HP Data Protector 6.2 software integration with HP 3PAR Storage System

Zero Downtime Backup solution

Technical white paper

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Executive summary

This white paper provides detailed information on how to integrate HP Data Protector software with HP 3PAR Storage Systems. The solution is based on Data Protector Zero Downtime Backup concept. The 3PAR InServ version mentioned and tested here is 2.3.1. The Data Protector version is 6.2.

Audience

This white paper is intended for solution architects, project managers, engineers, and support personnel involved in planning, designing, and configuring a Data Protector Zero Downtime Backup solution with HP 3PAR Storage Systems.
You need to be familiar with:
• HP 3PAR Storage architecture
• Data Protector and its Zero Downtime Backup solution

This white paper does not replace the standard product documentation.

Concepts

The solution presented in this white paper takes advantage of the Microsoft Volume Shadow Copy Service (VSS).

VSS is a framework that enables volume-based snapshots to be performed while the application continues to write data to the volume. These can be used for different purposes: backup of open files and applications with zero impact on the application, data restore and recovery and creating transportable shadow copies by means of a Hardware Provider.
VSS involves the following three components when creating a volume-based snapshot:
• VSS Requestor
• VSS Writer
• VSS Hardware Provider

VSS Requestor
VSS Requestor is an application that uses VSS framework to create and manage shadow copies of one or more volumes. Additionally, VSS Requestor (a backup/recovery application) communicates with the application whose data is to be backed up, to gather additional information needed to perform a backup.
The VSS framework, through the VSS Provider, makes an abstraction to the hardware specific replica. This allows the backup/recovery application to take advantage of hardware features without the need to know any details on how shadow copies are created on the hardware itself.
During restore, the Requestor communicates with the VSS framework in order to prepare the application and the system for restore. The backup/recovery application (Data Protector) is responsible for bringing data back to the application's known location, in order that the application can perform recovery from the restored data.
The HP Data Protector MS Volume Shadow Copy Integration component delivers VSS Requestor functionality to Data Protector.

VSS Writer

Each application or service that is running on Windows and wants to integrate with VSS framework has to provide a VSS Writer specific for that application or service. The writer is responsible to quiesce (pause) the application's data and make it suitable for a make shadow copy/replica and backup operation. At the same time, the application continues to be available to the user.

During restore, the writer ensures that the application is in the restore state and is not available to the user (or at least the part affected by restore). In addition, writers make it possible for the backup/recovery application to restore data back by unlocking files that are usually used by application during normal operation. If necessary, writers also indicate alternate locations for data to be restored.

For the list of writers that Data Protector supports, refer to the Data Protector VSS integration support matrix listed in the For more information section.

Figure 1: Microsoft Volume Shadow Copy Service Overview
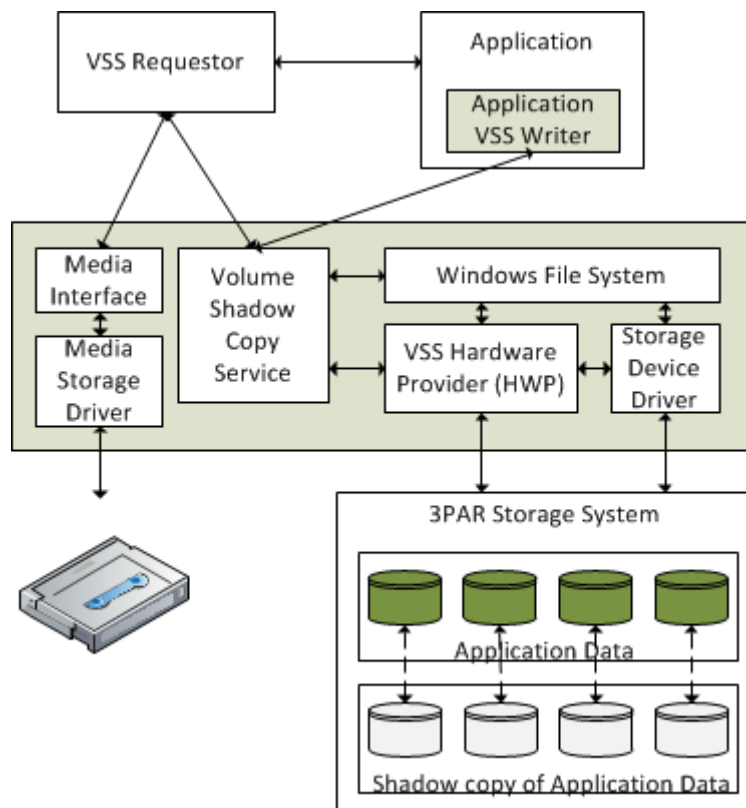
VSS Provider

VSS Provider is responsible for creating shadow copies/replicas when requested. The provider has to maintain different instances of replicated volume without any reflection to the application's I/O operations. In addition, the provider has to support all replicas through its life cycle from creating, manipulating, through to deleting.

There are three types of VSS providers:

- System provider that comes with Windows Operating System

- Software provider that can be provided by any third-party software vendor

- Hardware provider that is usually provided by disk-array vendors. It utilizes the disk array features to create, maintain and delete replicas on the disk array itself. If replicas are created by hardware

providers, the operating system does not need to maintain the point-in-time view of the replica. This job is off-loaded to the disk array that takes care that the replica maintains the same data during its lifetime. HP 3PAR Storage System provides the VSS Hardware Provider (HWP).

Solution Description

This solution is based on HP Data Protector 6.2 using Zero Downtime Backup and HP 3PAR Storage System.
Data Protector Zero Downtime Backup (ZDB) is a replication-based backup using disk technology which takes advantage of array functionality to create a point-in- time replica of the production volume. This technology enables zero impact backup, by performing it on a copy of the production data. ZDB provides continuity of business operations in mission-critical environments, by fully automating the backup process and fully integrating with the disk array.

The setup used for the solution consists of (see Figure **2**):
• Application server on which the application is running. The application data is stored on the HP 3PAR Storage System and is accessible via SAN.
• HP 3PAR Storage System provides the storage for the application.
• Backup server is used to move data from replica to backup device (for example tape).

Figure 2: Solution Setup
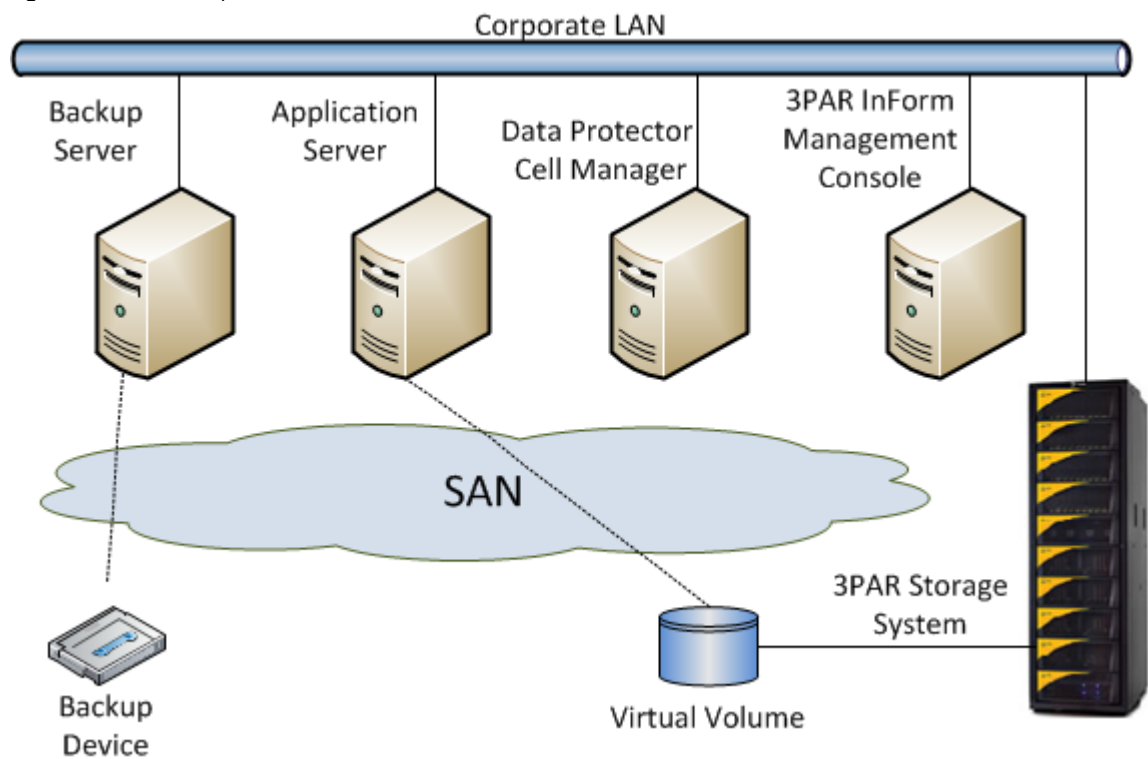
• Both application and backup hosts have Data Protector client software installed. Data Protector Cell Server is installed on one of the servers. Application and backup systems are the clients of Data Protector Cell Server. Server on which Data Protector Cell Server is installed does not require SAN access.

- 3PAR InForm Management Console is installed on one of the servers and manages the HP 3PAR Storage System.

Once the backup session is started, Data Protector will resolve the volumes involved in the backup. During this phase, Data Protector finds out on which storage volumes the selected objects are located. Finally, it requests the creation of a snapshot for each of those volumes by using 3PAR Hardware Provider. This copy is a replica or a virtual copy snapshot in 3PAR terms. The 3PAR Storage System maintains integrity of the data on the snapshots using *copy-on-write* technology. In Figure **3**, creating a virtual copy is shown by the red line.

Figure 3: Creation of Virtual Copy Snapshot
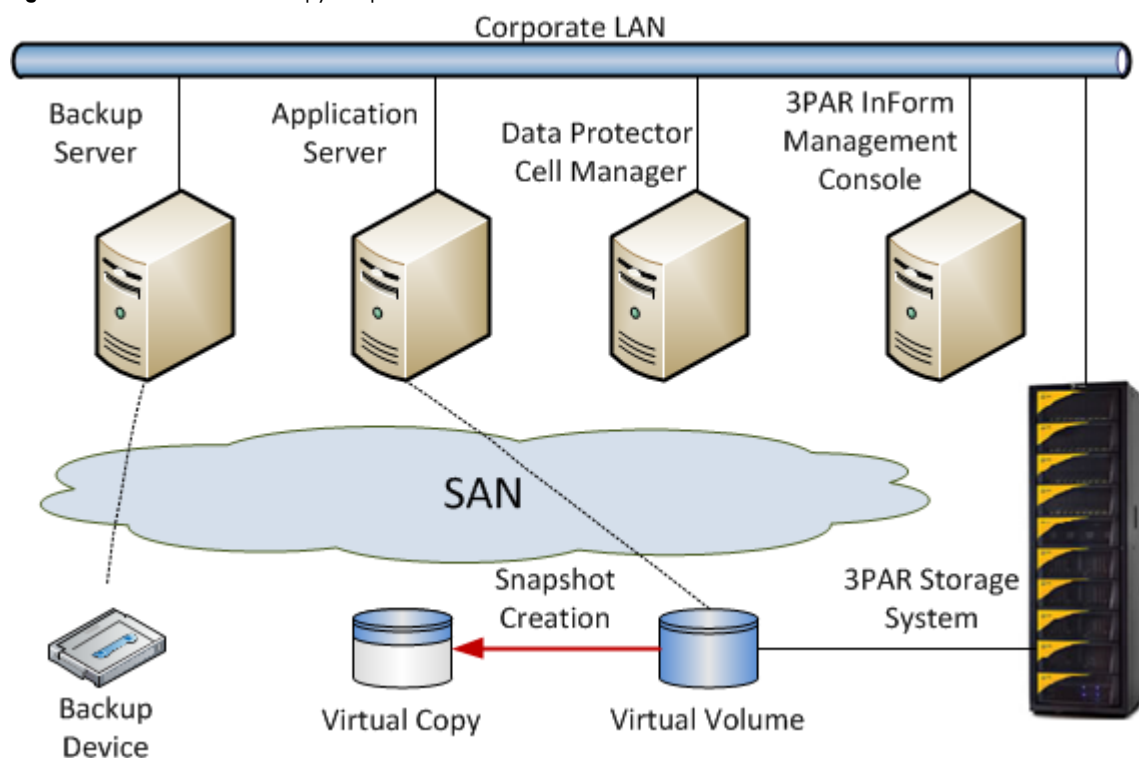
After it is created, the snapshot is presented to the backup host. The following screenshot shows, in the 3PAR InForm Management Console, the VSS-created Virtual Copy. Note that VSS created snapshots are named starting with **vss**. There are two snapshots with the same ID number. One has *ro* in its name to indicate that this snapshot is a read-only one. The second one has *rw* in its name to indicate that this snapshot is a read-write one and can be exported or presented to the server.

Figure 4: Base volume and virtual copies in 3PAR InForm Management Console

Name	Domain	State	Type	Provisioning	RAID	Virtual Size (GiB)	Reserved User Size (GiB)	Used User Size (% Virtual)	Reserved Copy Size (GiB)	Used Copy Size (% Virtual)	Exported To
Database1	BBN_R_AND_D	● Normal	Base	TPVV	RAID 1	500.000	485.625	96%	10.500	1%	tpc201
vss0000039_ro_031411183632	BBN_R_AND_D	● Normal	Virtual Copy	--	RAID 1	500.000	--	--	--	~0%	--
vss0000039_rw_031411183632	BBN_R_AND_D	● Normal	Virtual Copy	--	RAID 1	500.000	--	--	--	~0%	tpc202

At this point, the snapshot is visible on the backup host and data can be read and streamed to the tape device by the Data Protector Media Agent.

In Figure **5**, the backup to tape is shown by the red line between the snapshot volume, the backup host and the tape drive.

Figure 5: Backup server reads data from virtual copy and backs it up to backup device
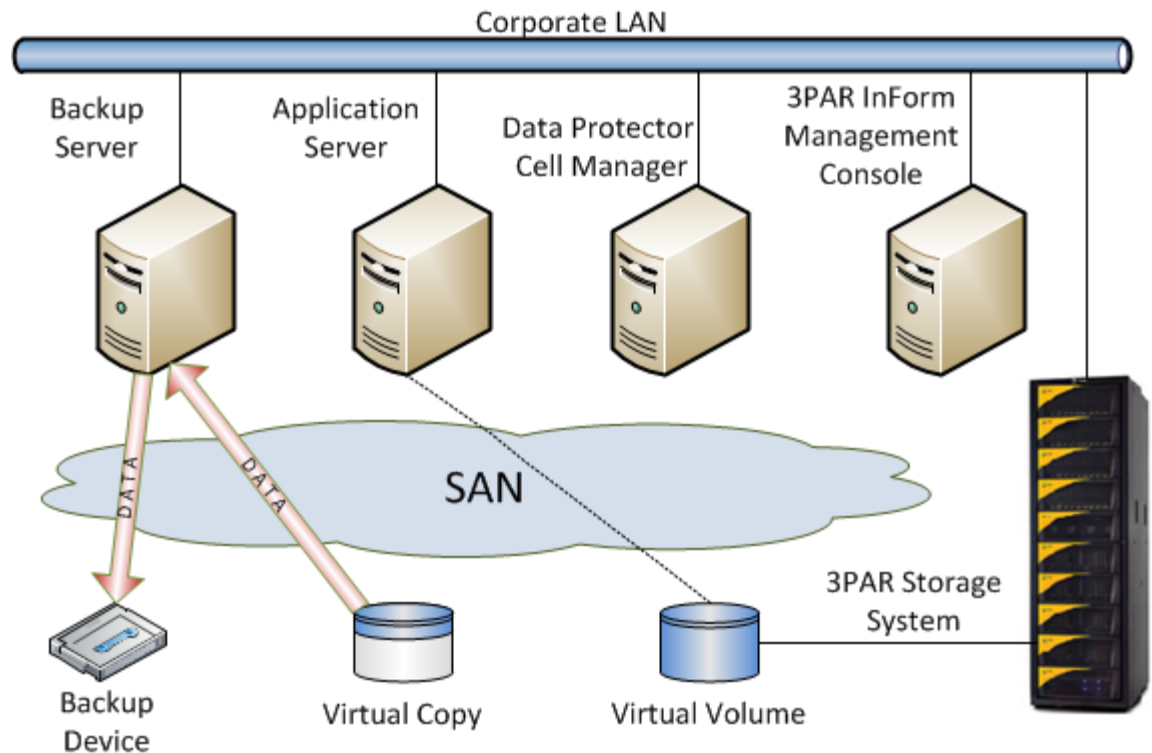
After Data Protector finishes with the backup of data to the tape device, there are two options that Data Protector can perform:

- Un-present the snapshot from the backup host and delete it from the array. Both steps are done using the 3PAR hardware provider.

- Data Protector keeps the snapshot on the array. The user is able to specify how many snapshots Data Protector should keep. If this option is specified before each backup, Data Protector checks if the number of snapshots to be kept has been reached. If this is the case, Data Protector deletes the oldest set of virtual copies before starting the backup (see Figure **6**).

Figure 6: Virtual Copies are kept after backup
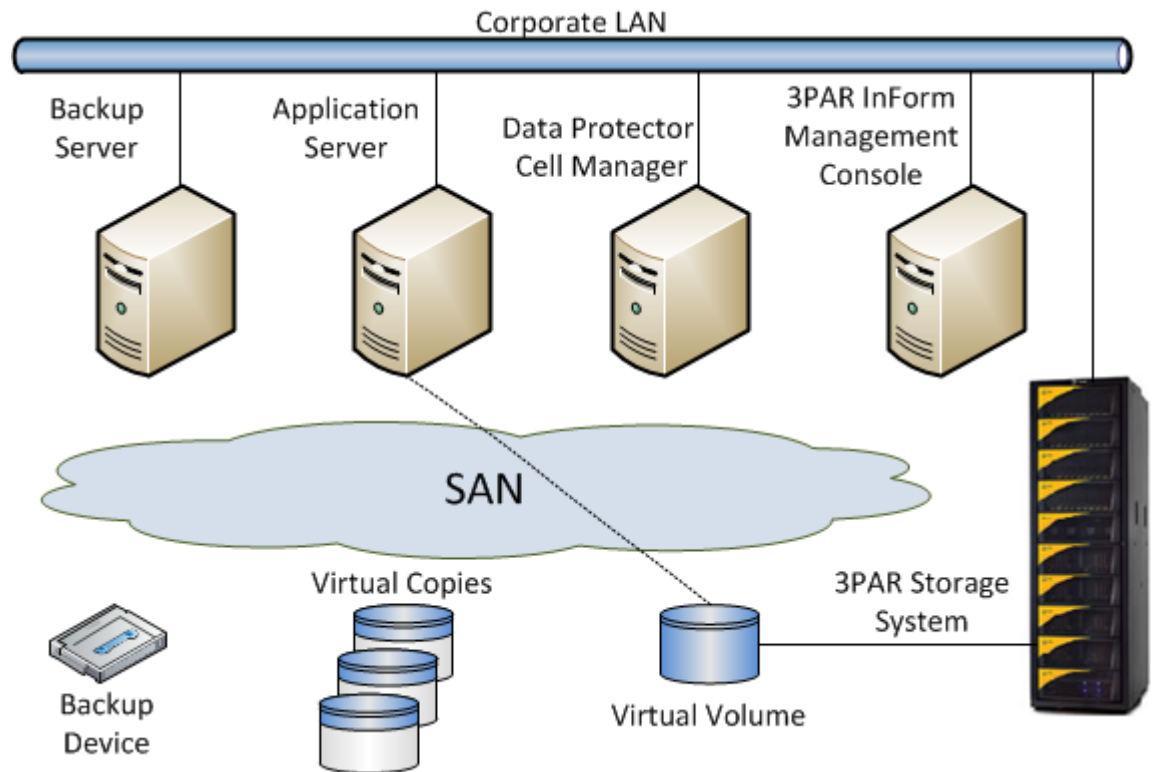
Preparing the environment

Data Protector Setup

Data Protector Cell Server can be installed on either Windows or UNIX servers. The MS Volume Shadow Copy Integration module must be installed on the application and backup servers (see Figure 7). In addition, the Media Agent must be installed on each server that can act as the backup server. However, the application server can also be the backup server at the same time. In this case, both components must be installed on the application server.

Figure 7: Data Protector Components available for installation
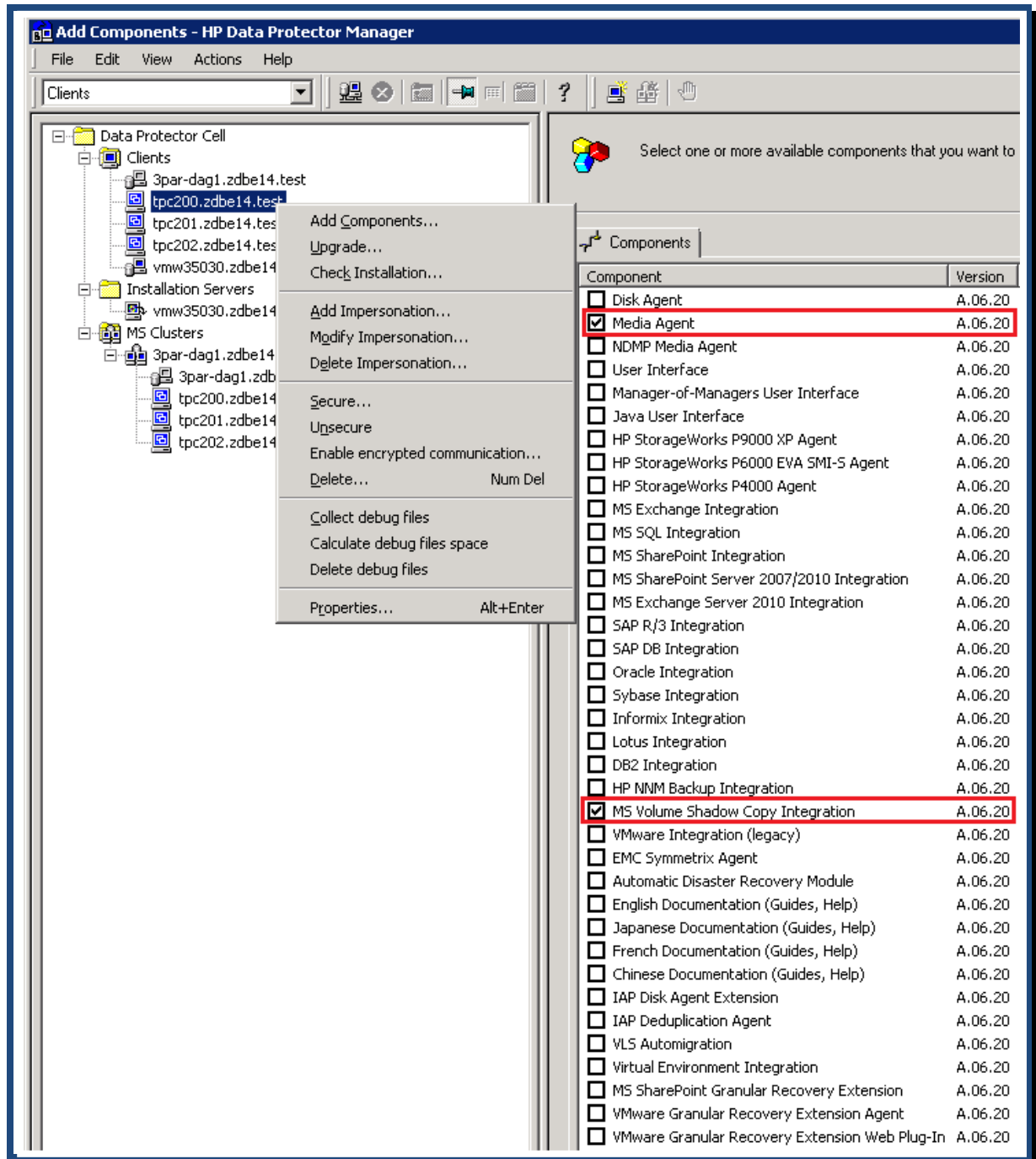
Licensing

Data Protector MS Volume Shadow Integration requires at least one terabyte (1 TB) of the following licenses to be available:

Windows Zero Downtime Backup for 1 TB
Windows zero downtime backup license is a terabyte-based license. The terabyte-amount of this license must be equal to, or higher than, the sum of disks to be protected by the integration in the whole Data Protector Cell. Be aware that the size of the protected LUN is not just the amount of data that is stored on the LUN, but the size of the provisioned virtual volume.
On-line Extension for ONE Windows / Linux system is a server-based license. You need as many of these licenses as the number of application servers that are protected. It is not required to have a license for standalone backup server.

