
```

DESCRIPTION

The `RMSql create` command creates a virtual copy of a SQL database or databases under an instance on the primary host where the SQL server instance is running. (The virtual copy can be mounted to a host later for off-host processing.)

The `RMSql create` command also allows the user to create a synchronization in periodic mode to a Remote Copy group where a single SQL database or all of the SQL databases under an instance are defined, and create another virtual copy at the secondary site as a backup.

As with Recovery Manager for SQL Server itself, this command only supports the online backup of an entire SQL database. Therefore, you must make sure the database is online before creating a virtual copy.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server to which the database belongs.

`-i <SQL instance>`

SQL server instance to which the database belongs.

Optional: If not specified, MSSQLSERVER is used as the default.

`-d <database>`

The database from which to create a virtual copy.

Optional: If not specified, the instance level of the virtual copy is used as the default.

`-w <waittime>`

Wait time in seconds. Recovery Manager uses this wait time to poll the status of the remote copy before creating a virtual copy at the secondary site.

Optional: If not specified, the wait time is 120 seconds by default.

`-rc <target server>`

Remote Copy target server. To use this option, the Recovery Manager Backup Component server, with Recovery Manager for SQL Server installed, must be located at the secondary site.

`-noemail`

Do not send an email notification even if configured for this operation.

Optional: If not specified, Recovery Manager sends an email notification of the virtual copy creation if configured. For more information, see *Configuring Email Notifications* on page 6.9.

`-exp <time> {unit}`

Set the expiration time for this virtual copy to the specified time and time unit. Valid values are:

- To set the expiration time in hours: 0-43800h (or H)
- To set the expiration time in days: 0-1825d (or D)

To use this option, the Recovery Manager policy must be set to an expiration-based policy.

Optional: If not specified, Recovery Manager creates the virtual copy using the expiration time specified in the current policy.

EXAMPLES

The following command creates a virtual copy for the database test on the SQL server (SQLServer).

```
RMSql create -s SQLServer -d test
```

The following command creates a virtual copy for the database test on a virtual SQL server (SQLVirtualServer) on a cluster.

```
RMSql create -s SQLVirtualServer -d test
```

The following command creates a Remote Copy snapshot for the database test on a virtual SQL server (SQLVirtualServer) on a cluster to a secondary site server (SecondaryServer).

```
RMSql create -s SQLVirtualServer -d test -rc SecondaryServer
```



NOTE: Use quotes ("") when an option value includes spaces.

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NOTE: VSS waits up to 10 seconds for a virtual copy operation; this interval is not configurable. In most cases, 10 seconds is a sufficient window in which to successfully create a virtual copy. However, in some circumstances under very heavy loads, 10 seconds may not be enough time, and the virtual copy might fail on this attempt. This failure is a VSS framework requirement on Microsoft's part. If such a failure occurs, VSS does not automatically retry the shadow copy creation. You must use the Recovery Manager GUI or CLI to re-attempt to create the virtual copy.



NOTE: During virtual copy creation, the system creates a backup document in XML format. This document contains current system information and can be used for restore purposes.



NOTE: The snapshot volume set is limited to up to 64 volumes. In other words, each database (under database-level operation) or each instance (under instance-level operation) can spread over a maximum of 64 volumes.



NOTE: You can only perform database- or instance-level operations if you have **sysadmin** permissions for SQL Server.

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COMMAND

`RMSql deletebackup`

SYNTAX

```
RMSql deletebackup -s <SQL server> [-i <SQL instance>] [-d <database>]
-t <timestamp>
```

DESCRIPTION

The `RMSql deletebackup` command removes the specified backup entry from the Recovery Manager repository only. It does not remove the Veritas NetBackup entry, nor does it remove the actual images backed up by NetBackup.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server to which the backup belongs.

`-i <SQL instance>`

SQL instance associated with the database.

Optional: If not specified, MSSQLSERVER (local) is used as the default value.

`-d <database>`

The database-level backup to be removed.

Optional: If not specified, the instance-level backup is removed by default.

`-t <timestamp>`

The backup entry timestamp.

EXAMPLE

The following command deletes the backup timestamp 020405162103:

```
RMSql deletebackup -s server1 -d db1 -t 020405162103
```


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COMMAND

`RMSql display`

SYNTAX

```
RMSql display -s <SQL server> [-rc <target server>] [-i <SQL instance>]
[-d <database>] [-t <timestamp>]
```

DESCRIPTION

The `RMSql display` command displays all virtual copies in the server at a local site or remote site.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server associated with the database.

`-i <SQL instance>`

SQL instance associated with the database.

Optional: If not specified, MSSQLSERVER is used as the default value.

`-d <database>`

Display the virtual copies created for a given database.

Optional: If not specified, all database and instance virtual copies belonging to the SQL server are displayed by default.

`-rc <target server>`

Remote Copy target server at secondary site. To use this option, the Recovery Manager Backup Component server, with Recovery Manager for SQL Server installed, must be located at the secondary site.

Optional: If not specified, the local site is used as the default value.

`-t <timestamp>`

Display detailed information about a specific virtual copy in the local repository.

Optional: If not specified, Recovery Manager displays information about all virtual copies.



NOTE: Recovery Manager does not support using the command `RMSql display -t` for display of information about a virtual copy that exists at a secondary site.

EXAMPLES

The following command displays the virtual copies for server1.

```
RMSql display -s server1
```



NOTE: Use quotes (" ") when an option value includes spaces.

COMMAND

`RMSql listbackup`

SYNTAX

```
RMSql listbackup -s <SQL server> [-i <SQL instance>]
[-d <database>] [-t <timestamp>]
```

DESCRIPTION

The `RMSql listbackup` command displays all virtual copies being backed up via Veritas NetBackup.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server to which the database belongs.

`-i <SQL instance>`

SQL server instance to which the database belongs.

Optional: If not specified, MSSQLSERVER (local) is used as the default.

`-d <database>`

Database for which to display virtual copies.

Optional: If not specified, Recovery Manager displays virtual copies being backed up at the instance and database level.

`-t <timestamp>`

Timestamp of a specific virtual copy to display.

Optional: If not specified, Recovery Manager displays all virtual copies being backed up.



NOTE: When you specify a timestamp, Recovery Manager displays detailed information about the virtual copy being backed up.

COMMAND

`RMSql mount`

SYNTAX

```
RMSql mount -s <SQL server> -t <timestamp> [-m <mount point>]
[-ts <host name>]
```

DESCRIPTION

The `RMSql mount` command mounts a virtual copy created by the `RMSql create` command.

To mount a virtual copy, you must create an available mount point on the NTFS volume before you execute the command.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server associated with the database.

`-t <timestamp>`

Timestamp for the virtual copy to be mounted.

`-m <mount point>`

Mount point for virtual copy devices.

Optional: If not specified, `%SystemDrive%\3parSnapshot` is used as the default mount point.

`-ts <hostname>`

Name of the host on which to mount the virtual copy.

Optional: If not specified, the local host is used as the default mount point.



WARNING: If you mount a volume with the `RMSql mount` command, you **must** unmount the volue with the `RMSql unmount` command. Do not manually unmount a volume that was mounted with the `RMSql mount` command.



NOTE: When mounting in read-write mode, the system uses VDS API to make the volume read-writeable. However if there is another operation on the disk and the device is locked, you cannot unmount the volume. If you attempt to unmount a locked volume, the system displays the following error message:

```
ERROR: COM call "pVolumeMF->Dismount(TRUE,FALSE)" failed.
Returned HRESULT = 0x80042413
Error text: <Unknown error code>
Error: There was an expected HRESULT error catched:
0x80042413 <Unknown error code>
```

This error message indicates the same issue as VDS_E_DEVICE_IN_USE.

To resolve the issue, restart the VDS service or reboot the machine.



NOTE: 3PAR only supports snapshot exposure to a host.

COMMAND

`RMSql policy`

SYNTAX

