IBM Tivoli Storage Manager for Virtual Environments
Version 7.1.8

Data Protection for VMware User's Guide

IBM

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Version 7.1.8

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Note:
Before you use this information and the product it supports, read the information in "Notices" on page 245.

This edition applies to version 7, release 1, modification 8 of IBM Tivoli Storage Manager for Virtual Environments (product number 5725-A44) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this publication

This publication provides overview, planning, and user instructions for IBM® Tivoli® Storage Manager for Virtual Environments.

Who should read this publication

This publication is intended for administrators and users who are responsible for implementing a backup solution with IBM Tivoli Storage Manager for Virtual Environments in one of the supported environments.

In this publication, it is assumed that you have an understanding of the following applications:

- Tivoli Storage Manager backup-archive client
- Tivoli Storage Manager server
- VMware vSphere or vCloud Director

Installation, configuration, and upgrade information is documented in the *IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware Installation Guide*.

Publications

The Tivoli Storage Manager product family includes IBM Tivoli Storage FlashCopy® Manager, IBM Tivoli Storage Manager for Space Management, IBM Tivoli Storage Manager for Databases, and several other storage management products from IBM.

To view IBM product documentation, see IBM Knowledge Center.

What's new in Version 7.1.8

IBM Tivoli Storage Manager for Virtual Environments Version 7.1.8 introduces new features and updates.

For a list of new features and updates in this release and previous Version 7 releases, see Data Protection for VMware updates.

New and changed information in this product documentation is indicated by a vertical bar (|) to the left of the change.

Chapter 1. IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware overview

IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware provides a comprehensive solution for protecting VMs.

Data Protection for VMware eliminates the impact of running backups on a VM by offloading backup workloads from a VMware ESX or ESXi-based host to a vStorage Backup server. Data Protection for VMware works with the Tivoli Storage Manager backup-archive client (installed on the vStorage Backup server) to complete full and incremental backups of VMs. The client node installed on the vStorage Backup server is called the data mover node. This node "moves" the data to the Tivoli Storage Manager server for storage, and for VM image-level restore at a later time. Instant restore is available at the disk volume level and full VM level. In addition, protection of vApps and organization vDCs in a vCloud Director environment is also available.

The Tivoli Storage Manager backup-archive client is a separately licensed component that contains its own user interfaces and documentation. Familiarity with this product and its documentation is necessary in order to adequately integrate a comprehensive plan for protecting your VMs with Data Protection for VMware. Tivoli Storage Manager for Virtual Environments for Microsoft Windows 64-bit includes the Tivoli Storage Manager backup-archive client data mover features on the product DVD or download package.