Setup of 3PAR Storage System Components

To prepare a 3PAR Storage System for integration with Data Protector, the following steps must be performed:
- Export source volumes to the application server
- Install and configure Microsoft MPIO with 3PAR
- Install and configure the 3PAR VSS Provider

All examples have been performed using FC SAN connection. No example has been done using iSCSI SAN.

Export source volumes to the application server

Prior to starting with exporting of source Virtual Volumes to the application, ensure that the following has been correctly configured:
- All application and backup servers have been properly zoned with the 3PAR Storage System
- Host objects for all application and backup systems have been created and configured. When configuring host objects, make sure that the right Personas are set (see Figure **8**):
  - For Windows 2008 based systems use second Persona:
    Generic-AULA
  - For Windows 2008 R2 based systems use first Persona:
    Generic

  If the application host is running as a Guest OS in either Microsoft Hyper-V or VMware EXS environment, and the LUNs are accessed from the Guest OS as Pass through (Hyper-V) Raw Disk Mapped (VMware) disk, the above rules also apply to that host.

If the virtual volume is going to be used by either an application running in a MS cluster or as a Clustered Shared Volume, it has to be exported to all clients that are part of the cluster or that are configured as the Hyper-V server.

Figure 8: 3PAR Storage System Host Object Configuration

Installation and configuration of Windows Multipath I/O Feature (MPIO)

HP 3PAR supports native Windows 2008 and Windows 2008 R2 MPIO. To configure MPIO for 3PAR Storage System, several steps must be performed:

- Install Windows MPIO Feature using Server Manager (see Figure 9).
- Start disk rescan using the Disk Management tool. At this point, you should be able to see all VLUNs that are exported to the server. The same VLUN will be listed as many times as there are paths to that VLUN (see Figure 10).
- In the MPIO Properties windows, go to Discover Multi-Paths tab. In the Device Hardware Id window, the 3PAR VVs should be listed. Click **Add** to add 3PAR VLUNs to MPIO configuration (see Figure **1**).
- Reboot the system.
- After system is rebooted, you will be able to see VLUNs listed only once in the Disk Management Tool.
- Bring the VLUNs online in case they are in an offline state.

- The VLUNs are now ready to be used on the system.

Figure 9: Install Windows Multipath I/O Feature
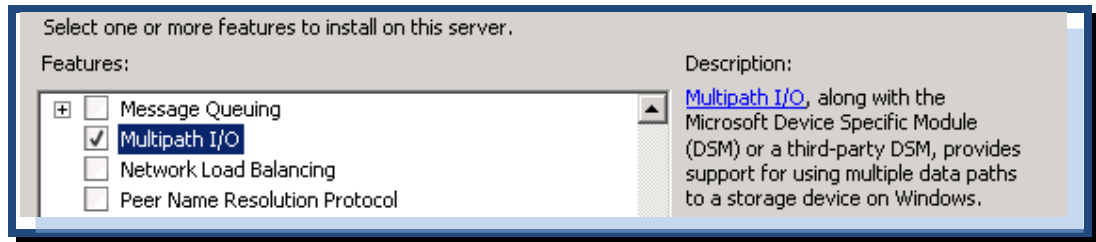
Figure 10: Multiple paths are available for the same Virtual Volume
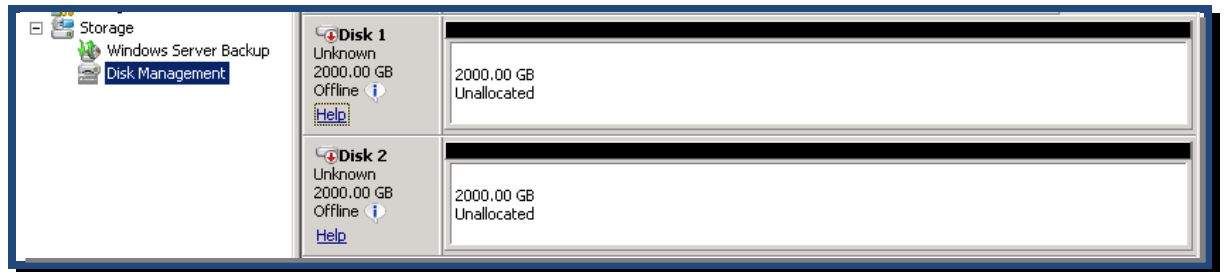
Figure 11: Add 3PAR Virtual Volumes to the list of supported MPIO Devices
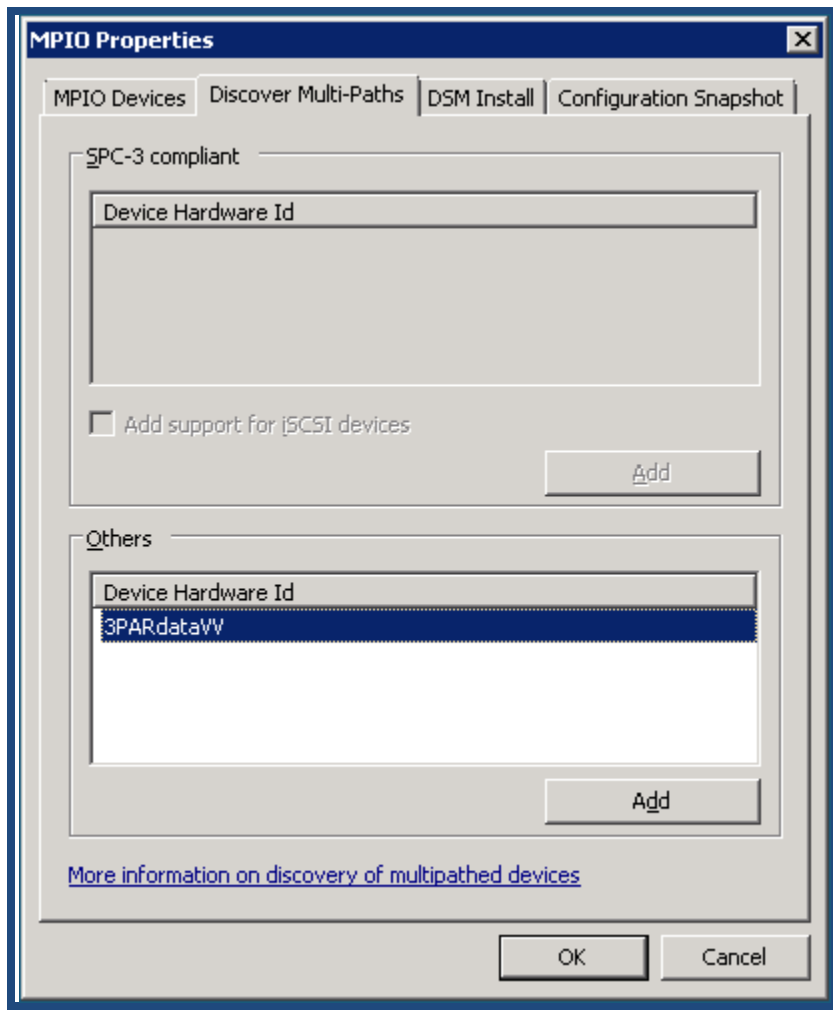
Install and configure 3PAR VSS Provider

Prior to installing 3PAR VSS Provider, the following software must be installed on the server:
- Microsoft .NET Framework 3.5
- 3PAR InForm CLI

3PAR VSS Provider installer will first install Visual C++ Runtime Libraries. After these libraries are installed, installer will start with the provider installation and configuration. As part of the configuration, the installation will prompt for the following InServ Storage System Connection configuration data (see Figure 12):
- IP address or FQDN of the 3PAR InServ Storage System.
- User name that will be used by the Provider to connect to the storage system. This user should have sufficient rights to create snapshots and to export them to the backup host.
- User's password.

Figure 12: Installation and configuration of 3PAR VSS Provider
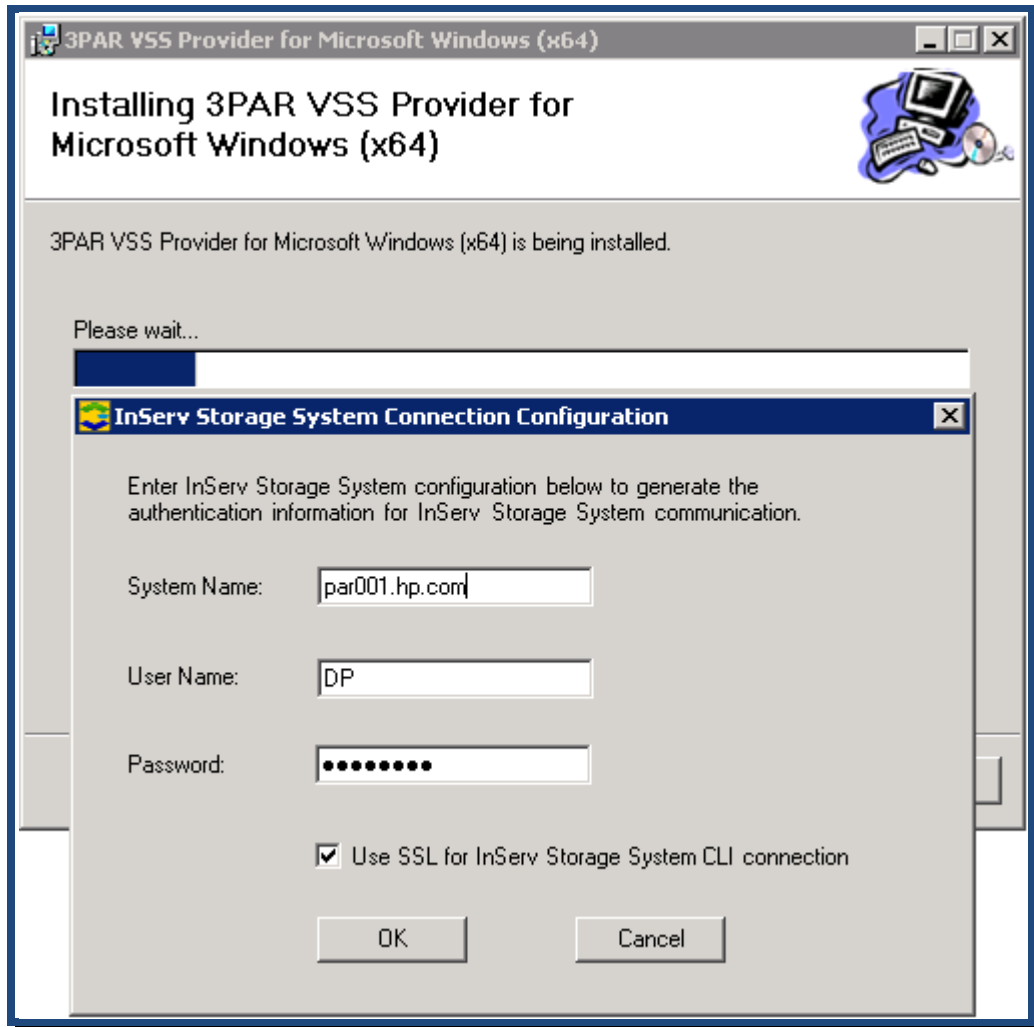
The installation process will check if the provided credentials are valid. It will also check that following licenses, which are needed for 3PAR VSS Provider to work properly, are enabled on the storage system (see Figure 13):

- Virtual Copy
- VSS Provider for Microsoft Windows

3PAR VSS Provider must be installed on both application and backup host.

To verify that installation was successful, execute following command:

```
C:\Users\administrator.TIC>vssadmin list providers
vssadmin 1.1 - Volume Shadow Copy Service administrative command-line tool
(C) Copyright 2001-2005 Microsoft Corp.

Provider name: '3PAR VSS Provider'
   Provider type: Hardware
   Provider Id: {5f466535-9c6c-4b33-be9f-8f3147381cf5}
   Version: 1.6.2.3

Provider name: 'Microsoft Software Shadow Copy provider 1.0'
   Provider type: System
```

```
    Provider Id: {b5946137-7b9f-4925-af80-51abd60b20d5}
    Version: 1.0.0.7
```

If installation was successful, 3PAR VSS Provider should be listed in the command output.

Additional 3PAR InServ Storage Systems can be configured with 3PAR VSS Provider using the following CLI command:

```
C:\Program Files\3par\HWPRV>ProvCfg.exe InServ -sys par002.hp.com -user DP -pass
myPassword -sockssl on
Success. Configuration for InServ Storage System <par002.hp.com> has been created
successfully.

You will need to restart the Volume Shadow Copy service and 3PAR VSS Provider
service for this change to become effective.
```

To check if the configured 3PAR storage system has all the required licenses enabled, execute the following command:

```
C:\Program Files\3par\HWPRV>ProvCfg.exe InServ -sys par002.hp.com -detail

<InServName>                    <InServID> <SSL> <State> <License>
============================== ========== ===== ==========
========================================
par002.hp.com                   2931       yes   good     Thin Provisioning (10240G)
                                                           Remote Copy
                                                           Virtual Copy
                                                           VSS Provider for Microsoft Windows
                                                           Recovery Manager for Oracle
                                                           Recovery Manager for Exchange
                                                           Recovery Manager for SQL
                                                           Dynamic Optimization
                                                           System Reporter
                                                           Domains
                                                           Virtual Lock
                                                           Thin Persistence
                                                           Thin Conversion
                                                           Adaptive Optimization
                                                           InForm Suite
                                                           Thin Copy Reclamation
```

Note

Backing up virtual volumes from two different 3PAR storage systems in the same backup session is not supported.

Prior to starting a backup session, ensure that all virtual volumes that are part of the backup set, have Copy Space Common Provisioning Group (CPG) configured (see Figure 14).

Figure 14: Copy Space Settings
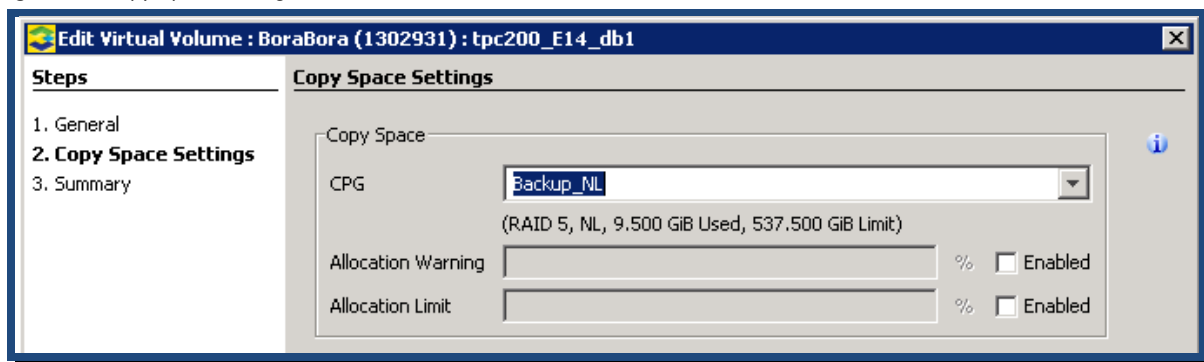
For an up-to-date list of supported environments, operating systems and applications, see the Data Protector VSS Integration Support matrix listed in the For more information section.

Configuring Data Protector Backup Specifications

VSS based backups must be configured using MS Volume Shadow Copy Integration. Configuration of the following backup types will be described in the following sections:
- File System backup
- Microsoft SQL backup
- Microsoft Exchange 2010 backup
- Microsoft Hyper-V R2 backup

File System backup

To configure a file system backup, a new MS Volume Shadow Copy Writers backup specification must be created (see Figure 15). The user is able to specify one of the two backup types:
- Local or network type: When this type of backup is selected, the application host will be at the same time the backup host. This would mean that data will be streamed to the media directly from the production server using its resources. This might have some implication on the application performance. For local backup, the option Hardware Provider must be selected. For the transportable backup, Data Protector automatically uses the option Hardware Provider.
- VSS transportable backup: When this type of backup is chosen, selection of backup host will be available. By having the application host separate from the backup host, the production application does not have any impact during the process of streaming data to media.

Figure 15: Configuring MS Volume Shadow Copy transportable backup
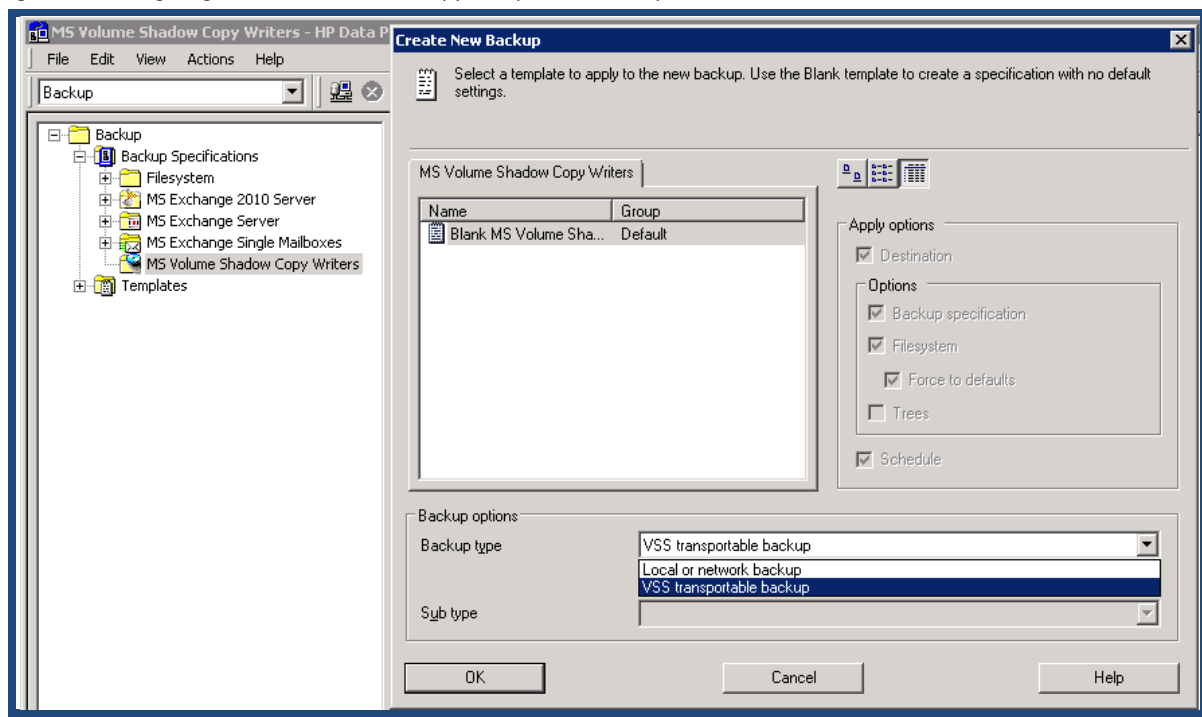
On the next wizard window, it is possible to select several options that are specific to the Volume Shadow Copy Integration (see Figure 16):

- Application system: server on which the application, in our case, file system, resides.

- Backup system: server from which streaming to media will be performed. On this server, in addition to the MS Volume Shadow Copy Integration, the Media Agent component must be installed (see Figure **7**).

- Keep the replica after the backup: if this option is selected, Data Protector will keep created virtual copy after the backup. All additional metadata information about the backup will also be. This allows Data Protector to be able to export and mask these copies on demand to any arbitrary system that has 3PAR VSS Provider configured.

- Track the replica for instant recovery option has to be kept unselected since instant recovery is not supported with 3PAR Storage System.

- Replica type must be set to Differential (Snapshot) since 3PAR VSS Provider supports creating of virtual copies only. If the Plex option is selected, the session will fail.

If Data Protector is to keep replicas after backup, it is possible to select the number of different copies to keep. Click Settings in the Replica management section (see Figure 17). In this window, it is possible to specify how many replicas will be kept by selecting the appropriate number of replicas to rotate. Other options on this window are specific to HP StorageWorks EVA. Note that that 3PAR Storage System is able to create maximum 128 writable virtual copies from the same source virtual volume when specifying the number of replicas to rotate.

Data Protector offers the possibility that virtual copies created during backup, stay exported and mounted on the backup host. Volumes on the replicas can be mounted on the backup server in either read-only or in the read/write mode. By clicking Mount options Setting, an additional set of options is available (see Figure 18). In this window it is possible to set following two options:

- Change the root directory where replicas will be mounted on the backup host.
  Default value is c:\mnt.

Figure 16: MS Virtual Shadow Copy Integration options

Figure 17: Replica management Settings
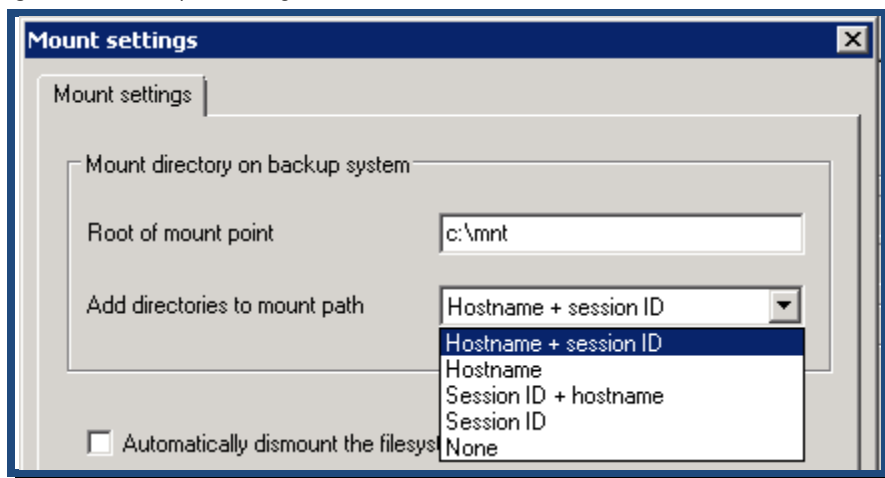
- Directory where replicas will be mounted is calculated from the combination of root mount point value and the additionally specified mount paths. In case that root directory is c:\mnt and that user specifies Hostname + session ID option, mount directory for the source volume that was mounted on F:\ drive letter on application host tpc200.zdbe14.test and replica was made in session with the ID 2011/04/12-3, will look like following:
C:\mnt\tpc200.zdbe14.test\2011-04-12-3\F\

In the next wizard window, you can specify the owner of the backups.