```
RMSql policy -s <SQL server> [-i <SQL instance>] [-q]
[-exp <time>{h|H|d|D}] [-in <instance virtual copy limit>]
[-n <database virtual copy limit>] [<-r>]
```

DESCRIPTION

The `RMSql policy` command sets the Recovery Manager policy at the instance and database level.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server to which the database belongs.

`-i <SQL instance>`

SQL server instance to which the database belongs.

Optional: If not specified, MSSQLSERVER (local) is used as the default.

`-r`

Retain the oldest virtual copy even when the number of virtual copies exceeds the limit set by the Recovery Manager policy. If you specify this option, Recovery Manager cannot create new virtual copies after the maximum copies allowed is reached (unless you manually remove one or more older virtual copies).

Optional: If not specified, Recovery Manager removes virtual copies.

`-q`

Query current policy status.

Optional: If not specified, the current policy status is not displayed.

`-n <database virtual copy limit>`

Maximum number of database-level virtual copies to retain.

Optional: If not specified, a maximum of 10 is used as the default.

`-in <instance virtual copy limit>`

Maximum number of instance-level virtual copies to retain.

Optional: If not specified, a maximum of 10 is used as the default.



NOTE: The sum of the values used for the `-n` and `-in` options cannot exceed 500.

`-exp <time>{h|H|d|D}`

If the policy is expiration-based, set the expiration time to the specified time and time unit. Valid values are:

- To set the expiration time in hours: 1-43800h (or H)
- To set the expiration time in days: 1-1825d (or D)

Optional: If not specified, the expiration time does not change.

EXAMPLE

The following command sets the maximum number of virtual copies to 5 at all times for the default SQL instance:

```
RMSql policy –n 5 -s <SQL server>
```

The following command sets the expiration time of virtual copies to 30 days for the default SQL instance:

```
RMSql policy -exp 30d -s <SQL server>
```



NOTE: By default, the Recovery Manager policy is set to a maximum of 10 virtual copies each for the instance level and the database level. In addition, the option to delete the oldest virtual copy is by default set to 'No'; therefore, when the virtual copy limit is reached, Recovery Manager retains the oldest virtual copy.

You can use the above example command either to expand the policy limit (by specifying a larger value for the `-n` option) or to enable removal of the oldest virtual copy if the limit has already been reached (by **not** using the `-r` option).

COMMAND

`RMSql portconfig`

SYNTAX

`RMSql portconfig [-n <number>] [-s <WindowsHost>]`

DESCRIPTION

After Recovery Manager for SQL Server is installed, by default the port used for communication between the backup server and production server is 9932. If necessary, you can specify an alternate port.

PARAMETERS

The following options are supported:

`-n <number>`

Port number.

Optional: If not specified, 9932 is used as the default.

`-s <WindowsHost>`

Name of the Windows host on which to change the port.

Optional: If not specified, the current host name is used as the default.

EXAMPLES

The following command changes the local port to 9999.

```
RMSql portconfig -n 9999
```

The following command changes the port on the specified SQL server to 9999.

```
RMSql portconfig -n 9999 -s <WindowsHost>
```



NOTE: After you execute the `portconfig` command, you must restart Recovery Manager Services.



NOTE: If you change the port value on one server, you must update the port value for every Recovery Manager for SQL system (including the Recovery Manager backup server) managed by the same Recovery Manager backup server.

COMMAND

`RMSql remove`

SYNTAX

`RMSql remove -s <SQL server> -t <timestamp>`

DESCRIPTION

The `RMSql remove` command removes a virtual copy from the InServ Storage Server and the Recovery Manager repository. The virtual copy must not be mounted; if the virtual copy is mounted, Recovery Manager does not remove it.

PARAMETERS

The following options are supported:

`-s <SQL server>`

SQL server to which the database belongs.

`-t <timestamp>`

Timestamp of the virtual copy to remove.



NOTE: After a virtual copy is removed, it cannot be used to restore data from the Recovery Manager repository. However, you can restore a removed virtual copy from the backup media if the virtual copy was backed up with the `RMSql backup` command and the backup entry is still available.

COMMAND

`RMSql report`

SYNTAX

```
RMSql report -s <WindowsHost> -output <OutputDirectory>
```

DESCRIPTION

The `RMSql report` command collects the environmental information from a specified Windows host and creates a report for diagnostic purposes.

PARAMETERS

The following options are supported:

`-output <OutputFolder>`

Full path to the folder in which to generate the report.

`-s <WindowsHost>`

Name of the Recovery Manager host.

EXAMPLE

The following command retrieves platform information from the host `Grampus` and saves the report in `c:\MyReport`.

```
RMSql report -s Grampus -output c:\MyReport
```

COMMAND

`RMSql repository`

SYNTAX

`RMSql repository [-a <alter location>] [-r]`

DESCRIPTION

After Recovery Manager for SQL Server is installed, by default the repository directory is located under the Recovery Manager install directory. To provide the highest level access to the repository, you can change the repository destination to the location of the 3PAR virtual volume.

PARAMETERS

The following options are supported:

`-a <alternateLocation>`

Alternate location in which to store data.

Optional: If not specified, Recovery Manager retains the current repository location.



NOTE: If you use the CLI to move the repository to an alternate location, you must restart the Recovery Manager GUI in order to view the repository in its new location.

`-r`

Retain the current repository location and only make changes to the registry values.

Optional: Use this option when Recovery Manager is reinstalled after operating under an alternate location. Note that if you use this option, you cannot move the repository path back to the alternate location.

EXAMPLE

The following command moves the repository directory to `d:\3parvv` and updates the registry database as well.

```
RMSql repository –a d:\3parvv
```

COMMAND

`RMSql restore`

SYNTAX

```
RMSql restore -s <SQL server> [-i <instance>] [-d <database>]
-t <timestamp> [-ts <target server>] [-M <masterServer>]
[-a <altLocation>] [-snap] [-noemail] [-norecovery] [-clonedb]
```

DESCRIPTION

You can use the `RMSql restore` command to perform 3 different types of restore:

- **Media Restore** - Using an existing backup entry, Recovery Manager issues a restore request to Veritas NetBackup. The image associated with this backup entry is then restored to the location you specify. If you do not specify an alternate location, data is restored to *SystemDrive*`:\3parSnapshot` by default.
- **File Copy Restore** - Using an existing virtual copy, Recovery Manager mounts the copy, extracts the database files, and copies the files back to their original locations. Because the files are copied over one by one, File Copy Restore is a relatively slow but reliable way of restoring data.
- **Volume Restore** - Using an existing virtual copy, Recovery Manager removes the existing VLUNs, promotes the virtual copy back to its base volume, and re-creates the VLUNs back to the host. Volume Restore is relatively fast. However, you should **not** perform this restore if the base volumes you are promoting contain data from other instances or databases.



NOTE: For more information about performing an instance-level file copy restore in an MSCS environment, see *Restoring a SQL Instance in an MSCS Environment Using File Copy Restore* on page 8.4.



NOTE: For more information about performing a volume restore in an MSCS environment, see *Restoring a Volume in an MSCS Environment Using Volume Restore* on page 8.4.

PARAMETERS

The following options are supported:

`-s <SQL Server>`

SQL server to which the database belongs.

`-i <SQL instance>`

SQL server instance to which the database belongs.

Optional: If not specified, MSSQLSERVER is used as the default.

`-d <database>`

Database from which to create a virtual copy.

Optional: If not specified, an instance-level restore is performed by default.

`-t <timestamp>`

Timestamp for the virtual copy to restore.

`-ts <target server>`

(Media Restore only) Target server for the restore request.

Optional: If not specified, the current server name is used as the default.

`-M <masterServer>`

(Media Restore only) Veritas NetBackup master server name.

Optional: If not specified, the current server name is used as the default.

`-a <altLocation>`

Alternate location to which to restore the data.

Optional: If not specified, data is restored to `<SystemDrive>:\3parSnapshot` by default.

`-snap`

(Volume Restore only) Promotes the virtual copy back to the base volume for a faster restore. You can only promote a base volume that is exposed to a host.

Optional: If not specified, the virtual copy is not promoted to the base volume.

`-noemail`

Do not send an email notification even if configured for this operation.

Optional: If not specified, Recovery Manager sends an email notification of the restore if configured. For more information, see *Configuring Email Notifications* on page 6.9.

`-norecovery`

Restore database with the SQL Server `norecovery` option. For more information, see *Recovering All Data with Point-of-Failure Recovery* on page 8.9.

`-clonedb <database name>`

Restore the database to a different database name.

Optional: If not specified, Recovery Manager restores the database to the original database name.



NOTE: If you are restoring a volume that is part of a Remote Copy target system, you must restore the virtual copy to the Remote Copy volume group that is part of the same Remote Copy target system as the virtual copy.

EXAMPLES

The following command performs a media restore of virtual copy 020405162103 from media backup to drive j:\.