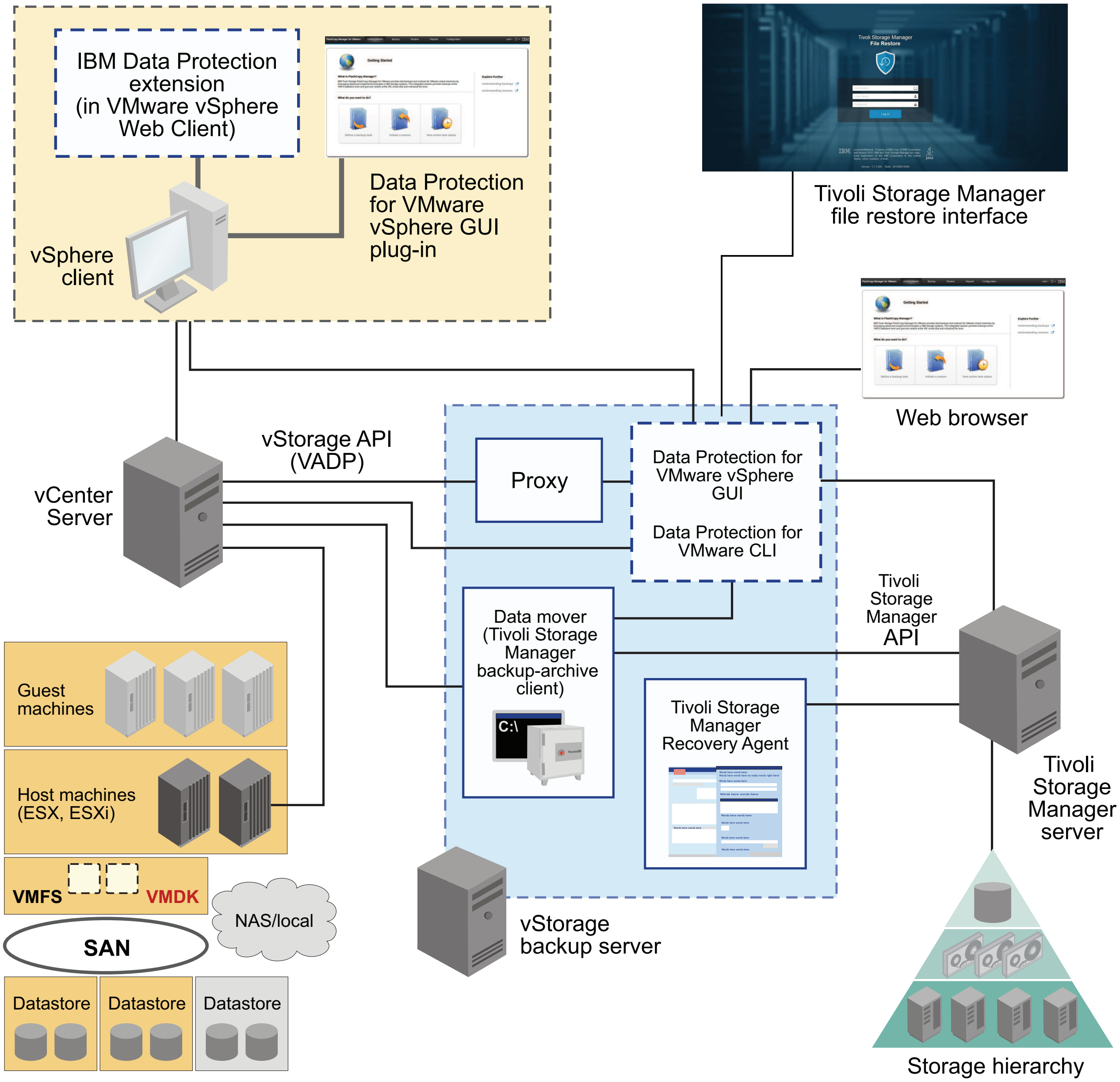

IBM Data Protection extension (in VMware vSphere Web Client)
Data Protection for VMware vSphere GUI plug-in
vSphere client
Tivoli Storage Manager file restore interface
Web browser
vStorage API (VADP)
vCenter Server
Proxy
Data Protection for VMware vSphere GUI
Data Protection for VMware CLI
Tivoli Storage Manager API
Data mover (Tivoli Storage Manager backup-archive client)
C:\
Tivoli Storage Manager Recovery Agent
Tivoli Storage Manager server
Guest machines
Host machines (ESX, ESXi)
VMFS
VMDK
NAS/local
SAN
Datastore
Datastore
Datastore
vStorage backup server
Storage hierarchy

Figure 1. Tivoli Storage Manager for Virtual Environments system components in a VMware vSphere user environment

Data Protection for VMware provides several components to assist with protecting your VMs.

Data Protection for VMware vSphere GUI

This component is a graphical user interface (GUI) that accesses VM data on the VMware vCenter Server. The content of the GUI is available in three views:

- A web browser view. This view is accessed in a supported web browser by using the URL for the GUI web server host. For example:

  `https://guihost.mycompany.com:9081/TsmVMwareUI/`

- A plug-in view that integrates with the VMware vSphere Client. This plug-in is accessed as a vCenter Server extension in the Solutions and Applications panel of your vCenter Server System. The panels and functionality of this view are the same as offered in the browser view.

Tip: The plug-in view is not supported in a VMware vSphere 6 environment.

- The IBM Data Protection extension view in the VMware vSphere Web Client. The panels in this view are uniquely designed to integrate within the web client, but data and commands for this view are obtained from the same GUI web server as the other views. The IBM Data Protection extension provides a subset of the functions that are available in the web browser and plug-in views and some additional functions. Configuration and advanced reporting functions are not offered in this view.

You can specify one or more views during installation.