Figure 19: Selecting objects to be backed up.
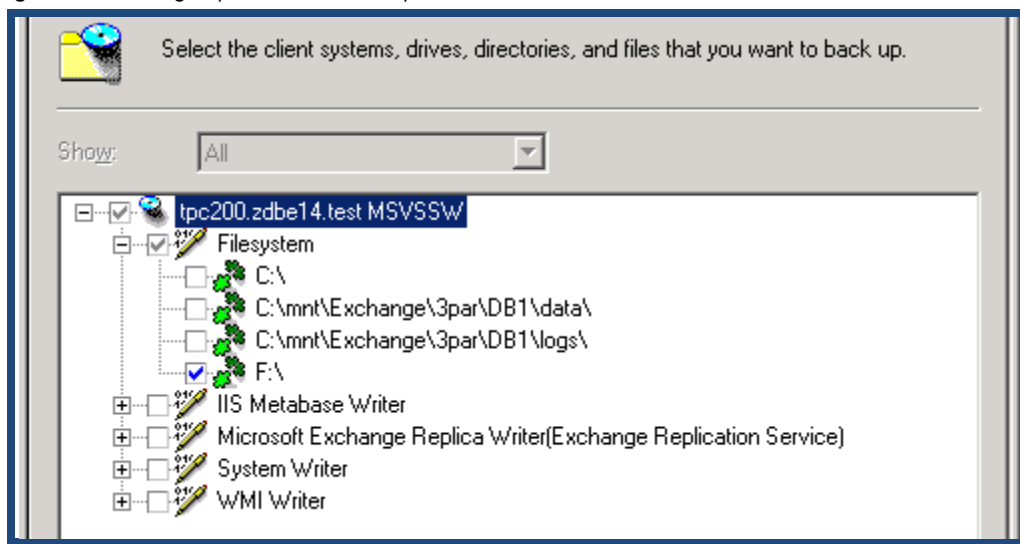
In the next window, you must choose the list of components that should be backed up with this backup specification. In the Figure 19, you can see that four file systems are available on the server. Make

sure that the file systems all reside on the 3PAR Storage System. If the file system does not reside on the disk array, the backup session will fail.

In the next wizard window, it is possible to specify the media drive where the backup should be stream to. Ensure that the selected backup device is configured to be accessed from the backup host. If this is not the case, the data will be transferred over the LAN to the server from where backup device/drive is accessible.

If it is required to create the virtual volumes only without streaming their content to the media, you can skip this window. Be aware that you will not be able to restore data from this type of backup using Data Protector.

In the next wizard window, you can specify some additional backup specification options like:

- Protection time for the media based backup. Backups made to media will be protected for the specified time. This protection period does not affect the rotation policy that is set in the replica management settings (see Figure 17).

- Pre- and post-executable scripts. These scripts will be executed before making the virtual copy and immediately after. These scripts can be used to perform additional tasks on the application server just before and immediately after replicas are created.

In the next wizard window, you can schedule the backups that will be run using this backup specification.

Before being able to start the backup, you must save the backup specification first. After the backup specification is saved, you can start the backup by clicking Start Backup.

A window will pop up in which it is possible to specify which type of backup to run:

- Tape backup: In this case, Data Protector streams all data from the created replicas to the selected media.

- Disk only (non-restorable session): If this option is selected, Data Protector will not stream data to the media. This option is available only in case that the option Keep the replica after the backup is selected (see Figure 16).

Note

Only full backup of file systems is supported. Incremental and differential backups are not supported!

For more details on all available options for backup specification creation, refer to the Data Protector Integration Guide for Microsoft Virtual Shadow Copy Service listed in the For more information section.

An example of the file system backup-session report can be found in Appendix B: File System Backup section.

File System restore from media

To restore data that has been backed up using MS Volume Shadow Copy Integration, select MS Volume Shadow Copy Writers subfolder in the Restore Objects tree (see Figure 20).

Figure 20: Select components to be restored.
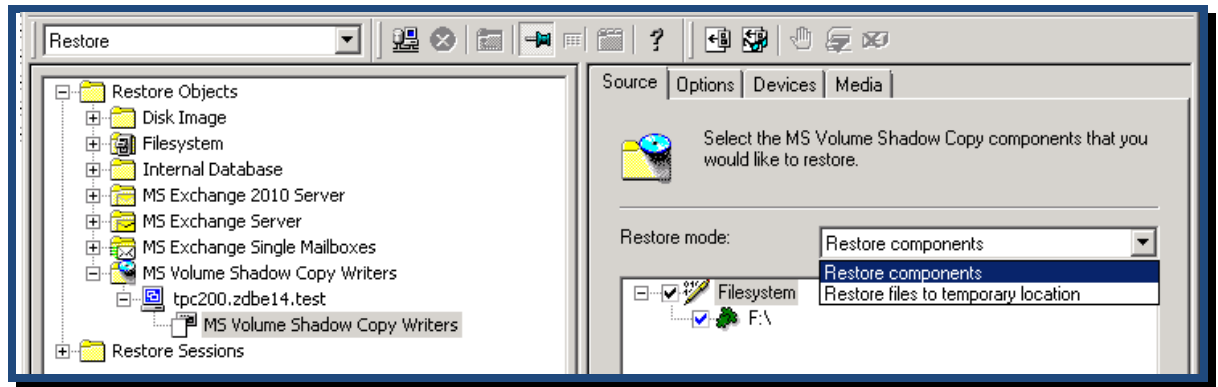
There are two restore modes available:

- Restore components will restore the whole data that was backed up on the selected file system
- Restore files to temporary location gives you the possibility to restore single files to either the original destination or to any other server or location (see Figure 21). To specify alternative server or location where selected files should be restored, use the Options tab.

By default, the last successful backup will be restored. This can be changed for each item that is selected for restore. By right-clicking the selected item, a new window pops up (see Figure 22). In the drop-down box, it is possible to specify any available backup session from which data will be restored.

You are now ready to start a restore operation.

Figure 21: Select single files to be restored.
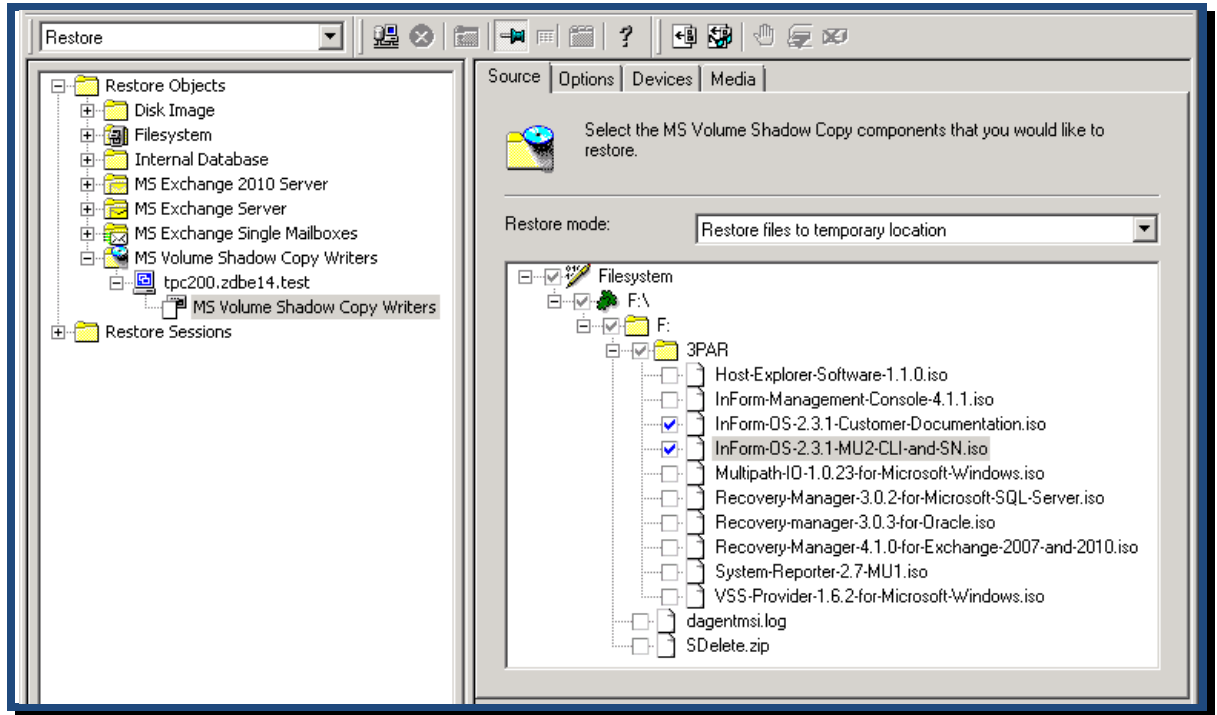
Figure 22: Select the backup from which data should be restored.
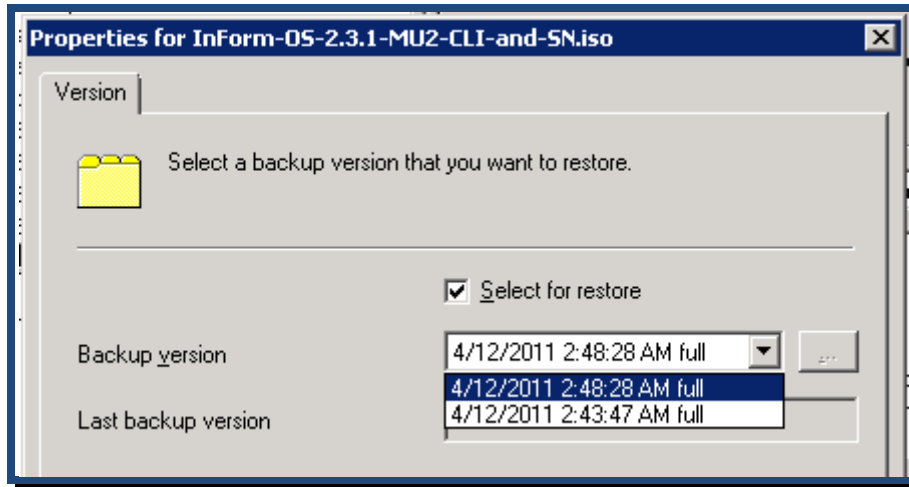
An example of the file system restore-session report can be found in Appendix B: in File System Restore section.

File System restore from virtual copy

In case the virtual copy still exists, it is possible to restore the whole LUN on which the file system exists by promoting the virtual copy to the source virtual volume. To get the list of available backups and virtual copies, use the following CLI command:

```
C:\Users\administrator.ZDBE14>"c:\Program Files\OmniBack\bin\omnidbvss.exe" -list session

        Session Key            IR      Disk-Only       Barlist Name
================================================================================
[0]     2011/04/12-1:tpc200    FALSE   FALSE           FStest
[1]     2011/04/12-2:tpc200    FALSE   FALSE           FStest
[2]     2011/04/12-3:tpc200    FALSE   FALSE           FStest


C:\Users\administrator.ZDBE14>
```

In order to restore data from virtual copy made in one of the backups, it should first be presented/exported and mounted on the server where the data will be restored. Use the following CLI command to export all virtual copies made in one session to the server and mount them on the temporary location:

```
C:\Users\administrator.ZDBE14>"c:\Program Files\OmniBack\bin\omnidbvss.exe" -enable session
2011/04/12-3:tpc200 -backhost tpc200.zdbe14.test -mnt_target c:\restore\ -
mnt_apphostname_sessionid
[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:08 PM
        Enabling backup '2011/04/12-3:tpc200'.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:08 PM
        Backup LUNs were not resolved with VDS Hardware Provider.
        Trying with VSS Hardware Provider instead.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:13 PM
        Importing Shadow Copy Set of session '2011/04/12-3:tpc200'.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:19 PM
        Imported Volume Shadow Copy with the properties:
                Snapshot ID:            {9FAB0898-4252-4F98-AF30-CCA50721B097}
                Snapshot Set ID:        {3250D01B-2CCC-4685-8F6C-040A12604091}
                Source volume:          \\?\Volume{02bc47fa-4b1a-11e0-b3bc-001cc4e221bc}\
                Originating host:       tpc200.ZDBE14.test
                Service host:           tpc200.ZDBE14.test
                Creation time:          2:47:41 AM
                Creation date:          Tuesday, April 12, 2011
                Provider ID:            {5F466535-9C6C-4B33-BE9F-8F3147381CF5}

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:19 PM
        Resolving backup volumes.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/12/2011 12:50:21 PM
        Resolved volume with properties:
                Storage ID:             DP-1-Volume-Basic-100000-ffd00000-{3d79d361-0000-
0000-0000-000000000000}
                Software VDS Provider:  Microsoft Virtual Disk Service Basic Provider
                Number of Disks:        1
                Number of Mount Points: 0
                Device Path:
\\?\SCSI#Disk&Ven_3PARdata&Prod_VV#7&120fcb3&0&000003#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:              {3D79D361-0000-0000-0000-000000000000}
                Disk Address:           Port3Path0Target0Lun3

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:22 PM
        Mounting backup volumes.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/12/2011 12:50:23 PM
        Mounted volume with properties:
                Storage ID:             DP-1-Volume-Basic-100000-ffd00000-{3d79d361-0000-
0000-0000-000000000000}
                Number of Mount Points: 1
                Mount points:
                        c:\restore\tpc200.zdbe14.test\2011-04-12-3\F\

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:24 PM
        Putting backup volumes into read-only mode.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/12/2011 12:50:25 PM
        The volume with properties was put into read-only mode:
                Storage ID:             DP-1-Volume-Basic-100000-ffd00000-{3d79d361-0000-
0000-0000-000000000000}
```

```
                      Number of Mount Points:  1
                      Mount points:
                              C:\restore\tpc200.zdbe14.test\2011-04-12-3\F\

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 12:50:26 PM
        Putting backup disks into read-only mode.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/12/2011 12:50:26 PM
        The disk with properties was put into read-only mode:
                Device Path:
\\?\SCSI#Disk&Ven_3PARdata&Prod_VV#7&120fcb3&0&000003#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:               {3D79D361-0000-0000-0000-000000000000}
                Disk Address:            Port3Path0Target0Lun3

C:\Users\administrator.ZDBE14>
```

Where:

-enable session 2011/04/12-3:tpc200

> specifies the backup session ID where replicas have been created

-backhost tpc200.zdbe14.test

> specifies the server where replicas will be exported/presented and mounted

-mnt_target c:\restore

> specifies the root mount point where replicas will be mounted

-mnt_apphostname_sessionid

> specifies the pattern to be used for the creation of unique mount points where replicas will be mounted. If this option is specified, replicas will be mounted at the folder that consists of the root mount point specified with the **-mnt_target** option, name of the application host from where the backup was taken, and the unique backup session ID in which the replica was created. In our example, the specified options result in the mounting of replicas in the following folder:
>
> > **C:\restore\tpc200.zdbe14.test\2011-04-12-3**

For more information on usage of omnidbvss CLI, refer to the Command Line Interface Reference documentation listed in the For more information section.

Note

If backup session is already enabled on one system, disable it prior enabling it to the restore server.

The result of the omnidbvss command is that the file system from the virtual copy made in backup session 2011/04/12-3 has been mounted on the C:\restore\tpc200.zdbe14.test\2011-04-12-3\F\ on server tpc200.zdbe14.test (see Figure 23). Using Windows Explore, it is possible to select any file from the backup file system and copy it to the desired location. The data on the backup file system cannot be modified since it is mounted in the read-only mode. This ensures that backup data stays preserved even after restore is done. After restore of data is done, the virtual copy can be un-exported using the same omnidbvss CLI using -disable option.

Figure 23: Content of virtual copy is available on the application system.
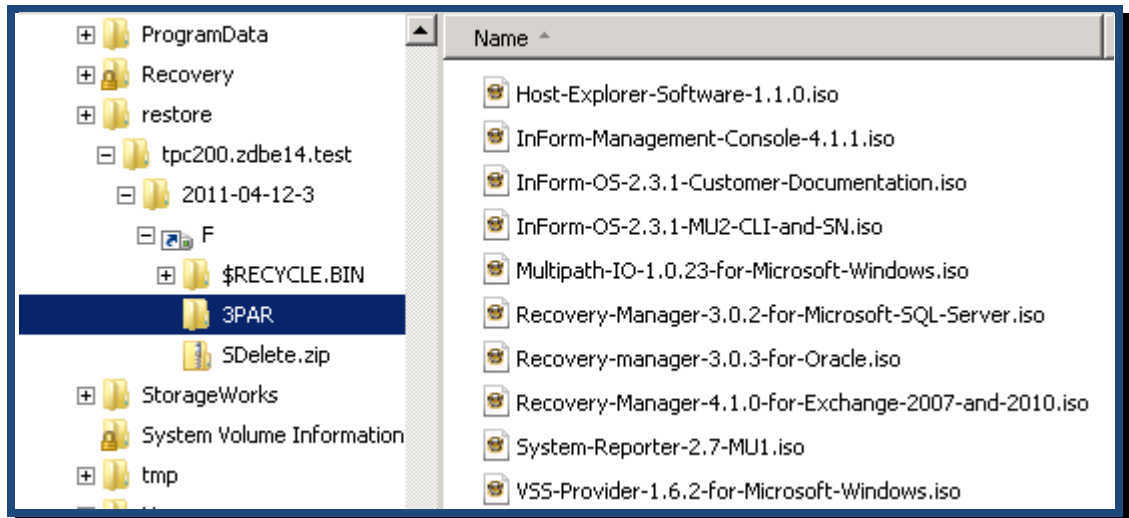
Microsoft SQL backup

Microsoft SQL Server provides support for creating snapshots from SQL Server data using VSS by providing SQL writer. Starting with MS SQL version 2005, SQL writer is included in the MS SQL installation. To check if the writer is properly installed and if it is in the proper, stable state, execute following command on the server where MS SQL Server is running:

```
C:\>vssadmin list writers
vssadmin 1.1 - Volume Shadow Copy Service administrative command-line tool(C) Copyright
2001-2005 Microsoft Corp.

......


Writer name: 'SqlServerWriter'
   Writer Id: {a65faa63-5ea8-4ebc-9dbd-a0c4db26912a}
   Writer Instance Id: {f6f07c24-a3be-44dd-b311-48020f20a512}
   State: [1] Stable
   Last error: No error

......

C:\>
```

To perform a backup of Microsoft SQL Server data, it is required that the MS Volume Shadow Copy Integration component is installed on the server where the SQL Server is running as well as on the backup server. It is not possible to run a transaction log backup using MS Volume Shadow Copy Integration. Only full backups are possible. These backups, even though they do the backup of transaction logs, do not truncate them. To be able to perform a backup of transaction logs, Data Protector MS SQL Integration component must be installed on the server where MS SQL Server is running. This integration uses Microsoft Virtual Disk Interface (VDI) to run block-level backup of transaction logs. For information on how to configure backup of MS SQL transaction logs, refer to the Integration Guide for Microsoft Application listed in the For more information section.

Before running backup, ensure that both data and log files are stored on the 3PAR Storage System disks.

To create a Microsoft SQL backup specification, use the same procedure as for the file system backup specification creation. The only difference is in the selection of components to be backed up. In the list of available writers, under SqlServerWriter, select components that you would like to backup in this backup specification. You can select either the whole MS SQL instance or specific database (see Figure 24). Database DB1_3PAR has its data stored on one file system and its transaction logs on the other:

- file system containing DB1_3PAR database files is mounted on:
  `C:\mnt\SQL2008R2\DB1\data\`

- file system holding transaction logs is mounted on:
  `C:\mnt\SQL2008R2\DB1\logs\`

Figure 24: Select Microsoft SQL Writer components to be backed up
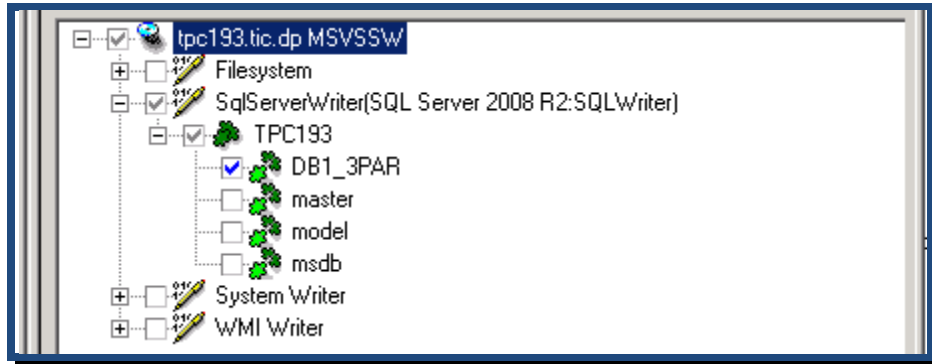
An example of the Microsoft SQL Server backup-session report can be found in Appendix B: Microsoft SQL Server Backup section.

Microsoft SQL restore from media

Restore to the point-in-time when a VSS-based backup was taken

To restore MS SQL VSS based backup to the point-in-time when VSS based full backup was taken, follow the same procedure as for file system restore described in the section File System restore from media. When coming to the point to choose the object to be restored, you must select the SqlServerWriter component that you want to restore (see Figure 25). All other options should be set in the same manner as for the file system restore from media. After restore is done, database will be recovered to the point in which it was when the full backup was taken. The database will be brought to an online state. It will be not possible to apply any transaction logs to the database.

Figure 25: Select Microsoft SQL Writer components to be restored.
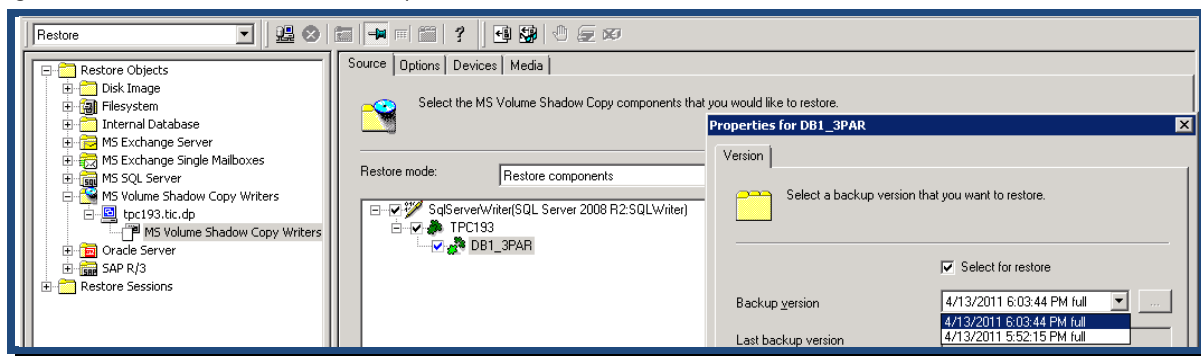
Restore to any point-in-time from media

To be able to restore MS SQL database to any point-in-time, the following is required:

- All transaction log backups must be available from the time when the full VSS based backup was taken until the desired time at which the database should be recovered.
- Database must be left in the recovery mode after restore of full VSS backup is performed (this is only possible by using the Data Protector CLI command `omnir`).