```
RMSql restore -s server1 -d test_db -t 020405162103 -M server1 -a J:\
```

The following command performs a file copy restore of virtual copy 020405162103.

```
RMSql restore -s server1 -d test_db -t 020405162103
```

The following command performs a volume restore of virtual copy 020405162103.

```
RMSql restore -snap -s server1 -d test_db -t 020405162103
```



NOTE: Use quotes ("") when an option value includes spaces.

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COMMAND

`RMSql setvc`

SYNTAX

`RMSql setvc`

```
-s <SQL server> [-i <instance>] [-d <database>] -t <timestamp>
-exp <time>{h|H|d|D}
```

DESCRIPTION

The `RMSql setvc` command sets the expiration time for an existing virtual copy (overriding the configured Recovery Manager policy). To use this command, the policy must be expiration-based.

PARAMETERS

The following options are supported:

`-s <SQL Server>`

SQL server to which the existing virtual copy belongs.

`-i <SQL instance>`

SQL server instance to which the existing virtual copy belongs.

Optional: If not specified, MSSQLSERVER is used as the default.

`-d <database>`

Database of the existing virtual copy.

Optional: If not specified, the timestamp is assumed to be at the instance level.

`-t <timestamp>`

Timestamp of the virtual copy for which you are changing the expiration time.

`-exp <time>{h|H|d|D}`

Set the expiration time for this virtual copy to the specified time and time unit. Valid values are:

- To set the expiration time in hours: 1-43800h (or H)
- To set the expiration time in days: 1-1825d (or D)

EXAMPLE

The following command sets the expiration time for virtual copy 020409162103 to 2 hours:

```
RMSql setvc -s server1 –t 020409162103 -exp 2h
```

The following command sets the expiration time for virtual copy 020409162103 to 30 days:

```
RMSql setvc -s server1 –t 020409162103 -exp 30d
```



NOTE: Use quotes ("") when an option value includes spaces.

COMMAND

```
RMSql timeconfig
```

SYNTAX

```
RMSql timeconfig [-s <WindowsHost>] [<-prt promotetime>]
[<-bkt backuptime] [-ai <analyzeinterval>]
```

DESCRIPTION

After you install Recovery Manager for SQL Server, by default the wait time for snap volume restore is 30 seconds, the wait time for backup is 5 minutes, and the wait time for analysis of the repository with the InServ is 60 minutes. You can use this command to change these values.

PARAMETERS

`-prt <promotetime>`

Time in seconds to wait for volume promotion.

Optional: If not specified, 30 seconds is used as the default wait time.

`-bkt <backuptime>`

Time in minutes to wait for backup.

Optional: If not specified, 5 minutes is used as the default wait time.

`-s <WindowsHost>`

Windows host on which Recovery Manager is installed.

Optional: If not specified, the local host is used as the default.

`-ai <analyzeinterval>`

Time in minutes to wait for automatically analysis of the repository against the InServ. Valid values are 10-1440 (10 minutes to 24 hours).

Optional: If not specified, 60 minutes is used as the default.



NOTE: If you use the `-ai` command to modify the analyze interval, you must restart Recovery Manager for SQL for the change to take effect.

EXAMPLES

The following command queries the time value for each setting.

```
RMSql timeconfig
```

The following command changes the promote time to 50 seconds.

```
RMSql timeconfig -prt 50
```

The following command changes the backup time to 7 minutes.

```
RMSql timeconfig -bkt 7
```

The following command will change the analyze interval to 30 minutes

```
RMSql timeconfig -ai 30
```



NOTE: In most cases, there is no need to change these values unless the backup and/or volume restore are taking an unusually long time to complete.

COMMAND

`RMSql unmount`

SYNTAX

`RMSql unmount -s <SQL server> -t <timestamp>`

DESCRIPTION

The `RMSql unmount` command unmounts a currently mounted virtual copy that was mounted by the `RMSql mount` command. Recovery Manager can only unmount a virtual copy if its mounted status is not "Available."

PARAMETERS

The following options are supported:

`-s <SQL server>`

The SQL server to which the database belongs.

`-t <timestamp>`

The timestamp of the virtual copy to unmount.



NOTE: During an unmount operation, Recovery Manager removes the mount point from the mounted volumes and then removes the mount point folder.

7.3 Running Recovery Manager as a Scheduled Job

In addition to creating virtual copies using the Command Line Interface, you can also use Windows Scheduled Tasks (or Windows Task Scheduler, depending on your Windows OS) to schedule automatic creation of virtual copies for a specific database.



NOTE: You can also use the Recovery Manager GUI to schedule automatic virtual copies. For more information, see *Scheduling Automatic Virtual Copies* on page 6.13.

7.3.1 Scheduling an Automated Task in Windows 2003

To set up Windows Scheduled Tasks to automatically create virtual copies:

1. Click **Start** > **Programs** > **Accessories** > **System Tools**.
2. Click **Scheduled Tasks**.
3. Double-click **Add Scheduled Tasks**.

   Result: The **Scheduled Task Wizard** opens.
4. Click **Browse** and navigate to Recovery Manager's install location.

   The default location is `C:\Program Files\3PAR\RM\SQL`
5. Click `RMSql.exe`.
6. Select the frequency of this task.
7. Click **Next**.
8. Select time and date to start this task.
9. Click **Next**.
10. Enter the user name, password, and password confirmation.
11. Click **Next**.
12. Select the **Open advanced properties** checkbox.
13. Click **Finish** to access advanced setup for the scheduled task.

14 On the **Task** tab, at the end of the path displayed in the **Run** field, add:

```
RMSql.exe create –s <SQL Server> –i <SQL Instance> -d <SQL database>
```

If the name has spaces, use double-quotes ("") to surround the name.

For more information, see the `RMSql CREATE` command.

For example:

```
"C:\Program Files\3par\RM\SQL\RMSql.exe" create –i inst01
–d test -s SQLserver
```

15 On the **Schedule** tab, further refine the scheduled task by selecting the frequency and start time of the task.

16 Click **Apply** and **OK** when finished.

Result: Virtual copies are created as you have scheduled. Depending on the policy set with the Recovery Manager GUI or CLI command, older virtual copies on the system might automatically be removed if the number of virtual copies exceeds your specified maximum threshold (see *Setting the Recovery Manager Policy Configuration* on page 6.7).

7.3.2 Scheduling an Automated Task in Windows 2008

To set up Windows Task Scheduler to automatically create virtual copies:

1 Click **Start** > **Programs** > **Accessories** > **System Tools** > **Task Scheduler**.

2 Click **Create Task**.

3 In the **Name** text box on the **General** tab, enter a name for the task.

4 Select the desired options in the **Security options** area.

5 Select the **Triggers** tab.

6 Click **New.**

7 Enter scheduling information for the automatic creation of virtual records.

8 Select the **Actions** tab.

9 Click **New**.

10 In the **New Action** dialog box, click Browse.

11 Navigate to the Recovery Manager install location. The default location is:

```
C:\Program Files\3PAR\RM\SQL
```

12 In the **Add arguments** text box, enter:

```
RMSql.exe create –s <SQL Server> –i <SQL Instance> -d <SQL database>
```

If the name has spaces, use double-quotes ("") to surround the name.

For more information, see the `RMSql CREATE` command.

For example:

```
"C:\Program Files\3par\RM\SQL\RMSql.exe" create –i inst01
–d test -s SQLserver
```

13 In the **Conditions** and **Settings** tabs, refine the scheduled task as desired.

14 Click **OK**.

Result: Virtual copies are created as you have scheduled. Depending on the policy set with the Recovery Manager GUI or CLI command, older virtual copies on the system might automatically be removed if the number of virtual copies exceeds your specified maximum threshold (see *Setting the Recovery Manager Policy Configuration* on page 6.7).

8 Recovery for Microsoft SQL Server

In this chapter

8.1 Microsoft SQL Server Recovery Models 8.1

8.2 Recovering Data with 3PAR Recovery Manager 8.2

8.3 Recovering from Logical Errors with Point-in-Time Recovery 8.3

8.3.1 Restoring a SQL Instance in an MSCS Environment Using File Copy Restore 8.4

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8.4 Recovering All Data with Point-of-Failure Recovery 8.9

8.4.1 Determining Whether You Can Perform a Point-of-Failure Recovery 8.9

8.4.2 Performing a Point-of-Failure Recovery 8.10

8.1 Microsoft SQL Server Recovery Models

Microsoft SQL Server offers three disaster-recovery models:

- **Simple Recovery Model** - The Simple Recovery model enables you to restore a database to the point at which a virtual copy or backup was created; it does not enable you to restore a database to a specific point in time. Therefore, any data modifications made between the time of the most recent backup and the time of the failure are lost. This

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recovery model uses circular logging to minimize the amount of space used for transaction logs.

- **Full Recovery Model** - The Full Recovery model enables you to restore a database to a specific point in time; either to a virtual copy created before an error occurred or to the point just before which a system failure occurred. Under this recovery model, transaction logs are saved until a failure occurs, and therefore no data is lost.
- **Bulk-logged Recovery Model** - The Bulk-logged Recovery model is used for high-performance operations such as bulk copying and bulk data modification.



NOTE: If you are recovering data from SQL servers across multiple domains, ensure you have stored the login and password for each domain on your backup server. For more information, see *Managing SQL Servers across Multiple Active Directory Domains* on page 4.3.

8.2 Recovering Data with 3PAR Recovery Manager

3PAR Recovery Manager for SQL supports both recovery from virtual copy and recovery from media. However, only recovery from virtual copy enables you to perform a point-in-time or point-of-failure recovery.

Therefore, if you are running SQL Server under the Full Recovery model, you must perform a restore from a virtual copy.

Recovery Manager uses the Volume Shadow Copy Service (VSS) framework to restore data. Because the VSS framework takes a database offline before it allows you to restore it, you do not need to place the database in single-user mode.



WARNING: When the SQL server takes a database offline, it writes a checkpoint record to database ID 9. After this log file becomes full, the SQL server cannot write the checkpoint record and therefore cannot take the database offline. To free up space in the log file before you perform the restore, either back up the transaction log for the database or detach the database.

8.3 Recovering from Logical Errors with Point-in-Time Recovery

Point-in-time recovery is useful for recovering from logical errors. For example, if you accidentally altered an entry or deleted a table, you can use a virtual copy to restore your instance or database back to a consistent, known prior state. Point-in-time recovery restores the instance or database to the state it was in at the time the virtual copy was created.

To perform a point-in-time recovery, use Recovery Manager to perform a file copy restore or a volume restore. The restore steps depend on whether your SQL servers are in a clustered or non-clustered environment:

- If you are performing a file copy or volume restore on an instance on a standalone SQL production server in a non-clustered environment, stop the SQL Server service for the instance, perform a standard file copy restore or volume restore, and start the SQL Server service.
- If you are performing a volume restore on a database on a standalone SQL production server in a non-clustered environment, stop the SQL Server service, perform a standard volume restore, and start the SQL Server service.
- If you are performing a file copy restore on a database on a standalone SQL production server in a non-clustered environment, perform a standard file copy restore. (Do NOT stop and start the SQL Server service .)



NOTE: You must schedule downtime to perform a restore. For more information about performing a standard restore using the Recovery Manager GUI, see Chapter 6, *Using the Recovery Manager GUI*. For more information about performing a standard restore using the CLI `RMSql restore` command, see Chapter 7, *Using the Recovery Manager CLI*.

- If you are performing the restore in an MSCS (clustered) environment, you must follow the instructions provided in one of the following sections, depending on the type of restore you are performing:
  - *Restoring a SQL Instance in an MSCS Environment Using File Copy Restore* on page 8.4
  - *Restoring a Volume in an MSCS Environment Using Volume Restore* on page 8.4

8.3.1 Restoring a SQL Instance in an MSCS Environment Using File Copy Restore

To perform a file copy restore on a SQL instance in an MSCS environment:

1 Launch the cluster manager, depending on the Windows OS:

- If you are using Windows 2008, launch **Failover Cluster Management**.
- If you are using Windows 2003, launch **Cluster Administrator**.

2 Take the following resources offline:

- SQL Server Agent
- SQL Instance Service

3 Locate the instance-level virtual copy you want to use to restore the SQL instance.

4 Run the `rmsql restore` command on this virtual copy. For more information on CLI commands, see Chapter 7, *Using the Recovery Manager CLI*.

5 Use the cluster manager (**Failover Cluster Management** or **Cluster Administrator**) to bring online the following resources:

- SQL Server Agent
- SQL Instance Service

8.3.2 Restoring a Volume in an MSCS Environment Using Volume Restore

To perform a volume restore on a SQL server in an MSCS environment:

1 Log on to your SQL production server (the active node in your cluster), and put all disks associated with the instance or database in maintenance mode.

2 Turn on maintenance as follows, depending on the Windows OS running on the SQL production server:

- If you are using Windows 2003:

  a From the Windows command line, run the following commands:

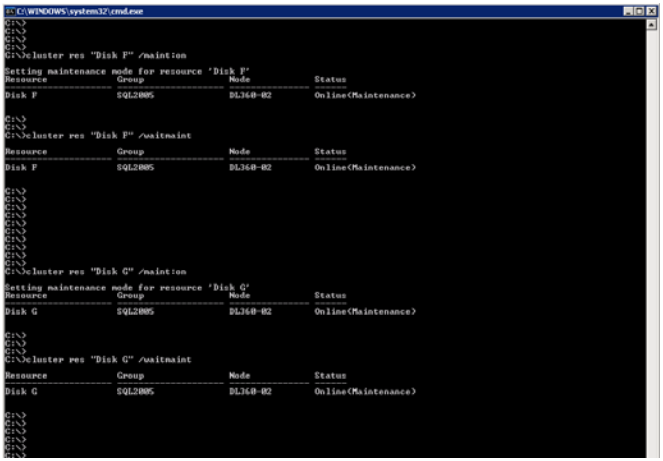
  ```
  cluster res "resourcename" /maint:on
  cluster res "resourcename" /waitmaint
  ```

  In the place of *resourcename*, use the name of the disk you are placing in maintenance mode. For example:

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```
cluster res "Disk F" /maint:on
cluster res "Disk F" /waitmaint
```

b. Repeat for all disks associated with the instance or database.

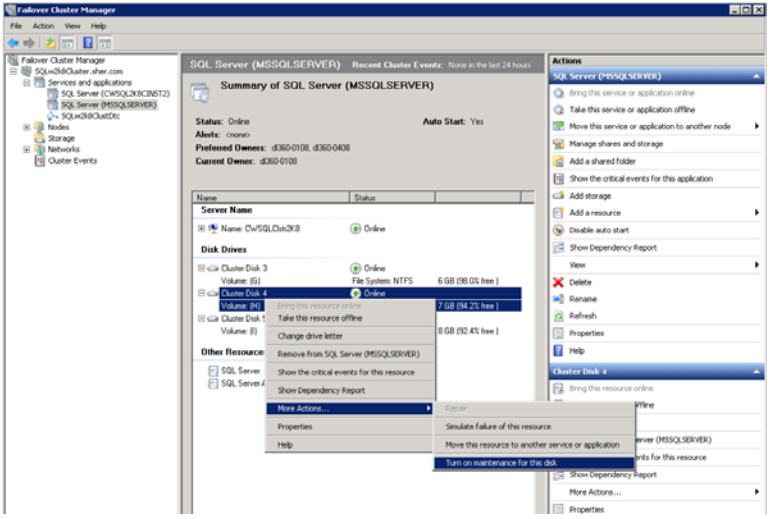


- If you are using Windows 2008:

  a. Launch **Failover Cluster Manager**.

  b. In the left pane, under **Services and applications**, select the SQL server on which you want to perform a restore.

  Result: The system displays the summary for that SQL server.



c Under **Disk Drives** in the **Summary** area, right-click the disk you want to restore.

d Select **More Actions** > **Turn on maintenance for this disk**.

e Repeat for all disks associated with the instance or database.