The Data Protection for VMware vSphere GUI can be installed on any system that meets the operating system prerequisites. The Data Protection for VMware vSphere GUI resource requirements are minimal as it does not process I/O data transfers. Installing the Data Protection for VMware vSphere GUI on the vStorage Backup Server is the most common configuration.

For the web-browser and plug-in views, you can register multiple Data Protection for VMware vSphere GUIs to a single vCenter Server. This scenario reduces the number of datacenters (and their VM guest backups) that are managed by a single VMware Data Protection for VMware vSphere GUI. Each plug-in can then manage a subset of the total number of datacenters that are defined on the vCenter Server. For each plug-in that is registered to the vCenter Server, one Data Protection for VMware package must be installed on a separate host. To update the managed datacenters, go to **Configuration** > **Edit TSM Configuration**. In the GUI Domain page, reduce the list of datacenters that are managed by the plug-in. Managing a subset of all available datacenters reduces the query and processing time that is required by the plug-in to complete operations.

When you register multiple Data Protection for VMware vSphere GUIs to a single vCenter Server, the following guidelines apply:

- Each datacenter can be managed by only one installed Data Protection for VMware vSphere GUI.
- A unique VMCLI node name is required for each installed Data Protection for VMware vSphere GUI.
- Using unique data mover node names for each installed Data Protection for VMware vSphere GUI simplifies managing the nodes.

The Data Protection for VMware vSphere GUI must have network connectivity to the following systems:

- vStorage Backup Server
- Tivoli Storage Manager server
- vCenter Server

In addition, ports for the Derby Database (default `1527`) and GUI web server (default `9081`) must be available.

Tivoli Storage Manager file restore GUI

The web-based file restore GUI enables you to restore files from a VMware virtual machine backup without administrator assistance. The GUI is installed automatically when the Data Protection for VMware vSphere GUI is installed. For more information, see Chapter 3, “Getting started with file restore,” on page 35.

Tivoli Storage Manager recovery agent

This service enables the mounting of any snapshot volume from the Tivoli Storage Manager server. You can view the snapshot locally, with read-only access, on the client system, or use an iSCSI protocol to access the snapshot from a remote computer. In addition, the recovery agent provides the instant restore function. A volume used in instant restore processing remains available while the restore process proceeds in the background. The recovery agent is accessed with the recovery agent GUI or command-line interface.

The recovery agent command-line interface is installed on a Windows system to perform the following tasks from a remote machine:

- Gather information about available restorable data, including lists of:
  - Backed-up VMs
  - Snapshots available for a backed-up machine
  - Partitions available in a specific snapshot
- Mount a snapshot as a virtual device.
- Get a list of virtual devices.
- Remove a virtual device.

Important: Information about how to complete tasks with the Tivoli Storage Manager recovery agent GUI is provided in the online help that is installed with the GUI. Click **Help** in any of the GUI windows to open the online help for task assistance.

For detailed information regarding commands, parameters, and return codes, see Chapter 6, "Recovery Agent command-line interface," on page 121.

Data Protection for VMware command-line interface

The Data Protection for VMware CLI is a full-function command-line interface that is installed with the Data Protection for vSphere GUI. You can use it to complete these tasks:

- Initiate a backup of your VMs to a Tivoli Storage Manager server, or schedule a backup for a later time.
- Initiate a full recovery of your VMs, VM files, or VM Disks (VMDKs) from a Tivoli Storage Manager server.
- View configuration information about the backup database and environment.

Although the Data Protection for vSphere GUI is the primary task interface, the Data Protection for VMware CLI provides a useful secondary interface. For example, it can be used to implement a scheduling mechanism different from the one implemented by the Data Protection for vSphere GUI. Also, it is useful when evaluating automation results with scripts.

For detailed information regarding available commands, see Chapter 5, "Data Protection for VMware command-line interface," on page 85.