Recovery of Microsoft SQL database to any point-in-time is a two-step process:

- Restore full VSS based backup and leave the database in recovery mode.
- Apply all transaction log backups up to the time of recovery.

Note

Make sure that the backup of all remaining transaction logs has been performed before starting the restore process.

To leave the database in the recovery mode after restore of full VSS base backup, use the Data Protector `omnir` CLI. (This cannot be done from the Data Protector GUI). To find out which full backups are available, use the following CLI command:

```
C:\>"\Program Files\OmniBack\bin\omnidbvss.exe" -list session

        Session Key           IR      Disk-Only       Barlist Name
=============================================================================
[0]     2011/04/18-26:tpc193   FALSE   FALSE           tpc193_SQL_DB1_3PAR
[1]     2011/04/18-35:tpc193   FALSE   FALSE           tpc193_SQL_DB1_3PAR

C:\>
```

To find the component names of the objects that were backed up in the backup session that is to be restored, execute following command:

```
C:\>"\Program Files\OmniBack\bin\omnidbvss.exe" -get session 2011/04/18-35:tpc193


=============================================================================
Session ID:             2011/04/18-35
Barlist Name:           tpc193_SQL_DB1_3PAR
Bar Hostname:           tpc193.tic.dp
Backup Type:            FULL
Instant Restore:        FALSE
```

```
Disk-Only:              FALSE

        Component Name
================================================================================
[0]     /SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR

        Storage ID
================================================================================
[0]     DP-1-Volume-Basic-100000-ffd00000-{72a912c8-0000-0000-0000-
000000000000}:tpc193.tic.dp
[1]     DP-1-Volume-Basic-100000-ffd00000-{72a912c9-0000-0000-0000-
000000000000}:tpc193.tic.dp

C:\>
```

From this output, you can see that the component name is:

/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR

This is now all the information required to start a restore session using omnir CLI. When specifying the option –no_recovery, Data Protector will not recover the database at the end of the full backup restore. Instead, it will leave it in the recovery mode (see Figure 26):

```
C:\Users\administrator.TIC>omnir -vss -barhost tpc193.tic.dp -session 2011/04/18-35:tpc193 -
tree "/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR" -no_recovery
[Normal] From: RSM@ita030.deu.hp.com ""  Time: 4/18/2011 9:24:42 PM
        Restore session 2011/04/18-40 started.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:34 PM
        Performing Restore.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:34 PM
        Loading Backup Metadata from VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:34 PM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:34 PM
        Gathering Existing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:36 PM
        Gathering Backed Up Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:36 PM
        Checking writer configuration.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:36 PM
        Performing Pre-Restore phase.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:21:38 PM
        Starting Restore of Full Backup '2011/04/18-35'.

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:22:13 PM
        STARTING Media Agent "FL194_Writer0"

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:22:14 PM
        Loading medium from slot C:\FL1\10394b8254dac5491551665009a.fd to device
FL194_Writer0

[Normal] From: OB2BAR_VSSBAR_COMP@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:22:16 PM
        Starting OB2BAR Restore: tpc193.tic.dp:/SqlServerWriter(SQL Server
2008R2:SQLWriter)/TPC193/DB1_3PAR "MSVSSW"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:22:19 PM
        Completed OB2BAR Restore: tpc193.tic.dp:/SqlServerWriter(SQL Server 2008
 R2:SQLWriter)/TPC193/DB1_3PAR "MSVSSW"

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:22:19 PM
        Restore of Full Backup '2011/04/18-35' finished.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:22:19 PM
        Performing Post-Restore phase.
```

```
[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 9:22:21 PM
        Saving writer configuration.

[Normal] From: RSM@ita030.deu.hp.com ""  Time: 4/18/2011 9:25:32 PM
        OB2BAR application on "tpc193.tic.dp" disconnected.

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:22:49 PM
        Unloading medium to slot C:\FL1\10394b8254dac5491551665009a.fd from device
FL194_Writer0

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:22:49 PM
        COMPLETED Media Agent "FL194_Writer0"


C:\Users\administrator.TIC>
```

Where:
  -vss

        specifies the type of restore session. It this case, it is a Virtual Shadow Copy session.
  -barhost tpc193.tic.dp
        specifies the server name where data will be restored.
  -tree "/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR"
        specifies the name of the object to be restored.
  -no_recovery
        specifies that Data Protector should leave the restored database in *restoring mode.*

Figure 26: MS SQL Database is left in the restoring mode after restore
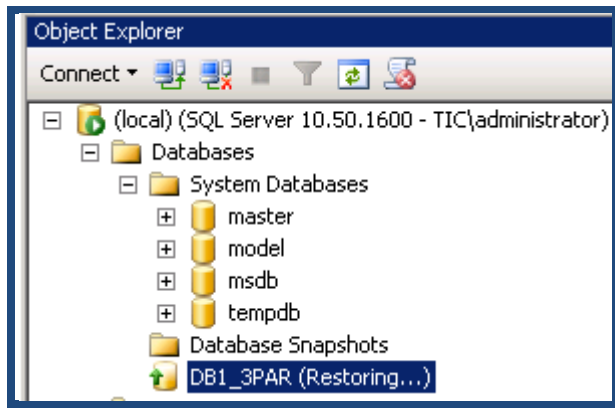
The next step is to restore the database transaction logs that have been taken since the full VSS based
backup. Restore of transaction logs can be done using the Data Protector Restore GUI (see Figure 27).
Transaction log backups must be restored one by one in the order they have been taken, starting with
the one that was taken after the full VSS backup. Make sure that you select the option *Restore only this
backup.* In addition, you must specify the following option in the Options tab (see Figure 28):

Leave database nonoperational, but be able to restore additional transaction logs.

With these options selected, the database will remain in the restoring mode and it will be possible to
restore the next transaction backup. When restoring the last transaction backup, select the option
Leave database operational. No additional transaction logs can be restored. This will result in
bringing the database in the online mode after restore of the transaction logs is done.

Figure 27: Restore of MS SQL transaction log
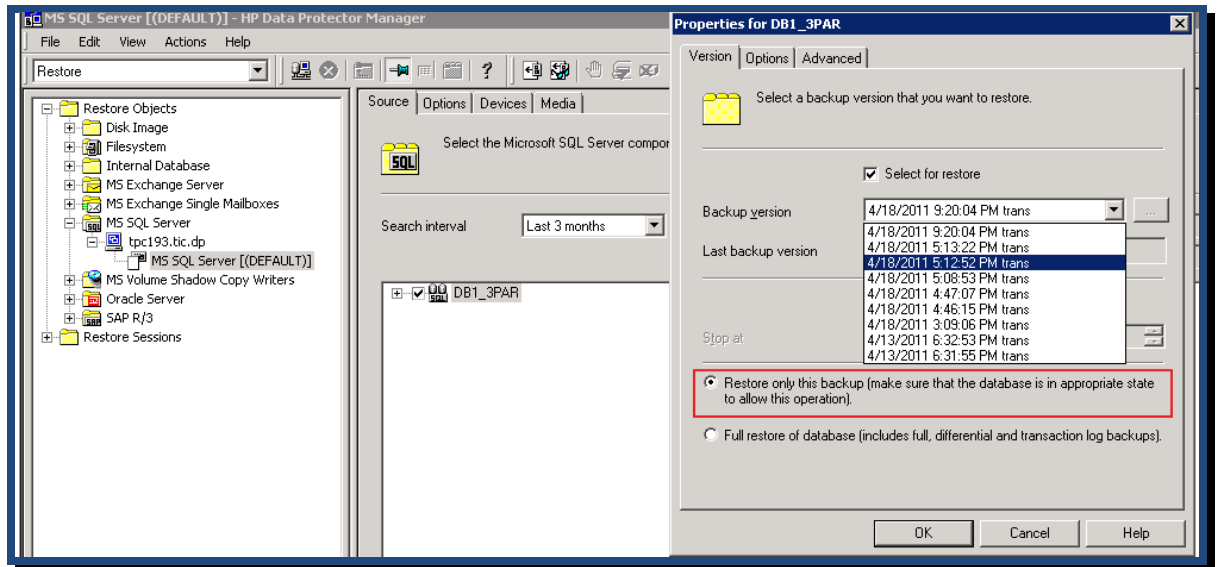
Figure 28: Select option to leave database in the restore mode in order to be able to restore additional transaction logs
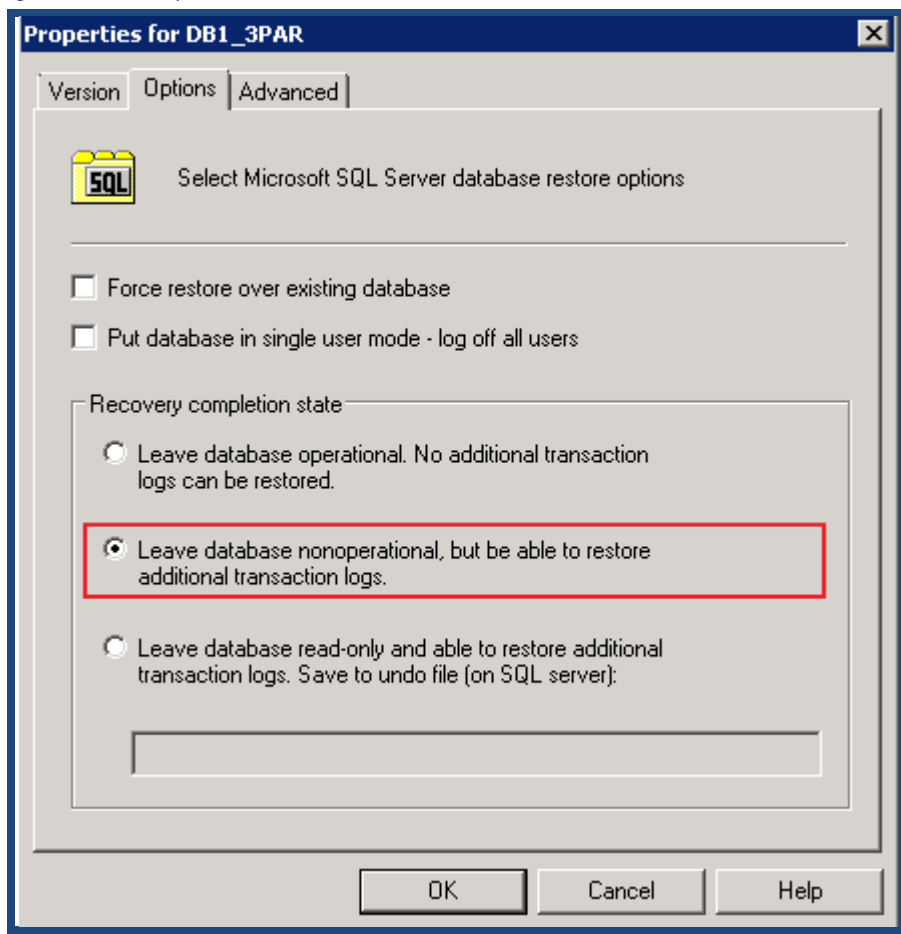
An example of the restore-session output of transaction logs can be found in the Appendix B: Microsoft SQL Server Transaction Log Restore section.

Microsoft SQL restore from virtual copy

In situations that virtual copies/snapshots are still available, it is possible to restore the database data by promoting virtual copies to its parents. The advantage of using this type of restore is significant when the amount of data to be restored is relatively large. Similar to the previous section, you must use Data Protector CLI commands to perform this kind of restore. To repeat the restore process from the previous section using 3PAR Storage System promotion capability, you must start the `omnir` CLI command with the option `-manula_restore <name_of_script>`. With this option specified, the restore process will stop at the point where data has to be restored to the production disks. Instead of restoring data from media, the specified script will be started. The restore process will wait for the script to finish before continuing with the restore session. The script can be written in the way that restores the data. It is also possible that the script is just waiting for the user to manually restore the data.

After starting the restore with this command and when the restore process is waiting for data to be restored, it is required to perform the following steps to restore data from virtual copies:

• Take the database offline

- In cases where MS SQL is running in the MS cluster, put all involved disks in the maintenance mode.
- Retrieve disk signature from all disks (use `diskpart detail disk` CLI)
- Unmount all involved disks and put them in offline mode.
- Remove all presentations from all virtual LUNs (un-export virtual LUNs) from all hosts.
- Promote all virtual copies to the parent LUN. Note that you have to promote the read-only (marked with *ro*) virtual copy (see Figure 29). Make sure that all promoted virtual copies are made in the same backup session!
- Wait until data is copied to the parent LUN.
- Export all virtual LUNs to all hosts where they were presented before restore.
- On the application host, put all disks online.
- Remove read-only flag from the restored volume (use `diskpart` commands: `select volume, attr volume clear readonly)`
- Change the disk signature for all disks back to its original value.
- Mount disks on the same mount point as they were mounted before restore.
- In cases where MS SQL is running in the MS cluster, take all disks out of maintenance mode.
- Resume the script.

Figure 29: Promote virtual copy to its parent

After the script is resumed, Data Protector will continue with the rest of the restore session. The database will be left in the recovery mode so that transaction logs can be applied and database restored to desired point-in-time.

The following is an example of a restore session using the manual restore option:

```
C:\Users\administrator.TIC>omnir -vss -barhost tpc193.tic.dp -session 2011/04/18
-35:tpc193 -tree "/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR
" -no_recovery -manual_restore SQL_man_restore.bat
[Normal] From: RSM@ita030.deu.hp.com ""  Time: 4/19/2011 1:18:07 AM
        Restore session 2011/04/19-9 started.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:14:59 AM
        Performing Manual Restore.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:14:59 AM
        Loading Backup Metadata from VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:14:59 AM
        Connecting to Volume Shadow Copy Service.
```

```
[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:14:59 AM
        Gathering Existing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:15:01 AM
        Gathering Backed Up Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:15:01 AM
        Checking writer configuration.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:15:01 AM
        Performing Pre-Restore phase.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:15:03 AM
        Starting pre-exec script 'C:\Program Files\OmniBack\bin\SQL_man_restore.bat'...

Executing vss manual restore
=========================================================================
Please start restore of SQL server files now!
Delete file C:\deleteWhenFinished.txt
on machine TPC193
as soon as restore finishes!
=========================================================================
===============================================
C:\deleteWhenFinished.txt deleted, continuing.
===============================================
[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:21:17 AM
        Performing Post-Restore phase.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:21:17 AM
        Script executed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/19/2011 1:21:19 AM
        Saving writer configuration.

[Normal] From: RSM@ita030.deu.hp.com ""  Time: 4/19/2011 1:24:31 AM
        OB2BAR application on "tpc193.tic.dp" disconnected.


C:\Users\administrator.TIC>
```

Where:
  -vss

        specifies the type of restore session. It this case, it is a Virtual Shadow Copy session.
  -barhost tpc193.tic.dp
        specifies the server name where data will be restored.
  -tree "/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR"
        specifies the name of the object to be restored.
  -no_recovery
        specifies that Data Protector should leave the restored database in *restoring mode.*
  -manual_restore SQL_man_restore.bat
        specifies that data will be restored by a third party tool. Instead of restoring data directly,
        Data Protector executes the specified script which restores the data.

An example of the SQL_man_restore.bat script used in the above session can be found in
Appendix A: Script used for manual MS SQL database restore section.
Follow the steps described in the previous section to restore all required transaction logs and to
recover the database to the desired point-in-time.

Microsoft Exchange 2010 backup

Microsoft discontinued the support for online backup APIs with this version of Exchange. The only
possible way to backup Exchange 2010 is using Virtual Shadow Copy Service. It is possible to
perform backup of Exchange 2010 by using Data Protector's MS Volume Shadow Copy Integration
as it was explained in the previous sections. Due to the complexity of the Exchange 2010 setup,
introduction of Database Availability Groups (DAG) and diversity of installation cases, a new

integration for backup of Exchange 2010 has been introduced. However, this integration is based on the Data Protector MS Volume Shadow Copy Service Integration. It is highly recommended to use this integration for backup of Exchange 2010. To use this integration, you are required to install Data Protector's MS Exchange Server 2010 Integration on all Exchange 2010 servers (see Figure **7**). In addition, MS Volume Shadow Copy Integration has to be installed on all these servers. If the backup server is not part of the Exchange setup, it is required to have MS Volume Shadow Copy Integration installed on that server.

If Exchange 2010 DAG is configured, the DAG's Virtual IP address needs to be imported into the Data Protector Clients list. When importing the virtual IP address, make sure that the type of the client that is going to be imported is set to Virtual Host (see Figure 30). This address **must** be used for each backup specification that will be created to backup any of the databases that are part of that DAG.

Figure 30: Import Database Availability Group's Virtual IP address
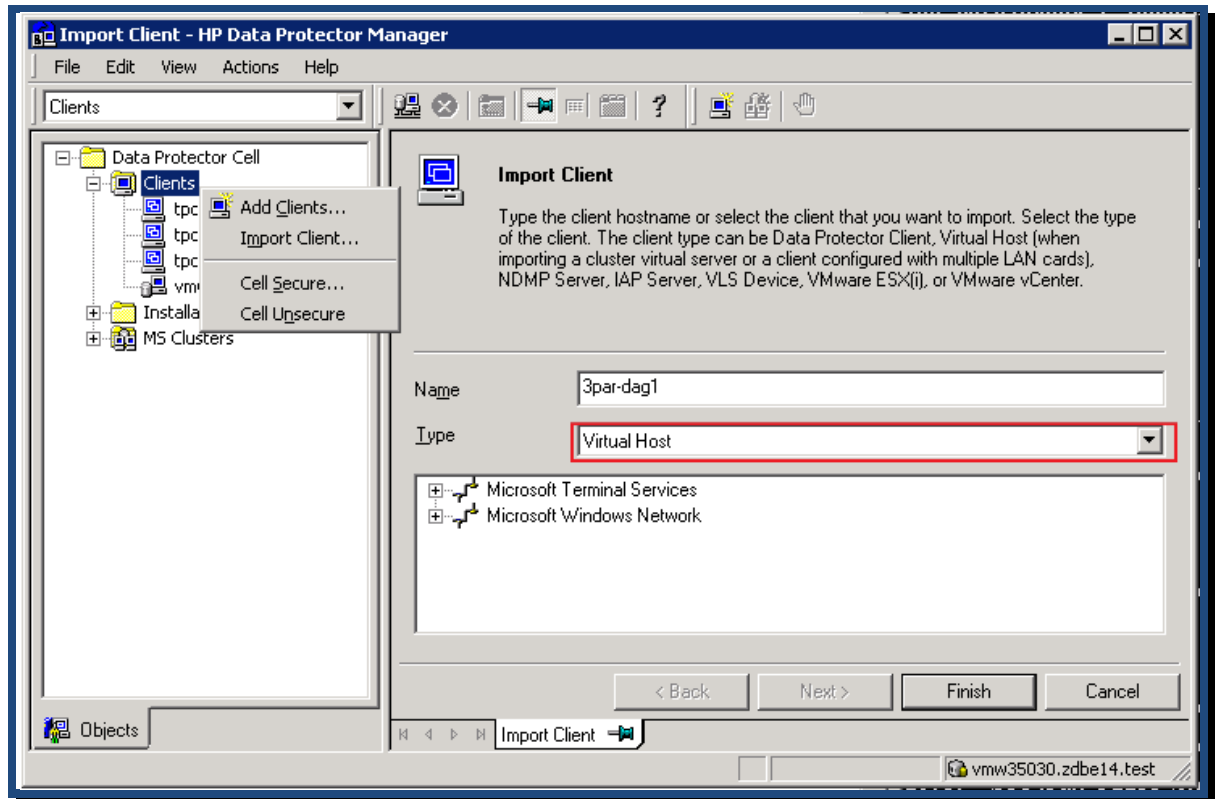
The Microsoft Exchange 2010 setup that has been used for the white paper consists of three servers: tpc200, tpc201, and tpc202. Database Availability Group has been configured on all these three servers with the virtual IP address: `3par-dag`. There is one database configured that is part of this DAG with the name `3PAD-DB1` (see Figure 31). Database data is stored on one disk and database logs on the second disk. The database is replicated on two other servers with the same disk layout. They are mounted on the same mount point on all three servers. Disks that are used for the database and log files are all provisioned from the 3PAR Storage System.

Figure 31: Microsoft Exchange 2010 DAG setup with 3PAR Storage System
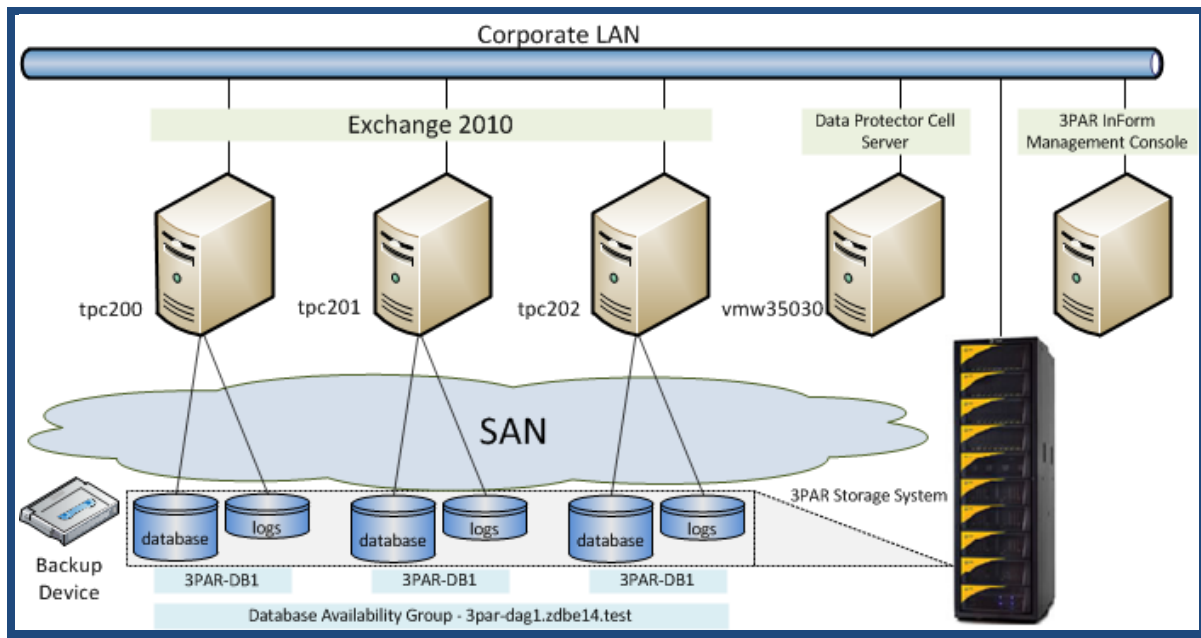
Figure 32 shows how the configuration appears in the Exchange Management Console.