3 Take the corresponding SQL Server and SQL Server Agent resources offline as follows, depending on the Windows OS:

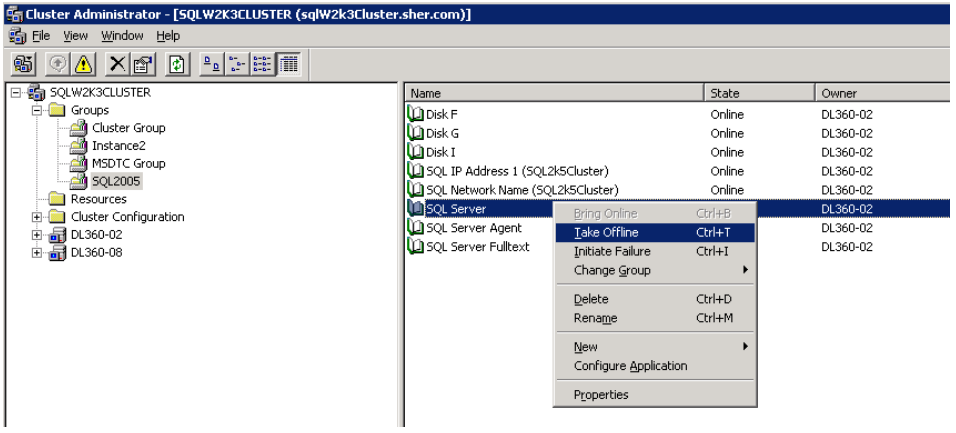
- If you are using Windows 2003:

a Launch **Cluster Administrator**.

b In the left pane, under **Groups**, select the cluster group you are taking offline.

c In the right pane, right-click **SQL Server** and select **Take Offline**.

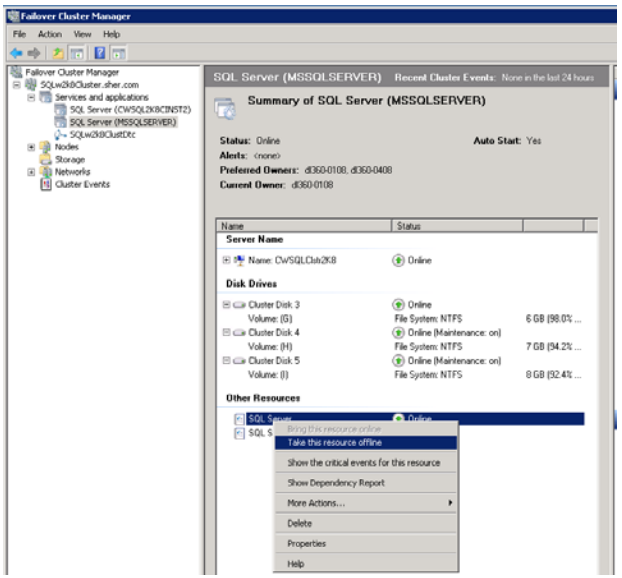
d In the right pane, right-click **SQL Server Agent** and select **Take Offline**.



- If you are using Windows 2008:

a In the left pane of **Failover Cluster Manager**, under **Services and applications**, ensure the SQL server you want to restore is still selected.

b Under **Other Resources** in the **Summary** area, right-click **SQL Server** and select **Take this resource offline**.



4 Log onto your backup server and perform a volume restore. To perform a volume restore, use either the `RMSql restore` command or the Recovery Manager GUI.

For more information about performing a restore using the Recovery Manager GUI, see Chapter 6, *Using the Recovery Manager GUI*. For more information about performing a restore using the CLI `RMSql restore` command, see Chapter 7, *Using the Recovery Manager CLI*.

5 Log back onto the SQL production server and take the disks out of maintenance mode as follows, depending on the Windows OS:

- If you are using Windows 2003:

  a From the Windows command line, run the following command:

  ```
  cluster res "resourcename" /maint:off
  ```

  In the place of *resourcename*, use the name of the disk you are taking out of maintenance mode. For example:

  ```
  cluster res "Disk F" /maint:off
  ```

  b Repeat for all disks associated with the instance or database.

- If you are using Windows 2008:

  a. Launch **Failover Cluster Manager**.

  b. In the left pane, under **Services and applications**, select the SQL server for which you want to end maintenance mode.

  c. Under **Disk Drives** in the **Summary** area, right-click the disk for which you want to end maintenance mode.

  d. Select **More Actions** > **Turn off maintenance for this disk**.

  e. Repeat for all disks associated with the instance or database.

6. Put the SQL Server and SQL Server Agent resources back online.

- If you are using Windows 2003:

  a. Launch **Cluster Administrator**.

  b. In the left pane, under **Groups**, select your cluster group.

  c. In the right pane, right-click **SQL Server** and select **Bring Online**.

  d. In the right pane, right-click **SQL Server Agent** and select **Bring Online**.

  Result: The volume restore is complete.

- If you are using Windows 2008:

  a. In the left pane of **Failover Cluster Manager**, under **Services and applications**, ensure the SQL server you restored is still selected.

  b. In the right pane, under **Other Resources**, right-click **SQL Server**.

  c. Select **Bring this resource online**.

  d. If the SQL Server Agent resource is still offline, right-click **SQL Server Agent** and select **Bring this resource online**.

  Result: The volume restore is complete.

8.4 Recovering All Data with Point-of-Failure Recovery

Point-of-failure recovery is useful if you cannot afford to lose any data in the event of a system failure.



NOTE: Point-of-failure recovery only supports a file copy restore at the database level.

8.4.1 Determining Whether You Can Perform a Point-of-Failure Recovery

You can perform a point-of-failure recovery, in which a database is completely recovered up to the point of the failure, if the following are all true:

- You have performed a full backup of the SQL database.
- You have subsequently used the SQL backup utility to perform one or more transaction log backups.
- You have access to undamaged transaction log backups and active transaction logs (i.e., even if one or more transaction log backups are damaged, undamaged copies of these backups exist).



NOTE: A transaction log backup is a copy of all the log records written to the live transaction log after the last full database backup or the last transaction log backup. If any transaction log backups within the sequence are missing, the database can only be restored to the last consecutive backup that exists in the sequence and you cannot perform a full recovery.

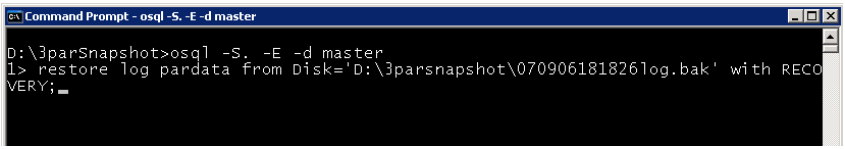
For more information on how to roll a database forward using a transaction log, see:

http://msdn.microsoft.com/en-us/library/ms189596.aspx

8.4.2 Performing a Point-of-Failure Recovery

When you apply the backed-up transaction log to a database that has been restored using a virtual copy, the system uses the STOPAT option to roll forward the database to a specific point in time.

To roll forward the transaction log, you can use either SQL Server Management Studio or a command line tool such as OSQL. For example:



To perform a point-of-failure recovery:

1 Locate the most recent consistent full backup and determine the following information:

- Timestamp (e.g., *010106000000*)
- Server name (e.g., *SQLserver01*)
- SQL instance name (e.g., *SQLInstan01*)
- Database name (e.g., *northwind*)

2 At the command prompt, enter the following:

```
RMSql.exe restore -s server name -i SQL instance name -d database name -t
timestamp -norecovery
```

For example:

```
RMSql.exe restore -s SQLserver01 -i SQLInstan01 -d northwind -t 010106000000 -
norecovery
```

3 To apply the transaction logs as well as to recover the database to the point in time desired, enter the following `restore` commands at the command prompt as described below:

a Enter the following command for the first to the penultimate backed-up transaction logs in the sequence:

```
RESTORE log database name from transaction log backup media
with norecovery;
```

The database is still in "no recovery" mode. You can now apply the backed-up transaction logs to update the database to the point of failure.

b Enter the following command for the last backed-up transaction log:

```
RESTORE log database name from transaction log backup media
with recovery; -stopat "timestamp"
```

For example:

```
RESTORE log northwind from Disk='G:\log1.bak' with norecovery;
RESTORE log northwind from Disk='G:\log2.bak' with norecovery;
RESTORE log northwind from Disk='G:\log3.bak' with recovery; -stopat
"Jun 28, 2006 5:44 PM"
```

9 Remote Copy for Recovery Manager

In this chapter

9.1 Overview 9.1

9.2 How Remote Copy Works 9.2

9.3 Setting Up Remote Copy 9.3

9.3.1 Setting Up a Remote Copy Group for Databases 9.4

9.3.2 Setting Up a Remote Copy Group for Instances 9.4

9.4 Recovering a SQL Database from a Secondary Site 9.5

9.5 Synchronous Long Distance Remote Copy Support 9.5

9.1 Overview

3PAR Remote Copy enables you to safeguard against disasters that might occur at one location by allowing you to keep a copy of valuable data at another location. For example, if there were a fire or earthquake at a particular location, all of the data stored there could be lost unless a backup copy is maintained at a separate location from which the data can be recovered. Remote Copy, supported through the InServ, can prevent data loss by maintaining an updated copy of your data at a separate site. To accomplish this goal, Remote Copy uses two InServs: a primary server used for production, and a secondary server used for backup

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purposes. Therefore, when disaster strikes in one location, there is always a backup at the secondary site. For more information, see the *3PAR Remote Copy User's Guide*.