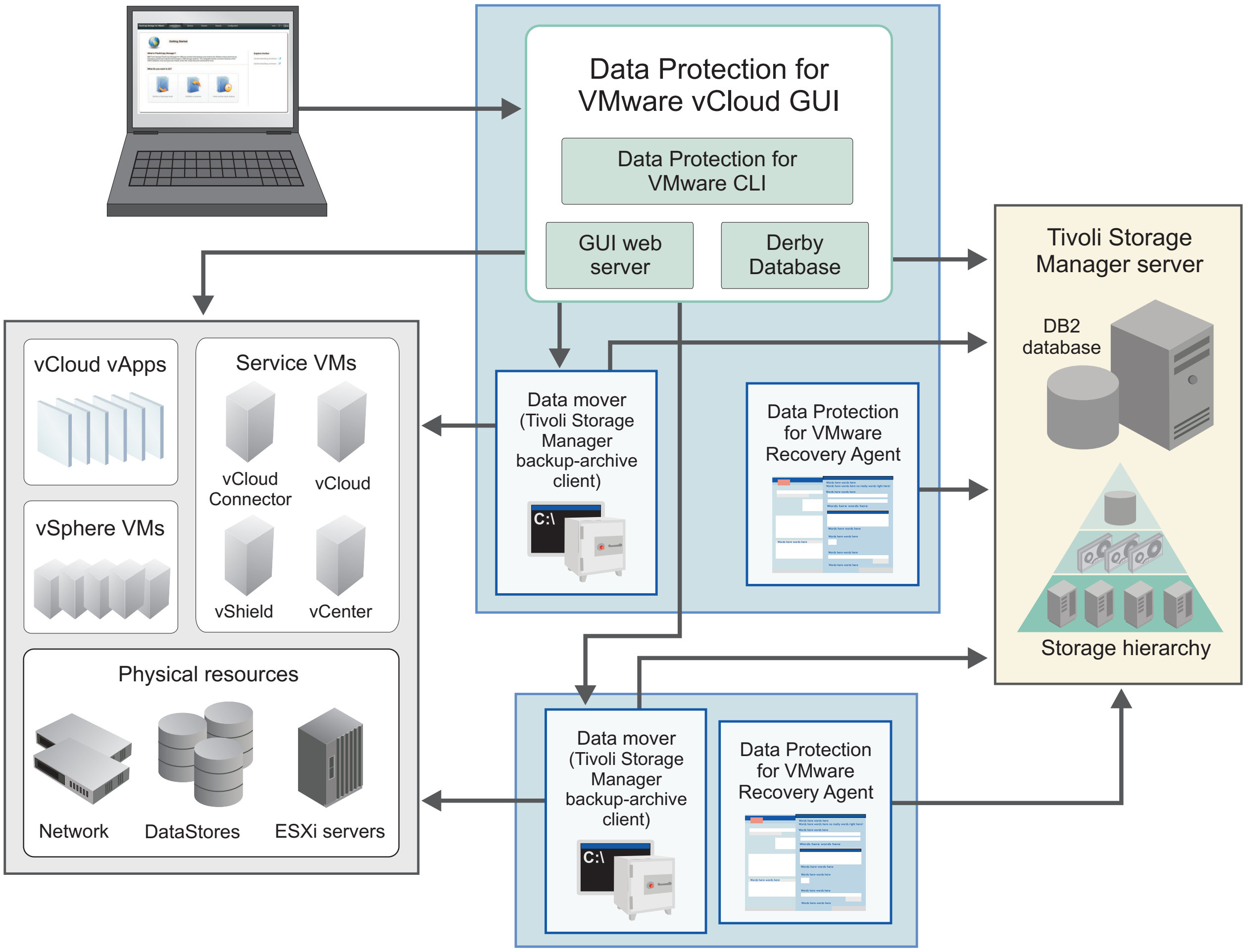

Data Protection for VMware vCloud GUI
Data Protection for VMware CLI
GUI web server
Derby Database
Tivoli Storage Manager server
DB2 database
Storage hierarchy
vCloud vApps
Service VMs
vCloud Connector
vCloud
vSphere VMs
vShield
vCenter
Data mover (Tivoli Storage Manager backup-archive client)
C:\
Data Protection for VMware Recovery Agent
Physical resources
Network
DataStores
ESXi servers
Data mover (Tivoli Storage Manager backup-archive client)
C:\
Data Protection for VMware Recovery Agent

Figure 2. Tivoli Storage Manager for Virtual Environments system components in a VMware vCloud Director user environment

Data Protection for VMware vCloud GUI

When you run the Tivoli Storage Manager for Virtual Environments installation wizard, you must select one of the following environment protection options: **vSphere Protection** or **vCloud Protection**. If you select **vCloud Protection**, the Data Protection for VMware vCloud GUI is installed.