Figure 32: Microsoft Exchange 2010 Management Console view of the setup

Before starting to create a backup specification, ensure that Exchange 2010 writers on all servers are configured and are in a stable state. The following command can be used to check the state of the writers.

```
C:\Users\administrator.ZDBE14>vssadmin list writers vssadmin 1.1 - Volume Shadow Copy
Service administrative command-line tool (C) Copyright 2001-2005 Microsoft Corp.

. . . .

Writer name: 'Microsoft Exchange Replica Writer'
   Writer Id: {76fe1ac4-15f7-4bcd-987e-8e1acb462fb7}
```

```
   Writer Instance Id: {92c255ce-7a79-42a8-b6f0-df6350d3d057}
   State: [1] Stable
   Last error: No error


. . . .

Writer name: 'Microsoft Exchange Writer'
   Writer Id: {76fe1ac4-15f7-4bcd-987e-8e1acb462fb7}
   Writer Instance Id: {e6e7deda-42f6-47bd-b022-40e3eea7627b}
   State: [1] Stable
   Last error: No error


C:\Users\administrator.ZDBE14>
```

Note that there are two writers available on the system. Microsoft Exchange Replica Writer is used for backup of passive databases and Microsoft Exchange Writer is used for backup of active databases. For each server that is part of the Database Availability Group it is required to have an On-line Extension for ONE Windows / Linux system license. Additionally, as many terabytes of Windows Zero Downtime Backup licenses as the amount of protected LUNs' size is needed (excluding LUNs used by passive database copies).

Create Exchange 2010 Data Protector backup specification

New backup specification for Exchange 2010 backup can be created by right-clicking the MS Exchange 2010 Server folder under the Backup Specification folder (see Figure 33). In earlier versions of Data Protector, Exchange backups are configured using the MS Virtual Shadow Copy Writers folder. Due to backward-compatibility reasons, this is also supported in Data Protector 6.2, but it is not recommended. In the first window, in the Backup options area select *VSS transportable backup* as Backup type if a dedicated backup server should be used. Or, if you would like to use the application server (for example, the server holding only passive database copies) to also perform the backup to media, select Local or network backup for backup type.

Figure 33: Microsoft Exchange 2010 backup specification
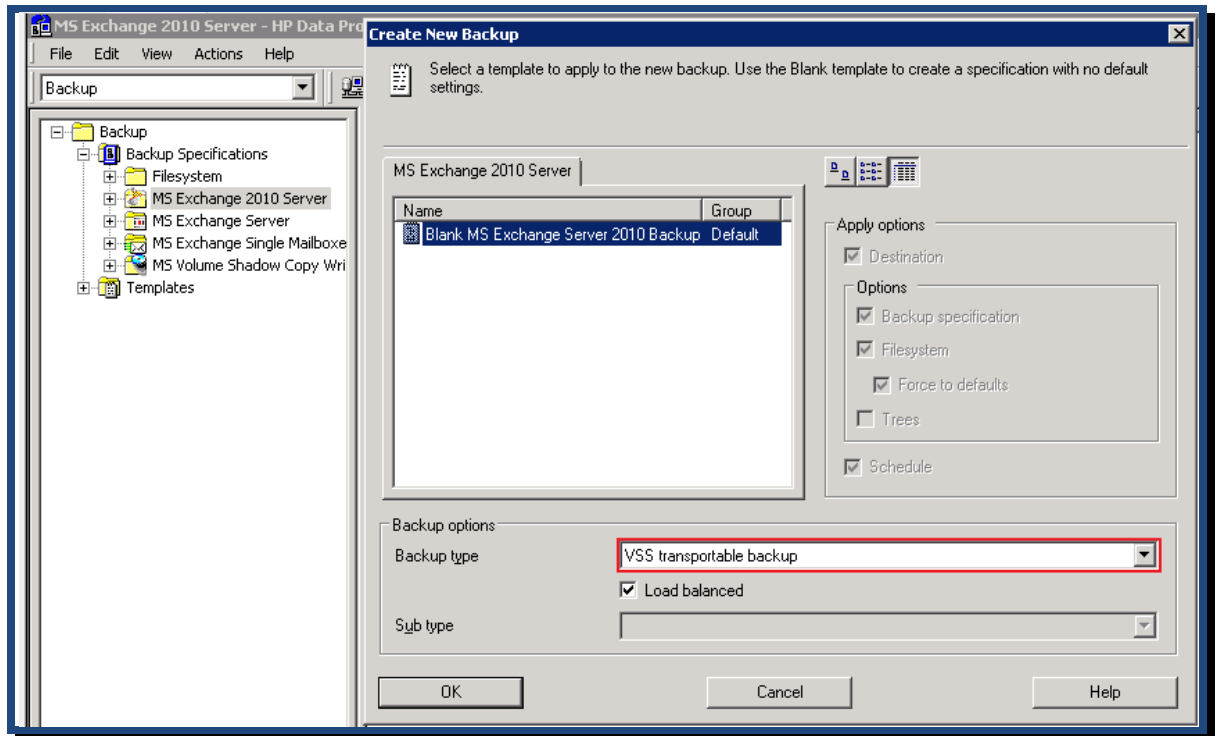
In the next wizard window, specify the DAG's name or the physical name of the Exchange server (see Figure 34). In cases where the DAG name is entered, Data Protector provides a server-independent database view as shown in (see Figure 35). For backup host, select the server that has the local access to the drives that will be used for the backup. All other options can be set in the same way as it was described in the File System backup section. In the next window, you can specify the way Data Protector will present the Exchange servers: by client name or by role.

Figure 34: Configuring VSS transportable backup options
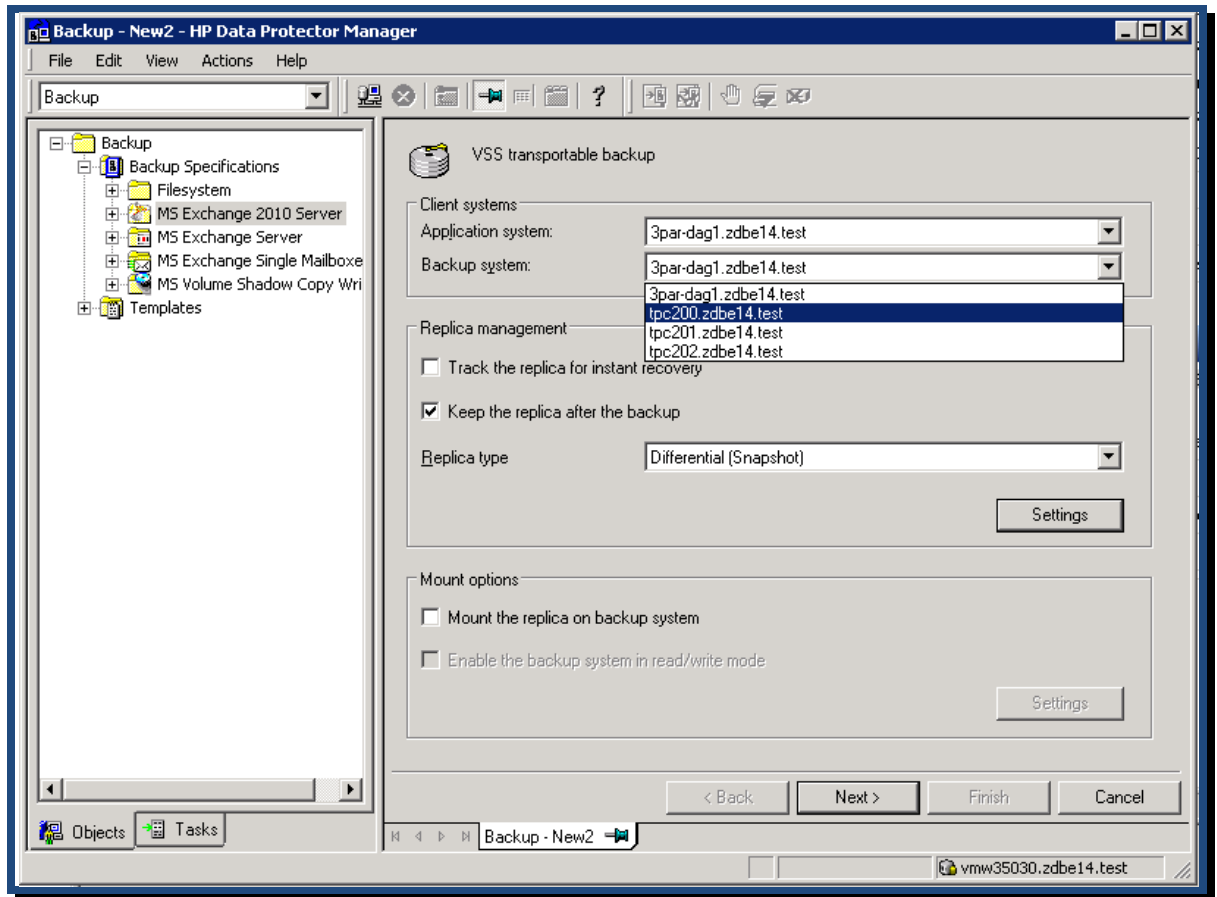
In the following window, a list of all available databases is shown (see Figure 35). Select the database(s) to be backed up and go to the next window.

Figure 35: Select databases to be backed up
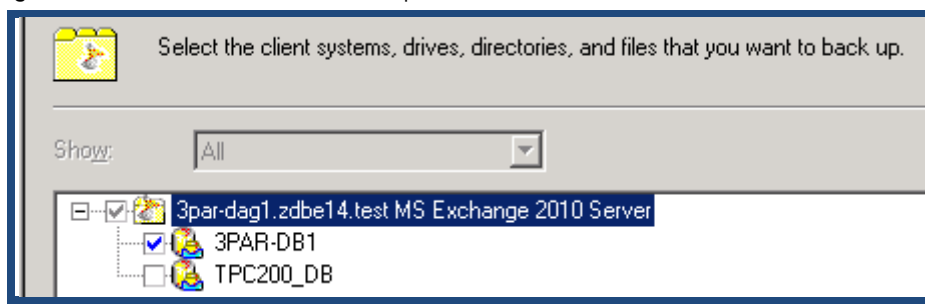
In the next wizard window (see Figure 36), it is possible to set the policies on which server the copy of the database(s) will be backed up. For more details on all options that are available on this page, refer to the Data Protector documentation listed in the For more information section.

Figure 36: Select a backup policy
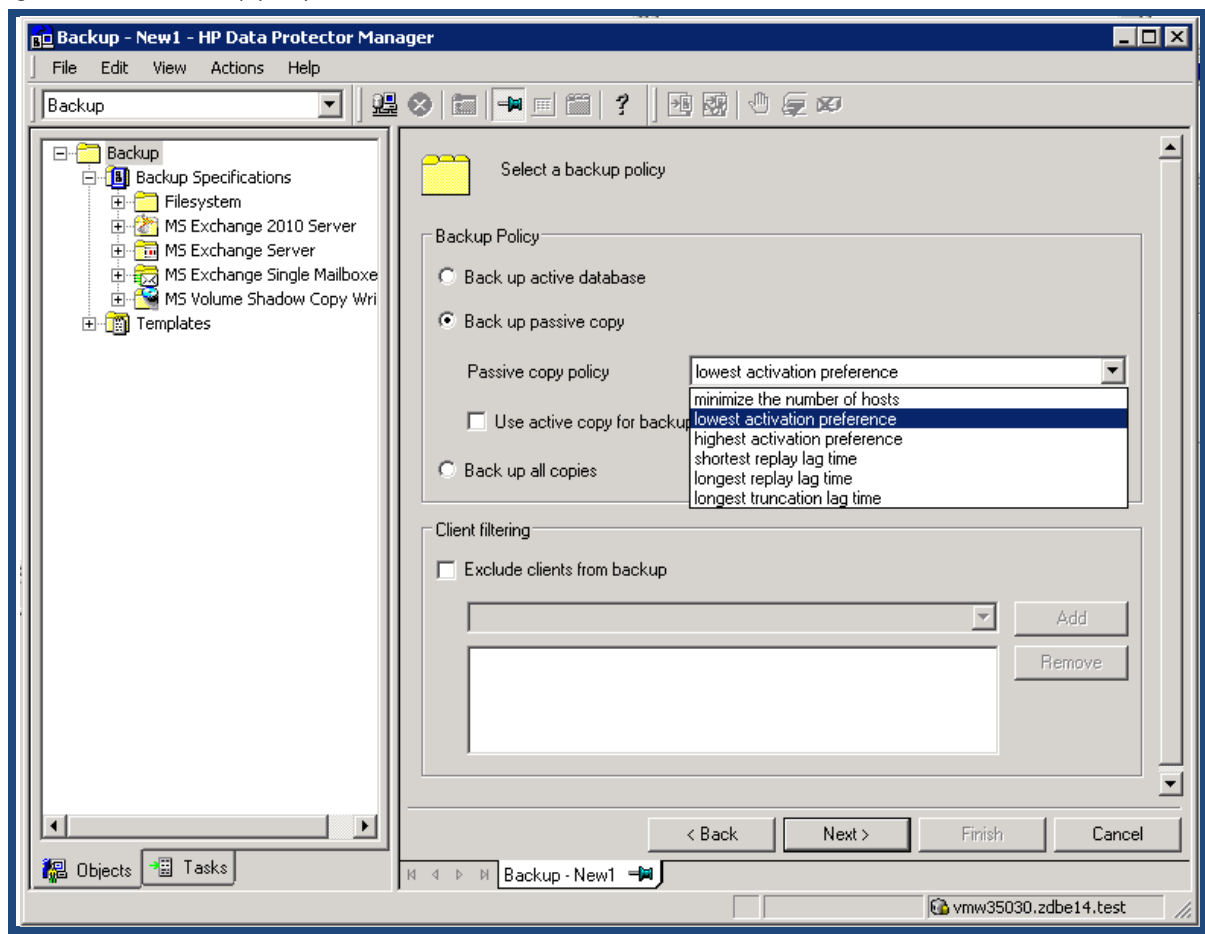
The next step is to specify the media to be used for the backup.

In the next window (see Figure 37), it is possible to specify application-specific options such as:

- Pre-exec and Post-exec executables that will be started before and after the backup is done. These executables will be started at the node where the DAG Virtual IP address is pointing to at the time of the backup.

- Consistency check options. After the virtual copy is created and exported/presented to the backup host, Data Protector will start the consistency check of the database file and log files. The consistency check creates a heavy I/O load on the storage system. It is possible to reduce this I/O load by introducing a pause of 1 second after a specified number of I/O operations. To further reduce the I/O load and to increase the backup speed, Data Protector provides the possibility to omit the consistency check completely or to run a consistency check of log files only. However, it is highly recommended to run a consistency check on both database and log files. By default, Data Protector will run a consistency check of log files only.

After backup completes successfully, Exchange Server 2010 truncates the backed up logs on all servers that are part of the DAG. Logs that have not yet been applied to all DAG copies are not truncated. Exchange Server 2010 truncates logs after full and incremental backups. However, it does not truncate logs after copy backups.

Figure 37: Microsoft Exchange Server 2010 Specific Options
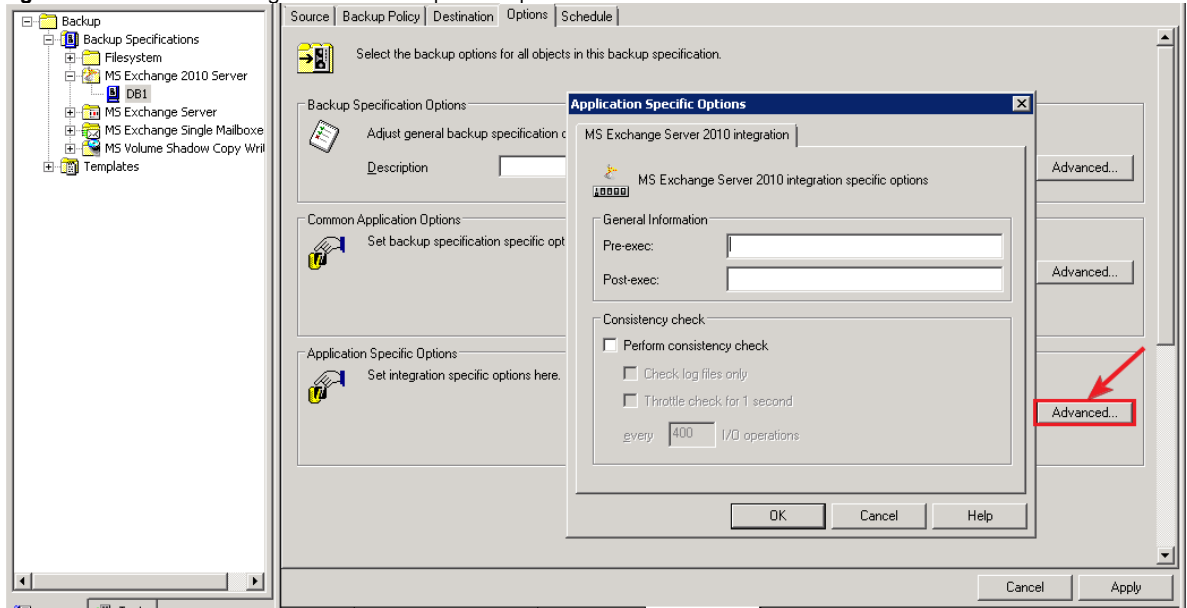
The remaining scheduling options have been described previously in the File System backup section.
After creation of backup specification is done, start the backup.
An example of the Exchange 2010 Server backup-session report can be found in Appendix B:
Microsoft Exchange 2010 Backup section.

The same backup specification can be used for backup of logs. In order to perform a 'logs only'
backup, select the incremental backup (Inc) instead of full when prompted for the backup type.

Microsoft Exchange 2010 restore from media

List of Microsoft Exchange 2010 databases that are available to be restored can be found in the
Restore panel under MS Exchange 2010 Server subfolder (see Figure 38).

Figure 38: List of Microsoft Exchange 2010 servers that can be restored
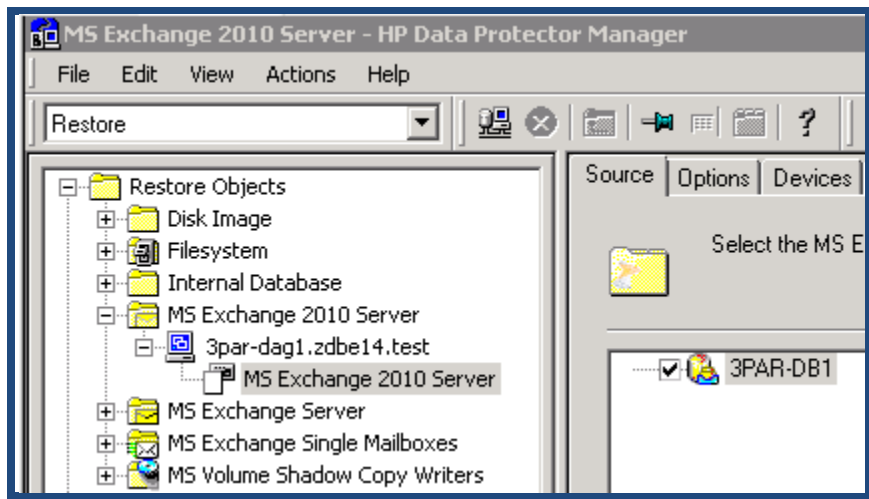
Figure 39: Restore options for Microsoft Exchange Server 2010 when failed database exists
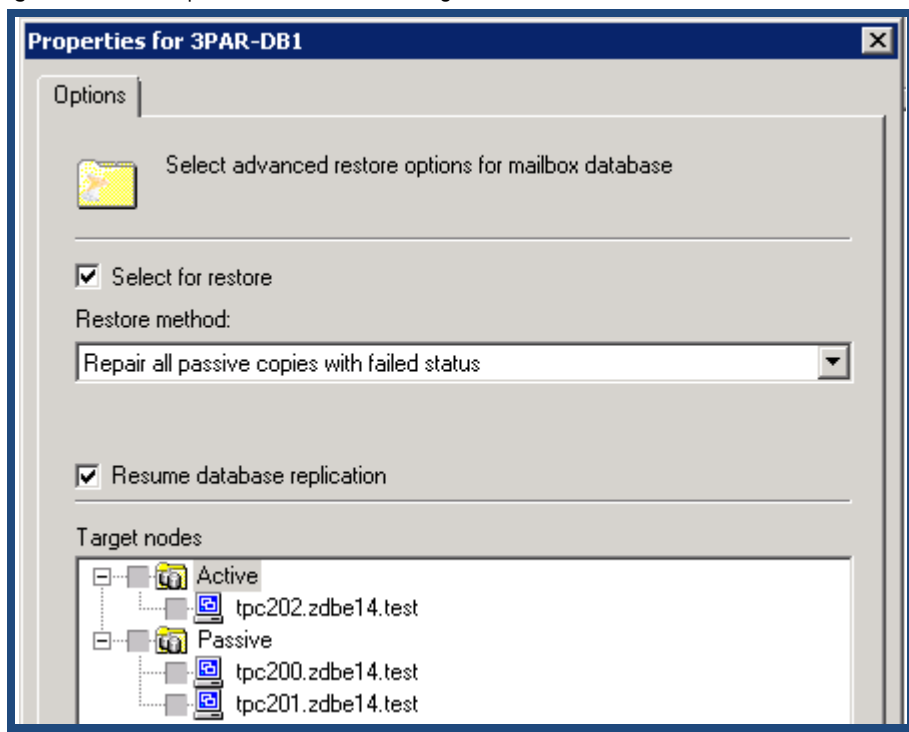
As soon as the database to be restored is selected, a window with the restore options will pop up (see Figure 39). Data Protector runs a *discovery* of the selected Microsoft Exchange 2010 database before this window is presented (this may take several minutes). If there is database that is in failed state, Data Protector automatically selects the option *Repair all passive copies with failed status* as the Restore method. Data Protector offers the following restore options:

• Restore all passive copies with failed status as shown in Figure 39

• Restore to the latest state

- Restore to a point-in-time, see Figure 40
- Restore to a new mailbox database, see Figure 40 (this can also be used for single mail recovery using the recovery database)
- Restore files to a temporary location

Figure 40: Additional restore options for Microsoft Exchange Server 2010 database
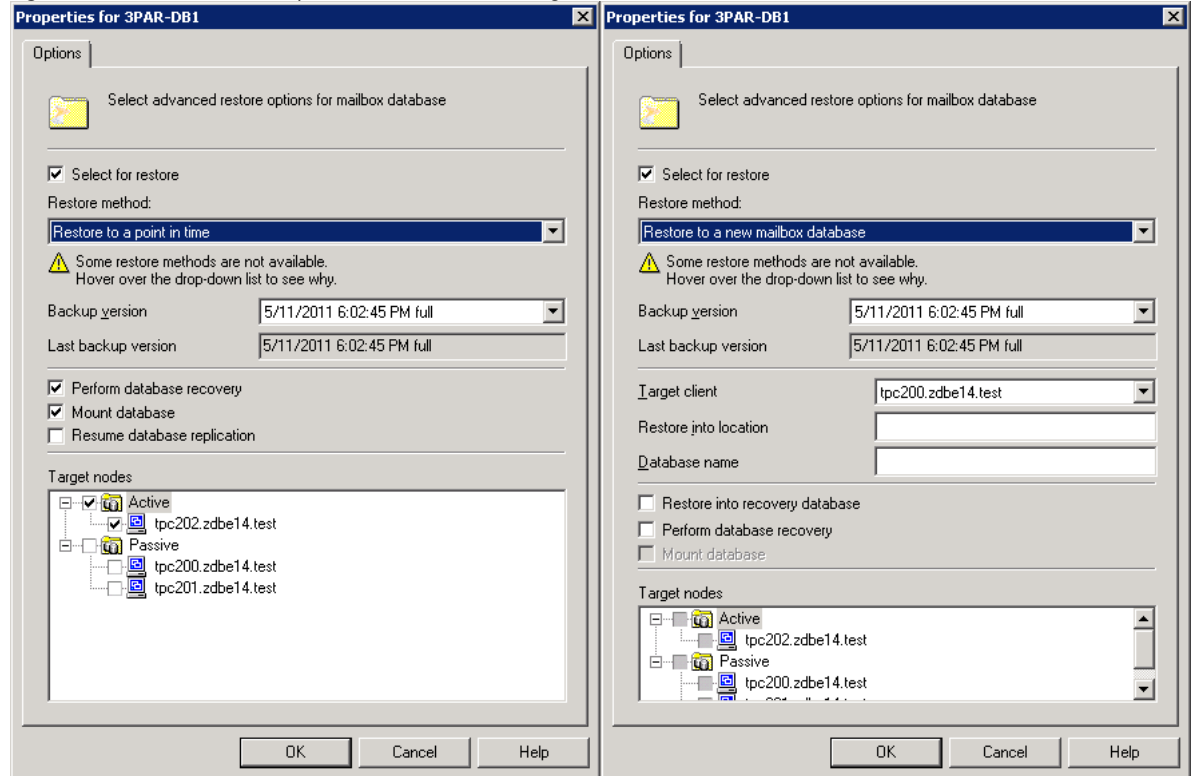
Now you are ready to start the restore process of a failed database.