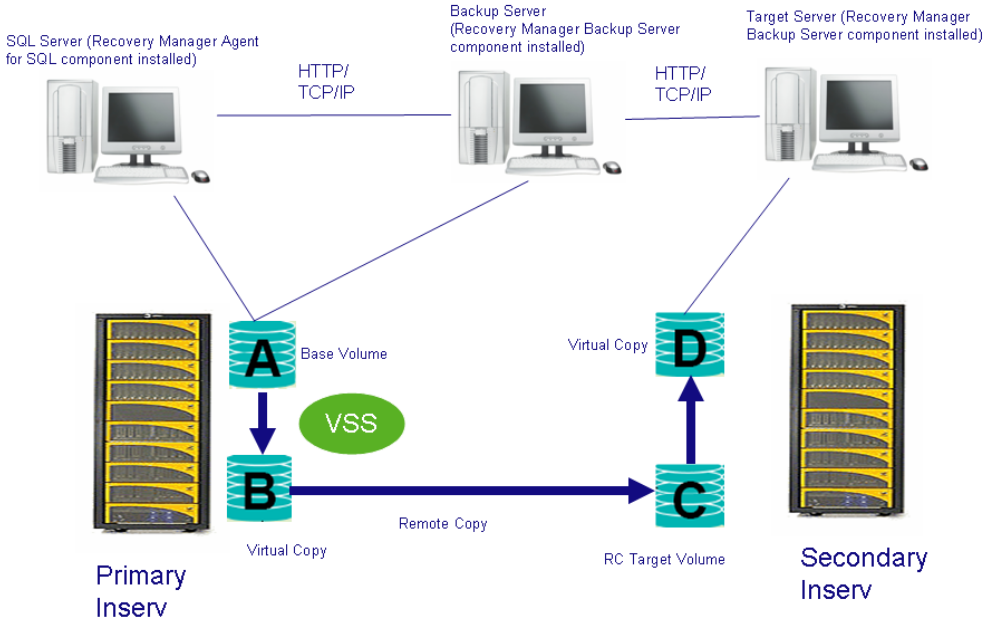
9.2 How Remote Copy Works

When you synchronize data between a production site and a secondary site, the various systems involved perform the following steps in sequence:

- 3PAR Recovery Manager leverages the VSS framework to freeze the I/O at the application level.
- The VSS provider creates a virtual copy of the database and log volumes.
- 3PAR Remote Copy performs a synchronization on the data changes to the target volumes at the secondary site.
- After the synchronization is complete, the target server at the secondary site (the backup server) creates a virtual copy on the Remote Copy target volumes.
- The target server saves the virtual copy in its repository at the secondary site.
- Recovery Manager removes the virtual copy created on the primary site.



NOTE: In order for the Recovery Manager GUI to manage virtual copies from the remote target server, you must configure Recovery Manager with the precise server and instance names for the supported SQL servers. For more information, see Chapter 4, *Configuring Recovery Manager*.



9.3 Setting Up Remote Copy

1. Install and configure a Remote Copy environment. For more information, see the *3PAR Remote Copy User's Guide.*
2. After you have set up Remote Copy between two InServs, create a remote copy group for testing.
3. Configure the remote copy group for synchronization in periodic mode with a period value of zero.

NOTE: Recovery Manager does not support synchronization in synchronization mode. In addition, 3PAR recommends that you set period values to zero to avoid conflict with other synchronization processes.

9.3.1 Setting Up a Remote Copy Group for Databases

1. Identify the volumes that contain the database and log files to be copied.
2. Create one (and only one) remote copy group per database.



NOTE: Recovery Manager only supports multiple databases in one remote copy group if all the databases in the group belong to the same instance.

3. Add the volumes belonging to the database and log files to the remote copy group as target (or secondary) volumes.



NOTE: Do not disperse files from one database over multiple remote copy groups. Recovery Manager does not support database and log files from one database being placed in any location other than the one remote copy group created for that instance.

4. Synchronize the remote copy group.



NOTE: Be sure to configure the secondary site with the same structures and Windows authentication mode settings as the primary site.

9.3.2 Setting Up a Remote Copy Group for Instances

1. Identify the volumes that contain all database(s) and log files to be copied.
2. Create one remote copy group for all database(s) in this instance.
3. Add all volumes belonging to this instance (all database and log files) to the remote copy group as target (or secondary) volumes.



NOTE: Do not disperse files from one instance over multiple remote copy groups. Recovery Manager does not support database and log files from one instance being placed in any location other than the one remote copy group created for that instance.

4 Synchronize the remote copy group.



NOTE: Be sure to configure the secondary site with the same structures and Windows authentication mode settings as the primary site.

9.4 Recovering a SQL Database from a Secondary Site

If a SQL database crashes at a primary site, you can recover the data from the dedicated target server at the secondary site as long as it is set up in an identical manner to the original SQL production server. For more information, see *Setting Up Remote Copy* on page 9.3.

To recover from a SQL database crash at a primary site, use 3PAR Recovery Manager for SQL Server on the backup server at the secondary site as follows:

1 Mount the virtual copy to the production server.

2 Log onto the production server and stop the SQL instance and its dependent services.

3 From the mounted virtual copy, manually copy all necessary database and log files to the corresponding database location.

4 Restart the SQL instance and its dependent services.

5 Log back onto the backup server and unmount the virtual copy.

9.5 Synchronous Long Distance Remote Copy Support

Recovery Manager for SQL supports Synchronous Long Distance Remote Copy in periodic mode. (Recovery Manager for SQL does not support Synchronous Long Distance Remote Copy in synchronous mode.) For more information, see the *3PAR Remote Copy User's Guide*.

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A
Server Virtualization Environments

A.1 VMWare and Egenera

VMWare and Egenera environments are supported under specific conditions. For VMWare and Egenera support in a virtualization environment, the setup must meet the following requirements:

- The disks presented to the SQL servers must be raw devices.
- The backup server must be connected directly to the InServ. The backup server cannot be connected to the InServ through VMWare or Egenera.
- You cannot run the `RMSql mount` command against a VMWare or Egenera server.



NOTE: New volumes presented to VMWare and Egenera servers are not surfaced automatically; you must use the backup host to mount the servers with the `RMSql mount` command. Therefore, you cannot use either File Copy Restore or Volume Restore to directly restore a SQL server that resides in a virtualization environment.

Figure A-1 on page A.2 shows the relationships between the InServ and VMWare and Egenera servers in a virtualization environment.