In cases where devices to be used for a restore are configured as multi-path devices, Data Protector starts the restore of data to the server (over the SAN) where the failed database is located. This prevents the restored data going over the LAN.

An example of the Microsoft Exchange 2010 Server restore-session report can be found in Appendix B: Microsoft Exchange 2010 Restore section.

Microsoft Hyper-V R2 backup

The backup of Microsoft Hyper-V is done through the Microsoft VSS framework. In Data Protector 6.2, a special integration for backup of virtual machines running on Microsoft Hyper-V has been developed. It is highly recommended to use this integration for backup of virtual machines. To be able to perform backup of virtual machines, Microsoft Hyper-V VSS Writer must be available on all servers that are part of the Hyper-V cluster. To check the availability and the status of Hyper-V writer, execute following command:

```
C:\Users\Administrator.TIC>vssadmin list writers
vssadmin 1.1 - Volume Shadow Copy Service administrative command-line tool (C) Copyright
2001-2005 Microsoft Corp.

Waiting for responses.
These may be delayed if a shadow copy is being prepared.
…
Writer name: 'Microsoft Hyper-V VSS Writer'
   Writer Id: {66841cd4-6ded-4f4b-8f17-fd23f8ddc3de}
   Writer Instance Id: {1ef504da-5a9f-4259-b995-a40cfbe0b7b5}
   State: [1] Stable
   Last error: No error
…

C:\Users\Administrator.TIC>
```

In the R2 version of Hyper-V, Microsoft introduced a new concept of shared storage that can be used to store data from virtual machines. This concept is called Cluster Shared Volume (CSV). Since CSV needs to be accessible from all servers that are in the Hyper-V cluster, the virtual volume on which CSV will be created must be exported to all these servers. In order to take advantage of Hyper-V feature, it is recommended to always use CSV for virtual machine storage. The setup used for developing this white paper is shown in the Figure 41.

Figure 41: Microsoft Hyper-V R2 setup.
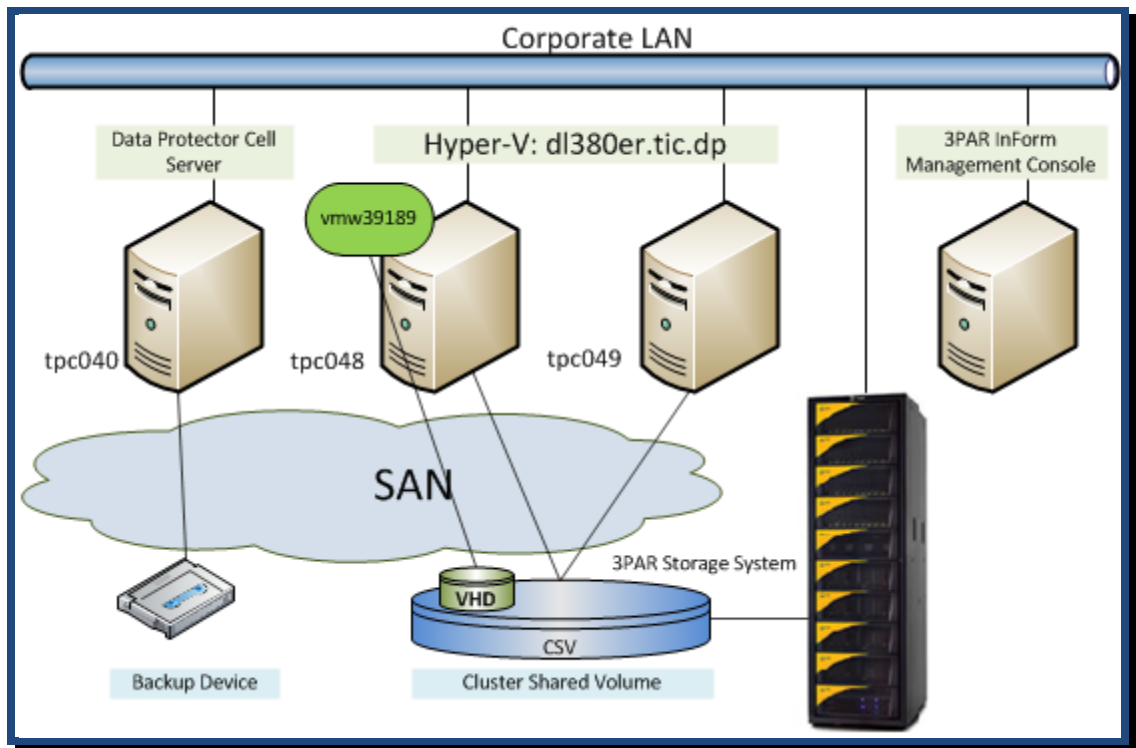
Licensing

For each Microsoft Hyper-V cluster environment it is required to have one On-line Extension for ONE Windows / Linux system license. In addition, it is needed to have as many terabytes of Windows Zero Downtime Backup licenses as the size of all CSVs, virtual volumes, which are going to be protected.

Installation and configuration

Data Protector MS Volume Shadow Copy Integration agent must be installed on each of the servers that are part of the Hyper-V cluster (see Figure **7**). Installation must be done in the same way as with a Microsoft Failover Cluster aware installation. Currently, this is not possible with the push installation from Data Protector's GUI. Instead, installation of agents must be done locally on each server. For more information on local client installation, refer to the Data Protector Installation Guide (see the For more information section).

After all clients have been installed, the Microsoft Hyper-V virtual IP address must be imported. Client import can be done using the Data Protector GUI. In the Clients scoping pane, right-click the Clients subfolder. In the pop-up menu, select Import Client option. After specifying the name of the virtual IP address, change the type of client to Hyper-V (see Figure 42). This virtual IP address should be used whenever Microsoft Hyper-V backup specification is created.

Figure 42: Importing Microsoft Hyper-V virtual IP address
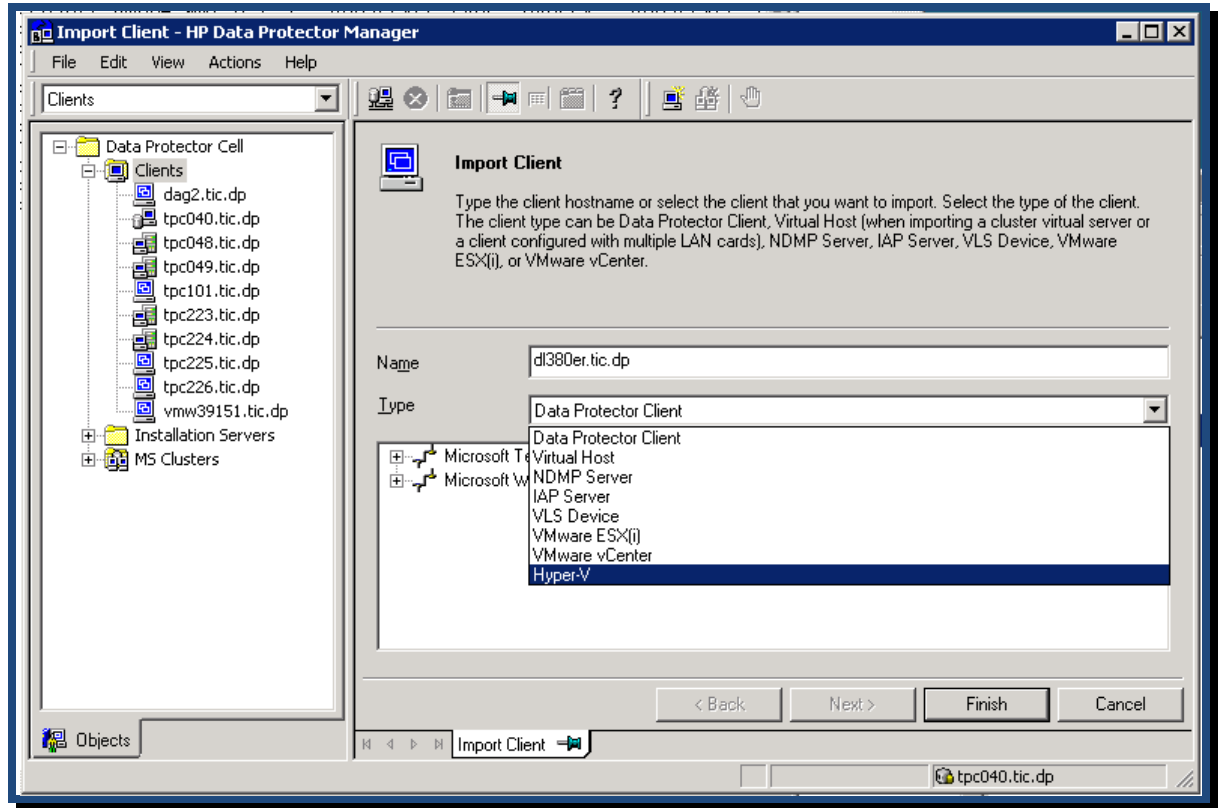
In earlier Data Protector versions, Hyper-V backups are configured using MS Virtual Shadow Copy Writers folder. Due to backward-compatibility reasons, this is also supported in Data Protector 6.2, but it is not recommended. However, there are some use cases where this integration should be used. Refer to the Data Protector 6.20 Integration Guide for Virtual Environments for more details. In Data Protector 6.2, a dedicated agent has been developed for protection of virtual environments. This agent is part of Virtual Environment Integration. This agent should be used for backup of virtual machines running on Microsoft Hyper-V setup. The Virtual Environment Integration must be installed on servers running Windows OS. For this integration to operate, a SAN connection is not required. Additionally, 3PAR VSS Provider must be installed and configured on all Hyper-V servers and on the backup host also.

Note

Servers that are part of the Microsoft Hyper-V setup cannot be used as backup hosts due to Microsoft Hyper-V limitations.

In order to successfully complete the replica creation, it is required to enable automatic mounting of new volumes on all Hyper-V servers. To enable automatic mounting, run the following command:

```
C:\Users\Administrator.TIC>mountvol /e
```

Configuration of backup specification

To create a backup specification for backing up of virtual machines running on Microsoft Hyper-V setup, select Virtual Environment subfolder under Backup Specifications folder in Backup scoping pane (see Figure 43).

Figure 43: Configuring backup specification for backup of virtual machines
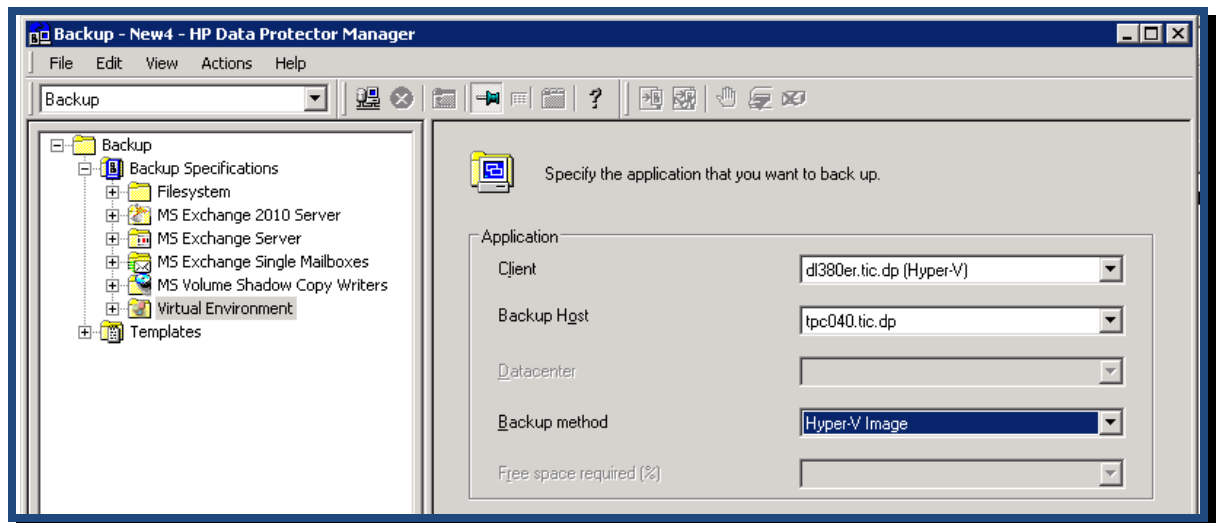
Under the application client, you must specify the virtual IP address of the Microsoft Hyper-V. The import of this virtual IP address is shown in Figure 42. As backup host, you must select one of the hosts where Virtual Environment Integration is installed. The backup method is set to Hyper-V Image as soon as the client selected for backup is a Hyper-V virtual IP client.

On the next window, specify the VSS transportable backup option (see Figure 16). Be aware that the backup host cannot be part of the Microsoft Hyper-V cluster setup.

On the next window, select all virtual machines that should be protected (see Figure 44). In the situation where a virtual machine gets moved from one physical server to the another, Data Protector will discover it and act appropriately.

For backup of virtual machines that are running on Microsoft Hyper-V, incremental backup is not supported. Only full backup is supported.

Figure 44: Select virtual machines to be backed up
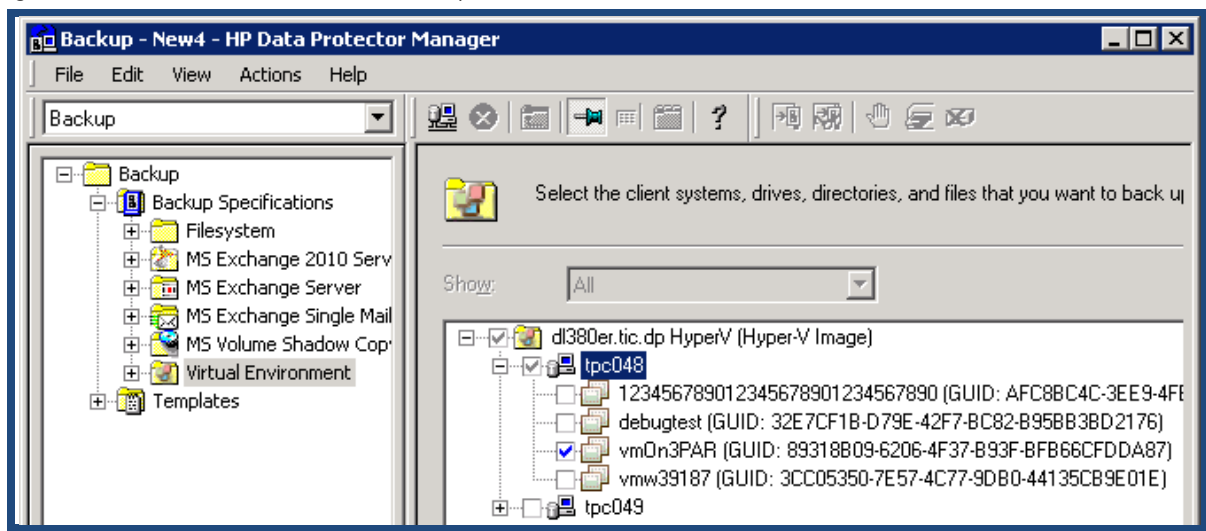
An example of the Microsoft Hyper-V backup-session report can be found in Appendix B: Microsoft Hyper-V Backup section.

Microsoft Hyper-V R2 restore from media

To restore a virtual machine that is running on Microsoft Hyper-V, under the Virtual Environment subfolder in Restore scoping pane, select the system under which Microsoft Hyper-V is running (see Figure 45). Under Source tab, select the virtual machine that you want to restore.

Figure 45: Select virtual machines to be restored.
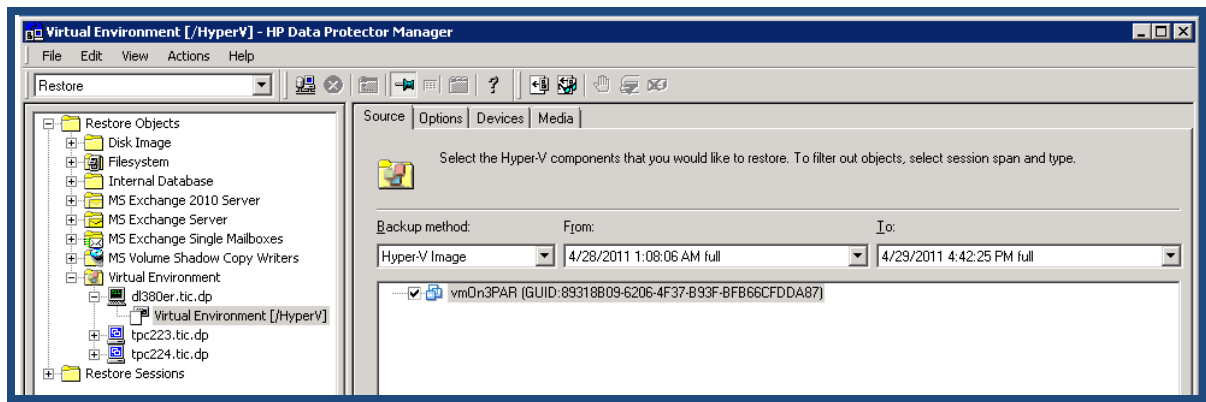
Under the Options tab select the Backup host where the Virtual Environment Integration is installed. As the Restore client, choose the virtual IP address of Microsoft Hyper-V setup where virtual machine is running (see Figure 46). To start the virtual machine after the restore process has completed, check the option *Power-on virtual machines after restore*.

Figure 46: Select options for virtual machine restore.
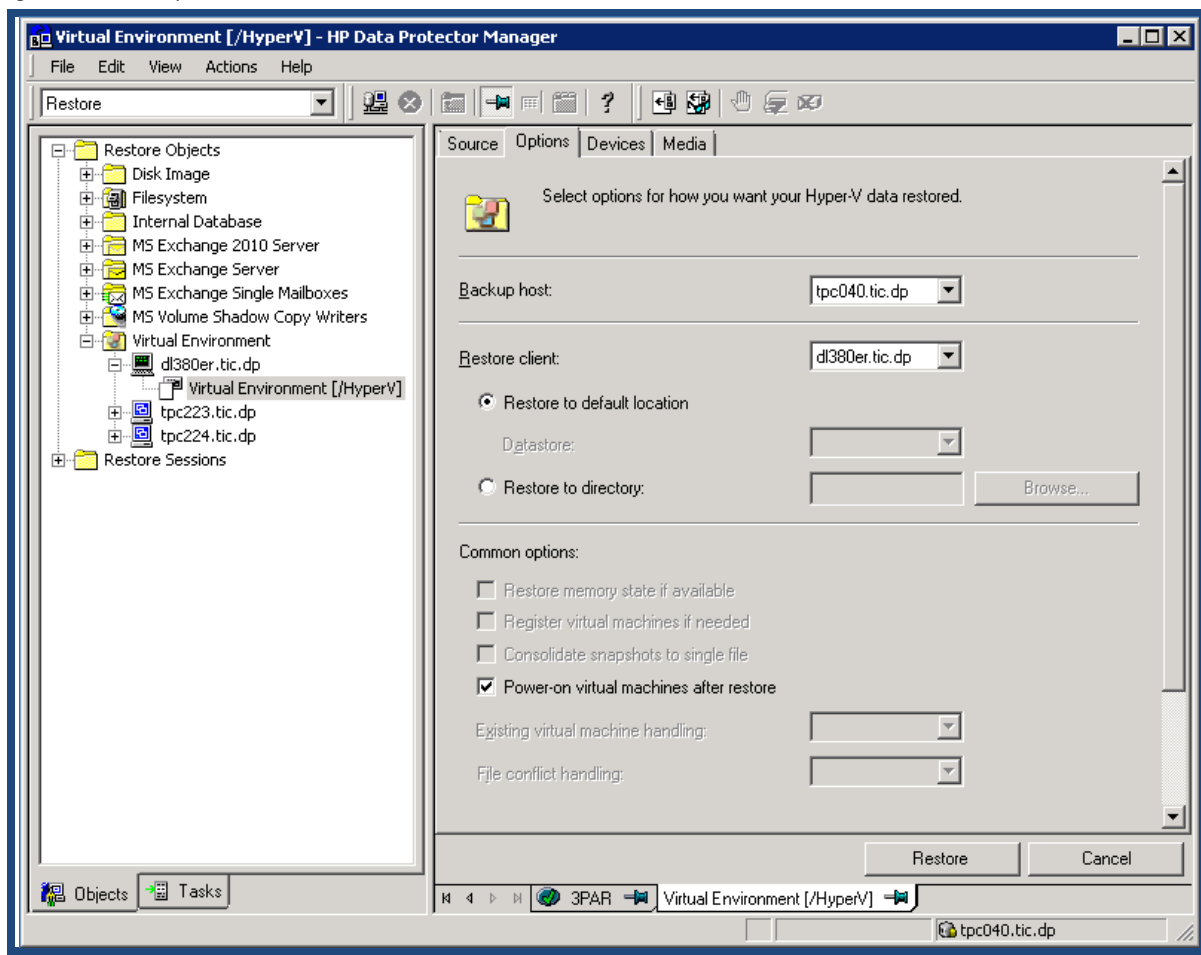
Note

Before starting the restore session, ensure that the virtual machine that is about to be restored, is deleted or exported from the Microsoft Hyper-V.

An example of the Microsoft Hyper-V restore-session report can be found in Appendix B: Microsoft Hyper-V Restore section.

After the restore session is completed, the virtual machine is restored and brought online.
For more information regarding backup and restore of virtual machines running on Microsoft Hyper-V refer to the Data Protector Integration Guide for Virtual Environments listed in the For more information section.

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Appendix A: Command Line Interface

List available Data Protector licenses

CLI used to list available Data Protector licenses:

```
C:\Program Files\OmniBack\bin>omnicc

Licensing mode    : Local
License server    : vmw35030.zdbe14.test

              Category                              Number of Licenses

...

 On-line Extension for ONE Windows / Linux system                20

...

 Windows Zero Downtime Backup for 1 TB                           50

...

```

Script used for manual MS SQL database restore

The following is the script used for the manual MS SQL database restore:

```
C:\>type "C:\Program Files\OmniBack\bin\SQL_man_restore.bat"
@echo off
echo delete this file as soon as restore finished > c:\deleteWhenFinished.txt
echo Executing vss manual restore
echo ====================================================================
echo Please start restore of SQL server files now!
echo Delete file C:\deleteWhenFinished.txt
echo on machine %COMPUTERNAME%
echo as soon as restore finishes!
echo ====================================================================
:loop
if EXIST C:\deleteWhenFinished.txt goto loop
echo ===========================================
echo C:\deleteWhenFinished.txt deleted, continuing.
echo ===========================================
C:\>
```

Appendix B: Session Outputs

File System Backup

The following is a sample of the file system backup-session report with the session id 2011/04/12-3:

```
[Normal] From: BSM@vmw35030.zdbe14.test "FStest"  Time: 4/12/2011 2:47:25 AM
        Backup session 2011/04/12-3 started.

[Normal] From: BSM@vmw35030.zdbe14.test "FStest"  Time: 4/12/2011 2:47:28 AM
        OB2BAR application on "tpc200.zdbe14.test" successfully started.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:28 AM
        Performing Full Transportable Backup.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:28 AM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:37 AM
        Replica type is set to Diff.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:38 AM
        Entering Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:39 AM
        Volume 'F:\' was successfully added to Shadow Copy Set with the following provider:
                Provider type:          Hardware
                Provider name:          3PAR VSS Provider
                Provider version:       1.6.2.3

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:39 AM
        Creating Volume Shadow Copies.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:41 AM
        Volume Shadow Copies successfully created.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:41 AM
        Importing Volume Shadow Copies from application host.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:41 AM
        Exiting Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:59 AM
        Imported Volume Shadow Copy with the properties:
                Snapshot ID:            {9FAB0898-4252-4F98-AF30-CCA50721B097}
                Snapshot Set ID:        {3250D01B-2CCC-4685-8F6C-040A12604091}
                Source volume:          \\?\Volume{02bc47fa-4b1a-11e0-b3bc-001cc4e221bc}\
                Originating host:       tpc200.ZDBE14.test
                Service host:           tpc200.ZDBE14.test
                Creation time:          2:47:41 AM
                Creation date:          Tuesday, April 12, 2011
                Provider ID:            {5F466535-9C6C-4B33-BE9F-8F3147381CF5}

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:59 AM
        Checking Shadow Copy Set consistency.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:47:59 AM
        Resolving backup volumes.

[Normal] From: OB2BAR_VDSA@tpc201.zdbe14.test "VDSA"  Time: 4/12/2011 2:48:02 AM
        Resolved volume with properties:
                Storage ID:             DP-1-Volume-Basic-100000-ffd00000-{3d79d361-0000-
0000-0000-000000000000}
                Software VDS Provider:  Microsoft Virtual Disk Service Basic Provider
                Number of Disks:        1
                Number of Mount Points: 0
                Device Path:
\\?\MPIO#Disk&Ven_3PARdata&Prod_VV&Rev_0000#1&7f6ac24&0&35303032414330314541423733#{53f56307
-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:              {3D79D361-0000-0000-0000-000000000000}
                Disk Address:           Port3Path0Target1Lun4
```

```
[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:03 AM
        Disk Backup of '/Filesystem/F' completed successfully.

[Normal] From: BMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 2:48:06
AM
        STARTING Media Agent "HP:Ultrium 4-SCSI_4_tpc200"

[Normal] From: BMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 2:48:12
AM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Loading medium from slot 21 to device Tape3:0:2:4C

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:25 AM
        Starting OB2BAR Backup: tpc200.zdbe14.test:/BackupSession/Metadata "MSVSSW"

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:25 AM
        Saving Backup Metadata to Tape.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:25 AM
        Saving Backup Metadata to VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:28 AM
        Completed OB2BAR Backup: tpc200.zdbe14.test:/BackupSession/Metadata "MSVSSW"

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:28 AM
        Proceeding with Tape Backup.

[Normal] From: OB2BAR_VSSBAR_COMP@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:48:28 AM
        Starting OB2BAR Backup: tpc200.zdbe14.test:/Filesystem/F "MSVSSW"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:19 AM
        Completed OB2BAR Backup: tpc200.zdbe14.test:/Filesystem/F "MSVSSW"

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:19 AM
        Tape Backup of '/Filesystem/F' completed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:19 AM
        Backup completed.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:19 AM
        Breaking Volume Shadow Copies and releasing the volumes.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:20 AM
        Mounting backup volumes.

[Normal] From: OB2BAR_VDSA@tpc201.zdbe14.test "VDSA"  Time: 4/12/2011 2:50:22 AM
        Mounted volume with properties:
                Storage ID:            DP-1-Volume-Basic-100000-ffd00000-{3d79d361-0000-
0000-0000-000000000000}
                Number of Mount Points:  1
                Mount points:
                        c:\mnt\tpc200.zdbe14.test\2011-04-12-3\F\

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:23 AM
        Putting backup volumes into read-only mode.

[Normal] From: OB2BAR_VDSA@tpc201.zdbe14.test "VDSA"  Time: 4/12/2011 2:50:24 AM
        The volume with properties was put into read-only mode:
                Storage ID:            DP-1-Volume-Basic-100000-ffd00000-{3d79d361-0000-
0000-0000-000000000000}
                Number of Mount Points:  1
                Mount points:
                        C:\mnt\tpc200.zdbe14.test\2011-04-12-3\F\

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MSVSSW"  Time: 4/12/2011 2:50:25 AM
        Putting backup disks into read-only mode.

[Normal] From: OB2BAR_VDSA@tpc201.zdbe14.test "VDSA"  Time: 4/12/2011 2:50:26 AM
        The disk with properties was put into read-only mode:
                Device Path:
\\?\MPIO#Disk&Ven_3PARdata&Prod_VV&Rev_0000#1&7f6ac24&0&353030324143303145541423733#{53f56307
-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:             {3D79D361-0000-0000-0000-000000000000}
                Disk Address:          Port3Path0Target1Lun4

[Normal] From: BSM@vmw35030.zdbe14.test "FStest"  Time: 4/12/2011 2:50:34 AM
```

```
        OB2BAR application on "tpc200.zdbe14.test" disconnected.

[Normal] From: BMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 2:50:37
AM
        Tape3:0:2:4C
        Medium header verification completed, 0 errors found.

[Normal] From: BMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 2:50:39
AM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Unloading medium to slot 21 from device Tape3:0:2:4C

[Normal] From: BMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 2:50:40
AM
        COMPLETED Media Agent "HP:Ultrium 4-SCSI_4_tpc200"

[Normal] From: BSM@vmw35030.zdbe14.test "FStest"  Time: 4/12/2011 2:50:40 AM

        Backup Statistics:

                Session Queuing Time (hours)       0.00
                -----------------------------------------
                Completed Disk Agents ........       2
                Failed Disk Agents ...........       0
                Aborted Disk Agents ..........       0
                -----------------------------------------
                Disk Agents Total  ...........       2
                =========================================
                Completed Media Agents .......       1
                Failed Media Agents ..........       0
                Aborted Media Agents .........       0
                -----------------------------------------
                Media Agents Total  ..........       1
                =========================================
                Mbytes Total .................   1083 MB
                Used Media Total .............       1
                Disk Agent Errors Total ......       0


==============================================================================
                    Session completed successfully!
==============================================================================
```

File System Restore

The following is a sample of the file system restore-session report with the session id 2011/04/12-6:

```
[Normal] From: RSM@vmw35030.zdbe14.test ""  Time: 4/12/2011 11:55:58 AM
        Restore session 2011/04/12-6 started.

[Normal] From: RMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 11:56:35
AM
        STARTING Media Agent "HP:Ultrium 4-SCSI_4_tpc200"

[Normal] From: RMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 11:56:40
AM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Loading medium from slot 21 to device Tape3:0:0:4C

[Normal] From: OB2BAR_DMA@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 11:56:55 AM
        Starting OB2BAR Restore: tpc200.zdbe14.test:/Filesystem/F "MSVSSW"

[Normal] From: OB2BAR_DMA@tpc200.zdbe14.test "MSVSSW"  Time: 4/12/2011 11:57:09 AM
        Completed OB2BAR Restore: tpc200.zdbe14.test:/Filesystem/F "MSVSSW"

[Normal] From: RSM@vmw35030.zdbe14.test ""  Time: 4/12/2011 11:57:10 AM
        OB2BAR application on "tpc200.zdbe14.test" disconnected.

[Normal] From: RMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 11:57:43
AM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
```

```
         Unloading medium to slot 21 from device Tape3:0:0:4C

[Normal] From: RMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_4_tpc200"  Time: 4/12/2011 11:57:44
AM
         COMPLETED Media Agent "HP:Ultrium 4-SCSI_4_tpc200"



===============================================================================
                      Session completed successfully!
===============================================================================
```

Microsoft SQL Server Backup

The following is a sample of the Microsoft SQL Server backup-session report with the session id
2011/04/18-35:

```
[Normal] From: BSM@ita030.deu.hp.com "tpc193_SQL_DB1_3PAR"  Time: 4/18/2011 5:09:05 PM
        Backup session 2011/04/18-35 started.

[Normal] From: BSM@ita030.deu.hp.com "tpc193_SQL_DB1_3PAR"  Time: 4/18/2011 5:09:05 PM
        OB2BAR application on "tpc193.tic.dp" successfully started.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:05:58 PM
        Performing Full Transportable Backup.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:05:58 PM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:05:58 PM
        Gathering Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:06:00 PM
        Updating writer configuration.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:06:00 PM
        Importing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:06:51 PM
        Replica type is set to Diff.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:06:57 PM
        Entering Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:06:59 PM
        Volume 'C:\mnt\SQL2008R2\DB1\data\' was successfully added to Shadow Copy Set with
the following provider:
            Provider type:          Hardware
            Provider name:          3PAR VSS Provider
            Provider version:       1.6.2.3

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:06:59 PM
        Volume 'C:\mnt\SQL2008R2\DB1\logs\' was successfully added to Shadow Copy Set with
the following provider:
            Provider type:          Hardware
            Provider name:          3PAR VSS Provider
            Provider version:       1.6.2.3

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:01 PM
        Creating Volume Shadow Copies.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:05 PM
        Volume Shadow Copies successfully created.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:05 PM
        Exiting Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:06 PM
        Importing Volume Shadow Copies from application host.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:52 PM
        Imported Volume Shadow Copy with the properties:
            Snapshot ID:            {D9F265C6-4969-4BBF-B56B-5B84CCB6ACEB}
            Snapshot Set ID:        {91E8CC26-024F-4863-BEAB-846A0F203816}
```

```
                Source volume:              \\?\Volume{42d09a48-5fdd-11e0-a41d-001cc4db0318}\
                Originating host:           tpc193.tic.dp
                Service host:               tpc193.tic.dp
                Creation time:              5:07:05 PM
                Creation date:              Monday, April 18, 2011
                Provider ID:                {5F466535-9C6C-4B33-BE9F-8F3147381CF5}


[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:52 PM
        Imported Volume Shadow Copy with the properties:
                Snapshot ID:                {8996965E-A959-49CE-9705-7F637CD7444A}
                Snapshot Set ID:            {91E8CC26-024F-4863-BEAB-846A0F203816}
                Source volume:              \\?\Volume{42d09a4f-5fdd-11e0-a41d-001cc4db0318}\
                Originating host:           tpc193.tic.dp
                Service host:               tpc193.tic.dp
                Creation time:              5:07:05 PM
                Creation date:              Monday, April 18, 2011
                Provider ID:                {5F466535-9C6C-4B33-BE9F-8F3147381CF5}


[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:52 PM
        Checking Shadow Copy Set consistency.


[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:52 PM
        Resolving backup volumes.


[Normal] From: OB2BAR_VDSA@tpc194.tic.dp "VDSA"  Time: 4/18/2011 5:07:58 PM
        Resolved volume with properties:
                Storage ID:                 DP-1-Volume-Basic-100000-ffd00000-{72a912c8-0000-
0000-0000-000000000000}
                Software VDS Provider:   Microsoft Virtual Disk Service Basic Provider
                Number of Disks:         1
                Number of Mount Points:  0
                Device Path:
\\?\mpio#disk&ven_3pardata&prod_vv&rev_0000#1&7f6ac24&0&353030324143313838353846423643#{53f563
07-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:                  {72A912C8-0000-0000-0000-000000000000}
                Disk Address:               Port3Path0Target3Lun8

[Normal] From: OB2BAR_VDSA@tpc194.tic.dp "VDSA"  Time: 4/18/2011 5:07:58 PM
        Resolved volume with properties:
                Storage ID:                 DP-1-Volume-Basic-100000-ffd00000-{72a912c9-0000-
0000-0000-000000000000}
                Software VDS Provider:   Microsoft Virtual Disk Service Basic Provider
                Number of Disks:         1
                Number of Mount Points:  0
                Device Path:
\\?\mpio#disk&ven_3pardata&prod_vv&rev_0000#1&7f6ac24&0&353030324143313838353930423643#{53f563
07-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:                  {72A912C9-0000-0000-0000-000000000000}
                Disk Address:               Port4Path0Target2Lun9

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:07:59 PM
        Disk Backup of '/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR'
completed successfully.

[Normal] From: BMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 5:08:02 PM
        STARTING Media Agent "FL194_Writer0"

[Normal] From: BMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 5:08:04 PM
        Loading medium from slot C:\FL1\10394b8254dac5491551665009a.fd to device
FL194_Writer0

[Normal] From: BMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 5:08:04 PM
        C:\FL1\10394b8254dac5491551665009a.fd
        Initializing new medium: "FL194_MediaPool_16"

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:04 PM
        Starting OB2BAR Backup: tpc193.tic.dp:/BackupSession/Metadata "MSVSSW"

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:04 PM
        Saving Backup Metadata to Tape.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:04 PM
        Saving Backup Metadata to VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:06 PM
        Completed OB2BAR Backup: tpc193.tic.dp:/BackupSession/Metadata "MSVSSW"
```

```
[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:06 PM
        Proceeding with Tape Backup.

[Normal] From: OB2BAR_VSSBAR_COMP@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:06 PM
        Starting OB2BAR Backup: tpc193.tic.dp:/SqlServerWriter(SQL Server 2008
R2:SQLWriter)/TPC193/DB1_3PAR "MSVSSW"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:08 PM
        Completed OB2BAR Backup: tpc193.tic.dp:/SqlServerWriter(SQL Server 2008
R2:SQLWriter)/TPC193/DB1_3PAR "MSVSSW"

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:09 PM
        Tape Backup of '/SqlServerWriter(SQL Server 2008 R2:SQLWriter)/TPC193/DB1_3PAR'
completed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:09 PM
        Saving writer configuration.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:09 PM
        Breaking Volume Shadow Copies and releasing the volumes.

[Normal] From: OB2BAR_VSSBAR@tpc194.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:10 PM
        Putting backup disks offline.

[Normal] From: OB2BAR_VSSBAR@tpc193.tic.dp "MSVSSW"  Time: 4/18/2011 5:08:10 PM
        Backup completed.

[Normal] From: OB2BAR_VDSA@tpc194.tic.dp "VDSA"  Time: 4/18/2011 5:08:10 PM
        The disk with properties was put offline:
                Device Path:
\\?\mpio#disk&ven_3pardata&prod_vv&rev_0000#1&7f6ac24&0&353030324143313835384642643#{53f563
07-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:              {72A912C8-0000-0000-0000-000000000000}
                Disk Address:          Port3Path0Target3Lun8

[Normal] From: OB2BAR_VDSA@tpc194.tic.dp "VDSA"  Time: 4/18/2011 5:08:10 PM
        The disk with properties was put offline:
                Device Path:
\\?\mpio#disk&ven_3pardata&prod_vv&rev_0000#1&7f6ac24&0&353030324143313835393042643#{53f563
07-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:              {72A912C9-0000-0000-0000-000000000000}
                Disk Address:          Port4Path0Target2Lun9

[Normal] From: BSM@ita030.deu.hp.com "tpc193_SQL_DB1_3PAR"  Time: 4/18/2011 5:11:29 PM
        OB2BAR application on "tpc193.tic.dp" disconnected.

[Normal] From: BMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 5:08:19 PM
        Unloading medium to slot C:\FL1\10394b8254dac5491551665009a.fd from device
FL194_Writer0

[Normal] From: BMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 5:08:19 PM
        COMPLETED Media Agent "FL194_Writer0"

[Normal] From: BSM@ita030.deu.hp.com "tpc193_SQL_DB1_3PAR"  Time: 4/18/2011 5:11:29 PM


        Backup Statistics:

                Session Queuing Time (hours)        0.00
                ------------------------------------------
                Completed Disk Agents ........        2
                Failed Disk Agents ...........        0
                Aborted Disk Agents ..........        0
                ------------------------------------------
                Disk Agents Total  ...........        2
                ==========================================
                Completed Media Agents .......        1
                Failed Media Agents ..........        0
                Aborted Media Agents .........        0
                ------------------------------------------
                Media Agents Total  ..........        1
                ==========================================
                Mbytes Total .................      3 MB
                Used Media Total .............        1
                Disk Agent Errors Total ......        0
```

```
===============================================================================
                        Session completed successfully!
===============================================================================
```

Microsoft SQL Server Transaction Log Restore

The following is a sample of the Microsoft SQL Server restorep-session report with the session id 2011/04/18-41 where only transaction logs are being restored:

```
[Normal] From: RSM@ita030.deu.hp.com ""  Time: 4/18/2011 9:31:25 PM
        Restore session 2011/04/18-41 started.

[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:16 PM

        Hewlett-Packard Data Protector Backup and Restore Agent for Microsoft SQL Server

        connected to SQL Server version 10.50 on machine TPC193

        Microsoft SQL Server 2008 R2 (RTM) - 10.50.1600.1 (X64)
        Apr  2 2010 15:48:46
        Copyright (c) Microsoft Corporation
        Enterprise Edition (64-bit) on Windows NT 6.1 <X64> (Build 7601: Service Pack 1)

[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:16 PM
        Character set: Latin1-General
        Sort order   : case-insensitive, accent-sensitive, kanatype-insensitive, width-
insensitive for Unicode Data, SQL Server Sort Order 52 on Code Page 1252 for non-Unicode
Data


[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:17 PM


        Database name    : 'DB1_3PAR'
        Target SQL Server : 'tpc193.tic.dp'
        Source SQL Server : 'tpc193.tic.dp'
        Versions to be restored:

        Session: 2011/04/18 0036, parallelism:   1, type: transaction log (incremental)

[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:17 PM
        SQL statement:
        RESTORE LOG (DB1_3PAR) FROM
        VIRTUAL_DEVICE = 'Data Protector_(DEFAULT)_DB1_3PAR_192816802_0'
        WITH NORECOVERY, BLOCKSIZE = 4096;

[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:17 PM
        Starting the restore of the database DB1_3PAR
        Version: '2011/04/18 0036'. Type: 'transaction log (incremental)'.

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:28:52 PM
        STARTING Media Agent "FL194_Writer0"

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:28:53 PM
        Loading medium from slot C:\FL1\10394b8254dac54f4551665009d.fd to device
FL194_Writer0

[Normal] From: OB2BAR_DB1_3PAR_0@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:55 PM
        Starting OB2BAR Restore: tpc193.tic.dp:/(DEFAULT)/DB1_3PAR/0 "MSSQL"

[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:56 PM
        Restore of database is complete.
        Data Protector agent is waiting for SQL Server to finish execution of the SQL
statement.
        Database will be left in a non-operational state to allow the restore of additional
backups.

[Normal] From: OB2BAR_DB1_3PAR_0@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:58 PM
        Completed OB2BAR Restore: tpc193.tic.dp:/(DEFAULT)/DB1_3PAR/0 "MSSQL"
```

```
[Normal] From: OB2BAR_Main@tpc193.tic.dp "(DEFAULT)"  Time: 4/18/2011 9:28:58 PM

        Database statistics:


        --------------------------------------------------------------
          1. DB1_3PAR          1 MB            1 min (379 Mb/h)
        --------------------------------------------------------------
[Normal] From: RSM@ita030.deu.hp.com ""  Time: 4/18/2011 9:32:08 PM
        OB2BAR application on "tpc193.tic.dp" disconnected.

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:29:29 PM
        Unloading medium to slot C:\FL1\10394b8254dac54f4551665009d.fd from device
FL194_Writer0

[Normal] From: RMA@tpc194.tic.dp "FL194_Writer0"  Time: 4/18/2011 9:29:29 PM
        COMPLETED Media Agent "FL194_Writer0"



===============================================================================
                    Session completed successfully!
===============================================================================
```