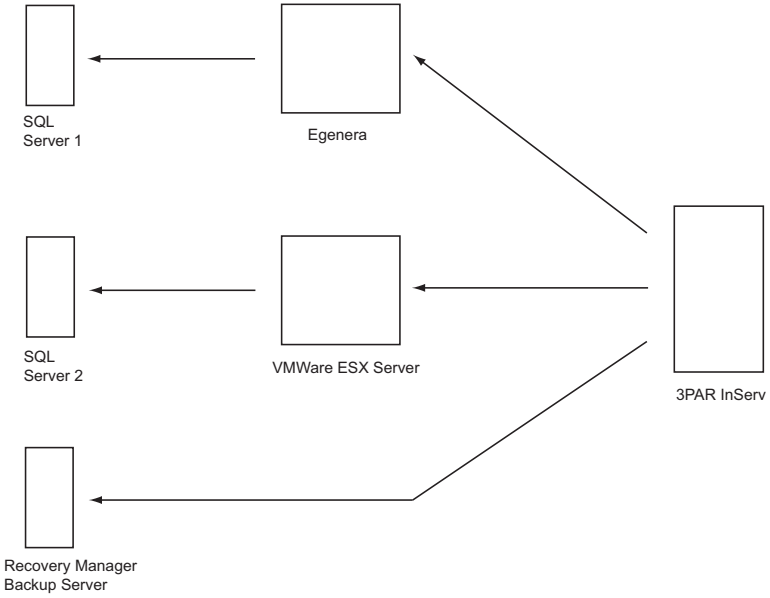


Figure A-1. Server Virtualization Environment

B Troubleshooting

This appendix is designed to be used like a Frequently Asked Questions section. It will help you find solutions to some of the common issues that might arise when running 3PAR Recovery Manager for Microsoft SQL Server.

Problem:
Recovery Manager displays error message "VSS_E_PROVIDER_VETO."

Suggestion:
Check the application event log and VSS provider log from the production server. If you see "Maximum of 28 writable virtual copies per volume is allowed," your virtual copy capacity might be full.

This error usually occurs when you mount a virtual copy. Unmount several virtual copies and continue the mount procedure.

Problem:
Even though Recovery Manager validated the configuration during operation, Recovery Manager exits without any messages during InServ checking.

Suggestion:
Validation might fail without proper notification. Restart the RMSql agent service on the backup and production servers.

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Problem:
A restore of a backup, which was created using Veritas NetBackup via the Recovery Manager GUI, fails.

Suggestion:
When you use the Recovery Manager GUI to back up a virtual copy using Veritas NetBackup and a directory is specified for backup, you must enter the directory name and path precisely, including the upper- and lowercasing (e.g., MuTenFF). If the names do not match exactly, a restore of this backup will fail. (This is a limitation of Veritas NetBackup.)

When backing up a directory, specify the directory in exactly the same case as it exists on the file system.

Problem:
When you create a virtual copy on a SAN boot disk, the virtual copy creation fails with error "Error-VSS_E_HOLD_ WRITES_TIMEOUT." The in-box system writer that enumerates all operating system and driver binaries is included as well. The error usually occurs because the I/O cannot hold the system writer.

Suggestion:
3PAR does not recommend placing a database on the SAN boot disk. Place all important databases on separate SAN disks.

Problem:
As data blocks are copied per the copy-on-write technology, the space for virtual copies on the virtual volume might become 100% full either if virtual copy space was statistically allocated as a percentage of the virtual volume, or if there is no additional space available for the CPG to auto-grow. If the space for virtual copies on a virtual volume becomes 100% full, the virtual copies on the virtual volume may become invalid and subject to the configured Snapshot Policy.

Suggestion:
Allocate more virtual copy space when creating virtual volumes during base volume creation, or use CPGs to manage the data generated by copy-on-write technology.

Problem:
You just installed Recovery Manager, but all GUI and CLI commands fail.

Suggestion:
If you install Recovery Manager via a remote desktop session, the newly added environment variables do not become effective until you log out of the session. (If Recovery Manager is installed directly from the system console, these variables should be available immediately.)

Problem:
Veritas NetBackup takes a substantial amount of time to complete a backup process.

Suggestion:
Make sure you have the latest maintenance package installed for your NetBackup application.

Problem:
Recovery Manager is running in a Windows cluster environment and the application event log displays the Volume Shadow Copy Service error: "Unexpected error querying for the IVssWriterCallback interface. Access is denied."

Suggestion:
Reconfigure the security settings for the cluster environment as follows:

1. Ensure that MSCS MS DTC is installed. MSCS MS DTC is required for the following procedure.
2. Click **Start** > **Run** > **dcomcnfg** or **Start** > **Administrative Tools** > **Component Services**.
3. Expand **Component Services** and click **Computers**.
4. Right-click **My Computer** and select **Properties**.
5. Select the **COM Security** tab.
6. Under **Access Permissions**, click **Edit Default**.
7. Add a **Cluster Service** account and select **Local Access** and **Remote Access**.
8. Reboot the machine.
9. Perform these steps on the second node.

Problem:
You attempt to perform a media restore using the CLI `-ts` command and the attempt fails.

Suggestion:
If the restore log contains the error message: "client <client> peername <peer name> is invalid for restore request", the restore client is different from the backup client. Configure Veritas NetBackup to perform a redirected media restore as follows:

1. Create an **altnames** directory on the NetBackup master server in the directory containing the backup policy for other clients:

   Install_path\NetBackup\db

2. Place an empty file named **No.Restrictions** in the **altnames** directory:

   Install_path\NetBackup\db\altnames\No.Restrictions

   Do not add a suffix to the files in the **altnames** directory.

3. Ensure the NetBackup client name on the requesting client matches the name of the client for which the backup was created. (The peer name of the requesting client does not need to match the NetBackup client name.)

C
Event Messages

This appendix provides information for the event messages generated by 3PAR Recovery Manager for Microsoft SQL Server.

Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5312	RMS5312: ERROR: Some of your volumes are either non-3PAR volumes or unsupported types of disk drives.	Some of the target volumes are not 3PAR virtual volumes. All of the drives need to be 3PAR drives. ■ Verify that all database and log destinations belong to a 3PAR storage system.
5313	RMS5313: ERROR: Couldn't find the Remote Copy group for the specified volume.	The Remote Copy group is not configured for the specified SQL database or instance. ■ Check the Remote Copy configuration and InServ setup. Consult the *3PAR InForm OS CLI Administrators Manual* or the 3PAR InForm OS Management Console online help for details on setting up and checking Remote Copy functionality.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5314	RMS5314: ERROR: The number of virtual volumes used to create the virtual copy does not match the number of virtual volumes in the Remote Copy group.	To create a virtual copy of a SQL database or instance, the virtual volumes configured to store SQL database and log files must match the virtual volumes configured in the Remote Copy group. ■ Check the Remote Copy configuration and InServ setup. Consult the *3PAR InForm OS CLI Administrators Manual* or the 3PAR InForm OS Management Console online help for details on setting up and checking Remote Copy functionality.
5315	RMS5315: ERROR: The Remote Copy group is not in the Started state.	To create a remote virtual copy, the Remote Copy group must be in the Started state. ■ Check the Remote Copy connection and InServ setup. Consult the *3PAR InForm OS CLI Administrators Manual* or the 3PAR InForm OS Management Console online help for details on setting up and checking Remote Copy functionality.
5316	RMS5316: ERROR: The virtual volumes in the Remote Copy group are not in the Synced state.	To create a remote virtual copy, all the virtual volumes in the Remote Copy group must be in the Synced state. ■ Check the Remote Copy connection and InServ setup. Consult the *3PAR InForm OS CLI Administrators Manual* or the 3PAR InForm OS Management Console online help for details on setting up and checking Remote Copy functionality.
5319	RMS5319: ERROR: The virtual copy was not found in the repository.	The repository might be out of sync. ■ Run `rmsql analyze` to list the out-of-sync entries.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5321	RMS5321: ERROR: The specified mount directory does not exist.	To use an alternate (non-default) mount point directory in the `rmsql mount` command, you must first create the mount point directory. ■ Verify that the mount point directory exists. ■ Alternatively, do not specify a mount directory. If an alternate directory is not specified; Recovery Manager uses the default mount directory.
5325	RMS5325: ERROR: The virtual copy timestamp does not exist for the snapshotset ID.	When you created the virtual copy, Recovery Manager could not store the virtual copy timestamp in the repository for the specified snapshotset ID. ■ Wait a few minutes and then retry the operation.
5326	RMS5326: ERROR: Volume Restore failed.	A failure occurred when restoring data using the volume restore feature. The failure might leave the InServ in an inconsistent state. ■ If the VLUNs are missing, ensure that they are re-created.
5327	RMS5327: ERROR: One or more of your volumes are on dynamic disks. Dynamic disks are not supported.	Some of the database or log files are stored on volumes created on dynamic disks. ■ Ensure that the database and log files reside on volumes created on basic disks.
5328	RMS5328: ERROR: One or more of your databases are on the system volume. You cannot create virtual copies of system volumes.	Some of the database or log files are stored on the system volume. ■ Ensure that the database and log files are on 3PAR virtual volumes.

Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5329	RMS5329: ERROR: The destination file already exists. Please specify a different restore location and try the operation again.	Performing a restore from backup does not overwrite an existing copy of the same file. ■ Verify that the specified restore folder is empty and try the operation again.
5332	RMS5332: ERROR: Could not find the SQL Writer. Either the Writer is not installed or is currently not running.	SqlServerWriter was not found on the SQL Server. ■ Run the vssadmin list writers command and verify that SqlServerWriter is listed. ■ Ensure that the SQL Writer service is in the Running state.
5333	RMS5333: ERROR: Remote Copy groups are not configured. A Remote Copy group must be present in order to perform this operation.	There are no Remote Copy groups configured on the InServ. ■ Ensure the Remote Copy group is configured before you create a remote virtual copy. ■ Check the Remote Copy connection and the InServ setup. Consult the *3PAR InForm OS CLI Administrators Manual* or the 3PAR InForm OS Management Console online help for details on setting up and checking Remote Copy functionality.
5335	RMS5335: ERROR: Mount point drive letter is already in use.	The specified mount point drive letter is already in use. ■ Be sure to specify an unused drive letter as a mount point when you enter the `rmsql mount` command.
5336	RMS5336: ERROR: Mount point directory is not a valid directory.	The specified mount point is not a directory. ■ Be sure to specify a valid directory as a mount point when you enter the `rmsql mount` command.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5337	RMS5337: ERROR: Mount point directory is not empty.	The mount point directory specified already contains files. ■ Be sure to specify an empty mount point directory when you enter the `rmsql mount` command.
5339	RMS5339: ERROR: Failed to execute the InForm CLI.	The InForm CLI command failed. ■ Check the error message for more details on the failed command. ■ Verify that you can connect to the required InServ from the CLI command window.
5341	RMS5341: ERROR: Could not find the header information in the command output.	Failed to parse the header information from the InServ CLI command output. ■ Verify that you can connect to the required InServ from the CLI command window. ■ Wait a few minutes and try the operation again.
5347	RMS5347: ERROR: Failed to locate NetBackup installation. Please make sure NetBackup is correctly installed.	The NetBackup installation information could not be retrieved from the registry. ■ Verify that NetBackup is properly installed and that you have access to the registry entry. ■ Use Add/Remove Programs to confirm that NetBackup is installed.
5348	RMS5348: ERROR: Could not find NetBackup start and end scripts.	The NetBackup start or end scripts could not be found in the Recovery Manager for SQL installation folder. ■ Ensure that the bpstart_notify.bat and bpend_notify.bat files are present in the Recovery Manager for SQL installation folder.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5349	RMS5349: ERROR: Failed to create or open backup include file for NetBackup.	Unable to open or create the NetBackup include file for the specified policy. You can run only one backup job per policy at a time on a NetBackup client. ■ Ensure that no other `rmsql backup` command is running. ■ Wait for the prior backup command to complete and try again.
5351	RMS5351: ERROR: NetBackup restore process has failed.	The NetBackup restore failed. ■ On the NetBackup server, check the application event log and NetBackup logs.
5354	RMS5354: ERROR: The SQL database was not found in the SQL Writer database list.	SqlServerWriter could not find the specified database in its list of databases supported for backup. ■ Verify that the database is online and attached. ■ Ensure that the database is not a snapshot/mirrored database.
5356	RMS5356: ERROR: The expiration time is out of range (0h - 43,800h).	The expiration time for a virtual copy must be a value between 0 and 43,800 hours (or between 0 and 1825 days). ■ Try again, using a value within the range allowed.
5357	RMS5357: ERROR: The Remote Copy group is configured in sync mode. Only periodic mode is currently supported. Please reconfigure the Remote Copy group.	To create remote virtual copies through Recovery Manager for SQL, the Remote Copy group must be configured in periodic mode. ■ Reconfigure the Remote Copy group and try the operation again.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5364	RMS5364: ERROR: Failed to back up the virtual copy. Please consult the backup progress logs for details.	The NetBackup backup process has failed. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5367	RMS5367: ERROR: Unknown error encountered. Please look at the logs for more information.	An unexpected error occurred. ■ For more details, check the logs in the Recovery Manager for SQL installation folder and the event logs.
5370	RMS5370: ERROR: The specified policy does not exist in the NetBackup configuration database.	The policy was not found in the NetBackup database. ■ Verify that the policy is valid. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5371	RMS5371: ERROR: The specified schedule does not exist in the configuration database.	The schedule was not found in the NetBackup database. ■ Verify that the schedule is valid. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5372	RMS5372: ERROR: Failed to connect to the NetBackup master server.	Recovery Manager could not connect to the NetBackup server. ■ Ensure that you can connect to the NetBackup master server. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5373	RMS5373: ERROR: No storage units available for use.	The backup cannot be created because no storage units are available. ■ Ensure that the storage units are configured and available for use. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5374	RMS5374: ERROR: The specified policy is not a valid client type.	The process cannot continue because the policy is not a valid client type. ■ Ensure that the policy is a valid client type. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5375	RMS5375: ERROR: This operation is not allowed at this time.	The NetBackup server is not currently allowing this operation. ■ Wait some time and try the operation again. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5376	RMS5376: ERROR: The specified client does not exist in the specified policy.	Recovery Manager cannot locate the client in the policy specified. ■ Verify that the client is correctly configured for the specified policy. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.

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Table C-1. Recovery Manager for Microsoft SQL Server Event Messages

Event ID	Event Message	Description/Action
5377	RMS5377: ERROR: The specified policy is not active.	To create backups, the policy used to create the backup must be active. ■ Verify that the specified policy is active. ■ For more details, check the application event log and NetBackup logs on the NetBackup server.
5378	RMS5378: ERROR: The current InForm OS does not support the specified command.	The command you entered is not supported in this version of the InForm OS. ■ Ensure that the correct commands are used for the installed InForm OS. ■ Upgrade the InForm OS to a version that allows you to use the specified command.

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D
Domain Set Support

In this appendix

D.1 Domain Set Feature D.1

D.1.1 Working with Domain Sets D.2

D.2 Volume Sets D.2

D.3 Host Sets D.2

This appendix includes information about 3PAR Recovery Manager for Microsoft SQL Server support for the domain set feature and functionality with the volume set and host set features.

D.1 Domain Set Feature

If your SQL Server configuration involves multiple database servers belonging to different 3PAR virtual domains, you can use the domain set feature to group these 3PAR virtual domains into one 3PAR InServ domain set. This configuration allows you to use just one Recovery Manager backup server to manage all your database servers.

Configure the domain set feature, using CLI commands, as follows:

1. Ensure you are running InForm OS 2.3.1 or higher.
2. Ensure you have access to all domains.
3. Create a domain set that contains all 3PAR virtual domains for all the database servers.

4 Create a Command Provisioning Group (CPG) belonging to the new virtual domain.

5 Create a virtual volume belonging to the CPG you just created.

6 Create a host belonging to the virtual domain.

7 Export the VLUN to the host.

8 On the Recovery Manager backup and production servers, set the user for the VSS provider.

9 Ensure the InServ connection is good.



NOTE: For more information on CLI commands, see the *3PAR InForm Command Line Interface Reference*. For more information on 3PAR VSS Provider, see the *3PAR VSS Provider for Microsoft Windows User's Guide*.

D.1.1 Working with Domain Sets

When working with domain sets, keep in mind the following:

- All hosts, users, and virtual volumes must belong to the same 3PAR virtual domain.
- To mount a virtual copy or media backup to a server that is in a different 3PAR virtual domain than the domain in which it was created, you must use the CLI command `RMSql mount -ts`.
- To create a Remote Copy group for a virtual volume that is in a user-defined domain, the target virtual volume must be in the same user-defined domain.

D.2 Volume Sets

Recovery Manager does not support volume sets.

Recovery Manager can work with any volume that is part of a volume set, but Recovery Manager cannot discover nor work with the volume set itself.

D.3 Host Sets

Recovery Manager does not support host sets.

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Revision History

Release Level	Revision Summary
320-200266 Rev A January 2011	First release of this manual describing new features for version 4.1.0.