Microsoft Exchange 2010 Backup

The following example is the session output of the Exchange 2010 backup session with session ID
2011/04/29-2:

```
[Normal] From: BSM@vmw35030.zdbe14.test "DB1"  Time: 4/29/2011 4:08:34 PM
        Backup session 2011/04/29-2 started.

[Normal] From: BSM@vmw35030.zdbe14.test "DB1"  Time: 4/29/2011 4:08:36 PM
        OB2BAR application on "3par-dag1.zdbe14.test" successfully started.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:08:54 PM
        Analyzing MS Exchange Server 2010 environment.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:09:19 PM
        Mailbox Databases selected for backup on server tpc202.zdbe14.test
                3PAR-DB1\TPC202

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:09:19 PM
        Initializing DP VSS Interface.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:09:19 PM
        Starting backup using DP VSS Interface.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:20 PM
        Performing Full Transportable Backup.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:20 PM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:21 PM
        Gathering Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:26 PM
        Importing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:34 PM
        Replica type is set to Diff.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:35 PM
        Entering Shadow Copy Set creation phase.
```

```
[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:37 PM
        Volume 'C:\mnt\Exchange\3par\DB1\data\' was successfully added to Shadow Copy Set
with the following provider:
                Provider type:          Hardware
                Provider name:          3PAR VSS Provider
                Provider version:       1.6.2.3

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:37 PM
        Volume 'C:\mnt\Exchange\3par\DB1\logs\' was successfully added to Shadow Copy Set
with the following provider:
                Provider type:          Hardware
                Provider name:          3PAR VSS Provider
                Provider version:       1.6.2.3

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:39 PM
        Creating Volume Shadow Copies.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:44 PM
        Volume Shadow Copies successfully created.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:44 PM
        Exiting Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:09:45 PM
        Importing Volume Shadow Copies from application host.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:10:05 PM
        Imported Volume Shadow Copy with the properties:
                Snapshot ID:            {AC01ADE1-A349-437C-9EA2-3A13B244FE93}
                Snapshot Set ID:        {08F6C84E-0F96-448A-8DFF-450A2BC9E6A6}
                Source volume:          \\?\Volume{7e8579a5-3bc4-11e0-8080-001cc4e26edc}\
                Originating host:       TPC202.ZDBE14.test
                Service host:           TPC202.ZDBE14.test
                Creation time:          4:09:43 PM
                Creation date:          Friday, April 29, 2011
                Provider ID:            {5F466535-9C6C-4B33-BE9F-8F3147381CF5}

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:10:05 PM
        Imported Volume Shadow Copy with the properties:
                Snapshot ID:            {DB44CFA0-3A9F-4FAA-A6EB-59CA51A97CFC}
                Snapshot Set ID:        {08F6C84E-0F96-448A-8DFF-450A2BC9E6A6}
                Source volume:          \\?\Volume{182af714-40ea-11e0-9927-001cc4e26edc}\
                Originating host:       TPC202.ZDBE14.test
                Service host:           TPC202.ZDBE14.test
                Creation time:          4:09:43 PM
                Creation date:          Friday, April 29, 2011
                Provider ID:            {5F466535-9C6C-4B33-BE9F-8F3147381CF5}

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:10:05 PM
        Checking Shadow Copy Set consistency.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:10:05 PM
        Performing Exchange consistency check of logs.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:14:50 PM
        Exchange consistency check completed successfully on the following log files:
                E010008A81A.log - E010008A8A6.log    Duration: 283.75 seconds

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:14:50 PM
        Resolving backup volumes.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 4:14:52 PM
        Resolved volume with properties:
```

```
                Storage ID:                DP-1-Volume-Basic-100000-ffd00000-{b37d4faa-0000-
0000-0000-000000000000}
                Software VDS Provider:  Microsoft Virtual Disk Service Basic Provider
                Number of Disks:           1
                Number of Mount Points:  0
                Device Path:
\\?\SCSI#Disk&Ven_3PARdata&Prod_VV#7&120fcb3&0&000003#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:                 {B37D4FAA-0000-0000-0000-000000000000}
                Disk Address:              Port3Path0Target0Lun3

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 4:14:52 PM
        Resolved volume with properties:
                Storage ID:                DP-1-Volume-Basic-100000-7fd00000-{b37d4fa5-0000-
0000-0000-000000000000}
                Software VDS Provider:  Microsoft Virtual Disk Service Basic Provider
                Number of Disks:           1
                Number of Mount Points:  0
                Device Path:
\\?\SCSI#Disk&Ven_3PARdata&Prod_VV#7&120fcb3&0&000004#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
                Disk GUID:                 {B37D4FA5-0000-0000-0000-000000000000}
                Disk Address:              Port3Path0Target0Lun4

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:14:53 PM
        Disk Backup of '/Microsoft Exchange Writer(Exchange Information Store)/Microsoft
Information Store/3PAR-DB1/File' completed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:14:53 PM
        Disk Backup of '/Microsoft Exchange Writer(Exchange Information Store)/Microsoft
Information Store/3PAR-DB1/Logs' completed successfully.

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 4:14:56
PM
        STARTING Media Agent "HP:Ultrium 4-SCSI_1_tpc200"

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 4:15:02
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Loading medium from slot 3 to device Tape0:0:0:1C

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:15:15 PM
        Starting OB2BAR Backup: tpc202.zdbe14.test:/BackupSession/Metadata "MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:15:15 PM
        Saving Backup Metadata to Tape.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:15:15 PM
        Saving Backup Metadata to VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:15:17 PM
        Completed OB2BAR Backup: tpc202.zdbe14.test:/BackupSession/Metadata "MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
4:15:17 PM
        Proceeding with Tape Backup.

[Normal] From: OB2BAR_VSSBAR_COMP@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:15:17 PM
        Starting OB2BAR Backup: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/Logs
"MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:15:17 PM
        Starting OB2BAR Backup: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/File
"MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 4:15:22 PM
```

```
        Completed OB2BAR Backup: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/Logs
"MSVSSW-APP"

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 5:11:24
PM
        Tape0:0:0:1C
        Medium header verification completed, 0 errors found.

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 5:11:26
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Unloading medium to slot 3 from device Tape0:0:0:1C

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 5:11:27
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Loading medium from slot 6 to device Tape0:0:0:1C

[Normal] From: OB2BAR_VSSBAR_COMP@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 5:16:10 PM
        Completed OB2BAR Backup: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/File
"MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:10 PM
        Tape Backup of '/Microsoft Exchange Writer(Exchange Information Store)/Microsoft
Information Store/3PAR-DB1/File' completed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:10 PM
        Tape Backup of '/Microsoft Exchange Writer(Exchange Information Store)/Microsoft
Information Store/3PAR-DB1/Logs' completed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:10 PM
        Breaking Volume Shadow Copies and releasing the volumes.

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:11 PM
        Mounting backup volumes.

[Normal] From: OB2BAR_VSSBAR@tpc202.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:12 PM
        Backup completed.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 5:16:14 PM
        Mounted volume with properties:
                Storage ID:             DP-1-Volume-Basic-100000-ffd00000-{b37d4faa-0000-
0000-0000-000000000000}
                Number of Mount Points:  1
                Mount points:
                        c:\mnt\tpc202.zdbe14.test\2011-04-29-2\C\mnt\Exchange\3par\DB1\data\

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 5:16:14 PM
        Mounted volume with properties:
                Storage ID:             DP-1-Volume-Basic-100000-7fd00000-{b37d4fa5-0000-
0000-0000-000000000000}
                Number of Mount Points:  1
                Mount points:
                        c:\mnt\tpc202.zdbe14.test\2011-04-29-2\C\mnt\Exchange\3par\DB1\logs\

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:15 PM
        Putting backup volumes into read-only mode.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 5:16:17 PM
        The volume with properties was put into read-only mode:
                Storage ID:             DP-1-Volume-Basic-100000-7fd00000-{b37d4fa5-0000-
0000-0000-000000000000}
                Number of Mount Points:  1
                Mount points:
                        C:\mnt\tpc202.zdbe14.test\2011-04-29-2\C\mnt\Exchange\3par\DB1\logs\

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 5:16:17 PM
```

```
          The volume with properties was put into read-only mode:
                  Storage ID:              DP-1-Volume-Basic-100000-ffd00000-{b37d4faa-0000-
0000-0000-000000000000}
                  Number of Mount Points:  1
                  Mount points:
                          C:\mnt\tpc202.zdbe14.test\2011-04-29-2\C\mnt\Exchange\3par\DB1\data\

[Normal] From: OB2BAR_VSSBAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 4/29/2011
5:16:18 PM
        Putting backup disks into read-only mode.

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 5:16:18 PM
        The disk with properties was put into read-only mode:
                  Device Path:
\\?\SCSI#Disk&Ven_3PARdata&Prod_VV#7&120fcb3&0&000003#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
                  Disk GUID:              {B37D4FAA-0000-0000-0000-000000000000}
                  Disk Address:           Port3Path0Target0Lun3

[Normal] From: OB2BAR_VDSA@tpc200.zdbe14.test "VDSA"  Time: 4/29/2011 5:16:18 PM
        The disk with properties was put into read-only mode:
                  Device Path:
\\?\SCSI#Disk&Ven_3PARdata&Prod_VV#7&120fcb3&0&000004#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
                  Disk GUID:              {B37D4FA5-0000-0000-0000-000000000000}
                  Disk Address:           Port3Path0Target0Lun4

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 5:16:27 PM
        Starting OB2BAR Backup: 3par-dag1.zdbe14.test:/33d5875e-c049-47d7-887d-
20b465e807d9/3PAR-DB1 "E2010"

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time:
4/29/2011 5:16:30 PM
        Completed OB2BAR Backup: 3par-dag1.zdbe14.test:/33d5875e-c049-47d7-887d-
20b465e807d9/3PAR-DB1 "E2010"

[Normal] From: BSM@vmw35030.zdbe14.test "DB1"  Time: 4/29/2011 5:16:31 PM
        OB2BAR application on "3par-dag1.zdbe14.test" disconnected.

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 5:16:33
PM
        Tape0:0:0:1C
        Medium header verification completed, 0 errors found.

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 5:16:35
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Unloading medium to slot 6 from device Tape0:0:0:1C

[Normal] From: BMA@tpc200.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 4/29/2011 5:16:36
PM
        COMPLETED Media Agent "HP:Ultrium 4-SCSI_1_tpc200"

[Normal] From: BSM@vmw35030.zdbe14.test "DB1"  Time: 4/29/2011 5:16:36 PM


        Backup Statistics:

                  Session Queuing Time (hours)        0.00
                  ----------------------------------------
                  Completed Disk Agents ........      4
                  Failed Disk Agents ...........      0
                  Aborted Disk Agents ..........      0
                  ----------------------------------------
                  Disk Agents Total  ...........      4
                  ========================================
                  Completed Media Agents .......      1
                  Failed Media Agents ..........      0
                  Aborted Media Agents .........      0
                  ----------------------------------------
                  Media Agents Total  ..........      1
                  ========================================
                  Mbytes Total ................. 359238 MB
                  Used Media Total .............      2
                  Disk Agent Errors Total ......      0


===============================================================================
```

```
                        Session completed successfully!
================================================================================
```

Microsoft Exchange 2010 Restore

The following is an example of an Exchange 2010 restore session output:

```
[Normal] From: RSM@vmw35030.zdbe14.test ""  Time: 5/2/2011 10:55:45 AM
        Restore session 2011/05/02-1 started.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:03 AM
        Analyzing MS Exchange Server 2010 environment.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:27 AM
        Restoring database 3PAR-DB1 :
                Restore mode     : Repair all passive copies with failed status
                Restore options  : Resume database replication - TRUE

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:28 AM
        Initializing DP VSS Interface.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:28 AM
        Database copies selected for restore from session 2011/04/29-2
                3PAR-DB1\TPC202
                Target nodes:
                        tpc201.zdbe14.test

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:28 AM
        Suspending replication of passive database copy 3PAR-DB1\TPC201.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:43 AM
        Starting restore of session 2011/04/29-2 using DP VSS Interface.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:43 AM
        Performing Restore.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:43 AM
        Loading Backup Metadata from VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:43 AM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:43 AM
        Gathering Existing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:47 AM
        Gathering Backed Up Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:56:47 AM
        Performing Pre-Restore phase.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
10:57:15 AM
        Starting Restore of Full Backup '2011/04/29-2'.

[Normal] From: RMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 5/2/2011 10:57:50
AM
        STARTING Media Agent "HP:Ultrium 4-SCSI_1_tpc200"
```

```
[Normal] From: RMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 5/2/2011 10:57:55
AM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Loading medium from slot 3 to device Tape1:0:2:1C

[Normal] From: OB2BAR_VSSBAR_COMP@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time:
5/2/2011 10:58:11 AM
        Starting OB2BAR Restore: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/Logs
"MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time:
5/2/2011 10:58:13 AM
        Starting OB2BAR Restore: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/File
"MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time:
5/2/2011 10:58:48 AM
        Completed OB2BAR Restore: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/Logs
"MSVSSW-APP"

[Normal] From: RMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 5/2/2011 12:23:09
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Unloading medium to slot 3 from device Tape1:0:2:1C

[Normal] From: RMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 5/2/2011 12:23:11
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Loading medium from slot 6 to device Tape1:0:2:1C

[Normal] From: OB2BAR_VSSBAR_COMP@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time:
5/2/2011 12:31:11 PM
        Completed OB2BAR Restore: tpc202.zdbe14.test:/Microsoft Exchange Writer(Exchange
Information Store)/Microsoft Information Store/33d5875e-c049-47d7-887d-20b465e807d9/File
"MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
12:31:12 PM
        Restore of Full Backup '2011/04/29-2' finished.

[Normal] From: OB2BAR_VSSBAR@tpc201.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
12:31:12 PM
        Performing Post-Restore phase.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
12:31:16 PM
        Resuming replication of passive database copy 3PAR-DB1\TPC201.

[Normal] From: OB2BAR_E2010_BAR@tpc200.zdbe14.test "MS Exchange 2010 Server"  Time: 5/2/2011
12:31:33 PM
        3PAR-DB1 database copies status after restore:
                3PAR-DB1\TPC201 - Initializing
                3PAR-DB1\TPC200 - Healthy
                3PAR-DB1\TPC202 - Mounted

[Normal] From: RSM@vmw35030.zdbe14.test ""  Time: 5/2/2011 12:31:33 PM
        OB2BAR application on "3par-dag1.zdbe14.test" disconnected.

[Normal] From: RMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 5/2/2011 12:31:46
PM
        By: UMA@tpc200.zdbe14.test@scsi4:0:0:0
        Unloading medium to slot 6 from device Tape1:0:2:1C

[Normal] From: RMA@tpc201.zdbe14.test "HP:Ultrium 4-SCSI_1_tpc200"  Time: 5/2/2011 12:31:47
PM
        COMPLETED Media Agent "HP:Ultrium 4-SCSI_1_tpc200"
```

Microsoft Hyper-V Backup

The following is an example of a backup- session output from a backup of one virtual, `vmOn3PAR`, machine running on Microsoft Hyper-V:

```
[Normal] From: BSM@tpc040.tic.dp "3PAR"  Time: 4/29/2011 4:35:32 PM
        Backup session 2011/04/29-1 started.

[Normal] From: BSM@tpc040.tic.dp "3PAR"  Time: 4/29/2011 4:35:34 PM
        OB2BAR application on "tpc040.tic.dp" successfully started.

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:35:34 PM
        Performing Hyper-V backup.

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:35:41 PM
        Found all virtual machines that were migrated to other hosts.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:40:58 PM
        Performing Full Transportable Backup.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:40:58 PM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:40:58 PM
        Gathering Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:35:49 PM
        Importing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:41:26 PM
        Replica type is set to Diff.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:41:27 PM
        Entering Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:41:30 PM
        Volume 'C:\ClusterStorage\Volume5\' was successfully added to Shadow Copy Set with
the following provider:
                Provider type:          Hardware
                Provider name:          3PAR VSS Provider
                Provider version:       1.6.2.3

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:41:32 PM
        Creating Volume Shadow Copies.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:42:00 PM
        Volume Shadow Copies successfully created.

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:42:00 PM
        Exiting Shadow Copy Set creation phase.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:36:46 PM
        Importing Volume Shadow Copies from application host.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:37:23 PM
        Imported Volume Shadow Copy with the properties:
                Snapshot ID:            {D0FF8322-6D49-46BC-87C5-7A9C1F82E782}
                Snapshot Set ID:        {09988C7C-CD85-46FC-AAA7-82D801955414}
                Source volume:          \\?\Volume{8a734ebf-53d3-11e0-a326-78e7d1de2dc0}\
                Originating host:       tpc048.tic.dp
                Service host:           tpc048.tic.dp
                Creation time:          4:41:40 PM
                Creation date:          Friday, April 29, 2011
                Provider ID:            {5F466535-9C6C-4B33-BE9F-8F3147381CF5}

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:37:23 PM
        Checking Shadow Copy Set consistency.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:37:23 PM
        Resolving backup volumes.

[Normal] From: OB2BAR_VDSA@tpc040.tic.dp "VDSA"  Time: 4/29/2011 4:39:20 PM
        Resolved volume with properties:
```

```
                Storage ID:              DP-1-Volume-Basic-100000-ffd00000-{bf400d5a-0000-
0000-0000-0000-000000000000}
                Software VDS Provider:  Microsoft Virtual Disk Service Basic Provider
                Number of Disks:         1
                Number of Mount Points:  0
                Device Path:
\\?\scsi#disk&ven_3pardata&prod_vv#5&1124384d&0&000103#{53f56307-b6bf-11d0-94f2-
00a0c91efb8b}
                Disk GUID:               {BF400D5A-0000-0000-0000-000000000000}
                Disk Address:            Port3Path0Target1Lun3


[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:21 PM
        Disk Backup of '/Microsoft Hyper-V VSS Writer/Virtual Machines/Backup Using Child
Partition Snapshot\vmOn3PAR' completed successfully.

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:44:39 PM
        STARTING Media Agent "filelib1_tpc048_Writer0"

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:44:40 PM
        Loading medium from slot F:\file_lib1\2849391054dbacd9d509f85002b.fd to device
filelib1_tpc048_Writer0

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:44:40 PM
        F:\file_lib1\2849391054dbacd9d509f85002b.fd
        Initializing new medium: "filelib1_tpc048_MediaPool_58"

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:25 PM
        Starting OB2BAR Backup: tpc048.tic.dp:/BackupSession/Metadata "MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:25 PM
        Saving Backup Metadata to Tape.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:25 PM
        Saving Backup Metadata to VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:27 PM
        Completed OB2BAR Backup: tpc048.tic.dp:/BackupSession/Metadata "MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:27 PM
        Proceeding with Tape Backup.

[Normal] From: OB2BAR_VSSBAR_COMP@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:39:27 PM
        Starting OB2BAR Backup: tpc048.tic.dp:/Microsoft Hyper-V VSS Writer/Virtual
Machines/89318B09-6206-4F37-B93F-BFB66CFDDA87 "MSVSSW-APP"

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:46:46 PM
        Unloading medium to slot F:\file_lib1\2849391054dbacd9d509f85002b.fd from device
filelib1_tpc048_Writer0

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:46:48 PM
        Loading medium from slot F:\file_lib1\2849391054dbace1d509f85002e.fd to device
filelib1_tpc048_Writer0

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:46:48 PM
        F:\file_lib1\2849391054dbace1d509f85002e.fd
        Initializing new medium: "filelib1_tpc048_MediaPool_59"

[Normal] From: OB2BAR_VSSBAR_COMP@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:12 PM
        Completed OB2BAR Backup: tpc048.tic.dp:/Microsoft Hyper-V VSS Writer/Virtual
Machines/89318B09-6206-4F37-B93F-BFB66CFDDA87 "MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:12 PM
        Tape Backup of '/Microsoft Hyper-V VSS Writer/Virtual Machines/Backup Using Child
Partition Snapshot\vmOn3PAR' completed successfully.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:12 PM
        Breaking Volume Shadow Copies and releasing the volumes.

[Normal] From: OB2BAR_VSSBAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:13 PM
        Putting backup disks offline.

[Normal] From: OB2BAR_VDSA@tpc040.tic.dp "VDSA"  Time: 4/29/2011 4:42:13 PM
        The disk with properties was put offline:
                Device Path:
\\?\scsi#disk&ven_3pardata&prod_vv#5&1124384d&0&000103#{53f56307-b6bf-11d0-94f2-
00a0c91efb8b}
```

```
                Disk GUID:               {BF400D5A-0000-0000-0000-000000000000}
                Disk Address:            Port3Path0Target1Lun3

[Normal] From: OB2BAR_VSSBAR@tpc048.tic.dp "HyperV"  Time: 4/29/2011 4:47:30 PM
        Backup completed.

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:22 PM
        VSS finished successfully.

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:22 PM
        Starting OB2BAR Backup: dl380er.tic.dp:/%2FHyperV/6/89318B09-6206-4F37-B93F-
BFB66CFDDA87 "VEAgent"

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:25 PM
        Completed OB2BAR Backup: dl380er.tic.dp:/%2FHyperV/6/89318B09-6206-4F37-B93F-
BFB66CFDDA87 "VEAgent"

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 4:42:25 PM
        Host 'tpc048.tic.dp': Successfully backed up virtual machine: vmOn3PAR (GUID:
89318B09-6206-4F37-B93F-BFB66CFDDA87)

[Normal] From: BSM@tpc040.tic.dp "3PAR"  Time: 4/29/2011 4:42:27 PM
        OB2BAR application on "tpc040.tic.dp" disconnected.

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:47:41 PM
        Unloading medium to slot F:\file_lib1\2849391054dbace1d509f85002e.fd from device
filelib1_tpc048_Writer0

[Normal] From: BMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 4:47:42 PM
        COMPLETED Media Agent "filelib1_tpc048_Writer0"

[Normal] From: BSM@tpc040.tic.dp "3PAR"  Time: 4/29/2011 4:42:27 PM


        Backup Statistics:

                Session Queuing Time (hours)       0,00
                -------------------------------------------
                Completed Disk Agents ........        3
                Failed Disk Agents ...........        0
                Aborted Disk Agents ..........        0
                -------------------------------------------
                Disk Agents Total  ...........        3
                ===========================================
                Completed Media Agents .......        1
                Failed Media Agents ..........        0
                Aborted Media Agents .........        0
                -------------------------------------------
                Media Agents Total  ..........        1
                ===========================================
                Mbytes Total .................     6635 MB
                Used Media Total .............        2
                Disk Agent Errors Total ......        0


================================================================================
                  Session completed successfully!
================================================================================
```

Microsoft Hyper-V Restore

The following is an example of a restore-session output from the restore of a virtual machine called vmOn3PAR that is running on Microsoft Hyper-V:

```
[Normal] From: RSM@tpc040.tic.dp ""  Time: 4/29/2011 6:13:07 PM
        Restore session 2011/04/29-4 started.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:31 PM
        Performing Restore.
```

```
[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:31 PM
        Loading Backup Metadata from VSS db.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:31 PM
        Connecting to Volume Shadow Copy Service.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:31 PM
        Gathering Existing Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:39 PM
        Gathering Backed Up Writer Metadata.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:52 PM
        Performing Pre-Restore phase.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:18:54 PM
        Starting Restore of Full Backup '2011/04/29-1'.

[Normal] From: RMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 6:19:29 PM
        STARTING Media Agent "filelib1_tpc048_Writer0"

[Normal] From: RMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 6:19:30 PM
        Loading medium from slot F:\file_lib1\2849391054dbacd9d509f85002b.fd to device
filelib1_tpc048_Writer0

[Normal] From: OB2BAR_VSSBAR_COMP@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:19:32 PM
        Starting OB2BAR Restore: tpc048.tic.dp:/Microsoft Hyper-V VSS Writer/Virtual
Machines/89318B09-6206-4F37-B93F-BFB66CFDDA87 "MSVSSW-APP"

[Normal] From: RMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 6:21:59 PM
        Unloading medium to slot F:\file_lib1\2849391054dbacd9d509f85002b.fd from device
filelib1_tpc048_Writer0

[Normal] From: RMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 6:21:59 PM
        Loading medium from slot F:\file_lib1\2849391054dbace1d509f85002e.fd to device
filelib1_tpc048_Writer0

[Normal] From: OB2BAR_VSSBAR_COMP@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:22:46 PM
        Completed OB2BAR Restore: tpc048.tic.dp:/Microsoft Hyper-V VSS Writer/Virtual
Machines/89318B09-6206-4F37-B93F-BFB66CFDDA87 "MSVSSW-APP"

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:22:46 PM
        Restore of Full Backup '2011/04/29-1' finished.

[Normal] From: OB2BAR_VSSBAR@tpc049.tic.dp "HyperV"  Time: 4/29/2011 6:22:46 PM
        Performing Post-Restore phase.

[Normal] From: OB2BAR_VEPA_BAR@tpc040.tic.dp "HyperV"  Time: 4/29/2011 6:17:35 PM
        VSS finished successfully.

[Normal] From: RSM@tpc040.tic.dp ""  Time: 4/29/2011 6:17:36 PM
        OB2BAR application on "tpc040.tic.dp" disconnected.

[Normal] From: RMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 6:23:19 PM
        Unloading medium to slot F:\file_lib1\2849391054dbace1d509f85002e.fd from device
filelib1_tpc048_Writer0

[Normal] From: RMA@tpc048.tic.dp "filelib1_tpc048_Writer0"  Time: 4/29/2011 6:23:19 PM
        COMPLETED Media Agent "filelib1_tpc048_Writer0"


==============================================================================
                     Session completed successfully!
==============================================================================
```

For more information

To read more about HP Data Protector, go to http://www.hp.com/go/dataprotector

To access the following documents, an HP-Passport login is required:

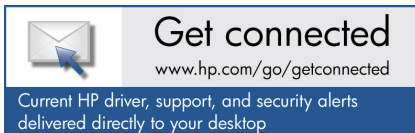HP Data Protector 6.20 Integration Guide for Microsoft Volume Shadow Copy Service

HP Data Protector 6.20 VSS integration support matrix

HP Data Protector 6.20 Command Line Interface Reference

HP Data Protector 6.20 Integration Guide for Microsoft Application

HP Data Protector 6.20 Installation and Licensing Guide

HP Data Protector 6.20 Integration Guide for Virtualization Environments

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