Use this GUI to protect vApps and organization vDCs in a vCloud Director environment.

This GUI is accessed through a URL bookmark to the GUI web server. For example:

```
https://guihost.mycompany.com:9081/TsmVMwareUI/
```

The Data Protection for VMware vCloud GUI is the primary interface from which to complete these tasks:

- Run immediate or schedule incremental forever backups of specific vApps, or vApps contained in an organization vDC to Tivoli Storage Manager server storage.
- Restore single or multiple vApps.

- Generate reports to display progress information about your tasks and space usage information about your backups.
- Display information about the progress of your tasks, the most recent events that completed, the backup status of your vApps, and space usage. This information can help you troubleshoot errors that occurred in backup processing.

Backup and restore types

Data Protection for VMware provides the following types of backup and restore functions:

Incremental forever backups

Data Protection for VMware provides incremental forever backup. Rather than scheduling weekly full backups, this backup solution requires only one initial full backup. Afterward, an ongoing (forever) sequence of incremental backups occurs. The incremental forever backup solution provides these advantages:

- Reduces the amount of data that goes across the network.
- Reduces data growth because all incremental backups contain only the blocks that changed since the previous backup.
- No comparison with the backup target is needed since only changed blocks are identified.
- Minimizes impact to the client system.
- Reduces the length of the backup window.
- No need to schedule an initial full backup as a separate schedule: the first issue of an incremental forever backup automatically defaults to an incremental forever full backup.

In addition, the restore process is optimized, as only the latest versions of blocks that belong to a restored backup are restored. Since the same area on the production disk is recovered only one time, the same block is not written to multiple times.

Full VM backups

Back up an entire VM in your VMware vCenter to Tivoli Storage Manager storage. This is an entire VM image snapshot, which is a single snapshot that contains all of the VM disks. All data is backed up at the disk block level. The data can then be restored to a disk, or mounted as a virtual volume to restore a file. These backups are managed and retained according to storage policies set up by the Tivoli Storage Manager administrator.

Incremental VM backups

Back up only the VM data that has changed since the last full backup completed. All data is backed up at the disk block level. When a full backup has not been issued for the VM, Data Protection for VMware issues a full backup by default.

You can also use Data Protection for VMware to interface with the Windows backup-archive client in order to use the Change Block Tracking capabilities provided by the vStorage APIs for Data Protection (VADP).

File restore

Use the Tivoli Storage Manager file restore interface to restore files with a web-based interface. File owners can search, locate, and restore files from a VM backup without administrator assistance.

Instant restore

With instant restore, you can restore the content of a single volume from a snapshot. This restore uses the snapshot data that is generated by the backup-archive client. Instant restore can be done from a full or incremental VM backup. You can use the volume immediately, while the restore process continues in the background. Instant restore requires an in-guest installation.

Full VM restore

Restore a full or incremental VM backup. The entire VM is restored to the state it existed in when originally backed up.

Full VM instant restore

With full VM instant restore, the restored VM becomes available for instant use, either for validating the backed up VM or for restoring the VM to permanent storage. The restored VM is available for instant use in read/write mode.

How Tivoli Storage Manager nodes are used in a virtual environment

Data Protection for VMware communicates to VMs during backup, restore, and mount operations through Tivoli Storage Manager nodes.

A node represents a system on which the backup-archive client, Data Protection for VMware, or other application client is installed. This system is registered to the Tivoli Storage Manager server. Each node has a unique name (node name) that is used to identify the system to the Tivoli Storage Manager server. Communication, storage policy, authority, and access to VM data are defined based on a node.

In a Data Protection for VMware vSphere production environment, the most basic node is the data mover node. This node represents a specific backup-archive client (data mover) that "moves data" from one system to another. In a basic vSphere environment, where VMs are backed up by a single client, the VM data is stored directly under the data mover node.

In some scenarios, several data movers are used to back up a complete virtual environment, such as a VMware datacenter. In this scenario, since the backup work is distributed among multiple data movers, the VM data is stored in a shared node (instead of a specific data mover node). This shared node is called the datacenter node. Thus, in this large system vSphere environment, the data mover nodes store VM data into the datacenter node.

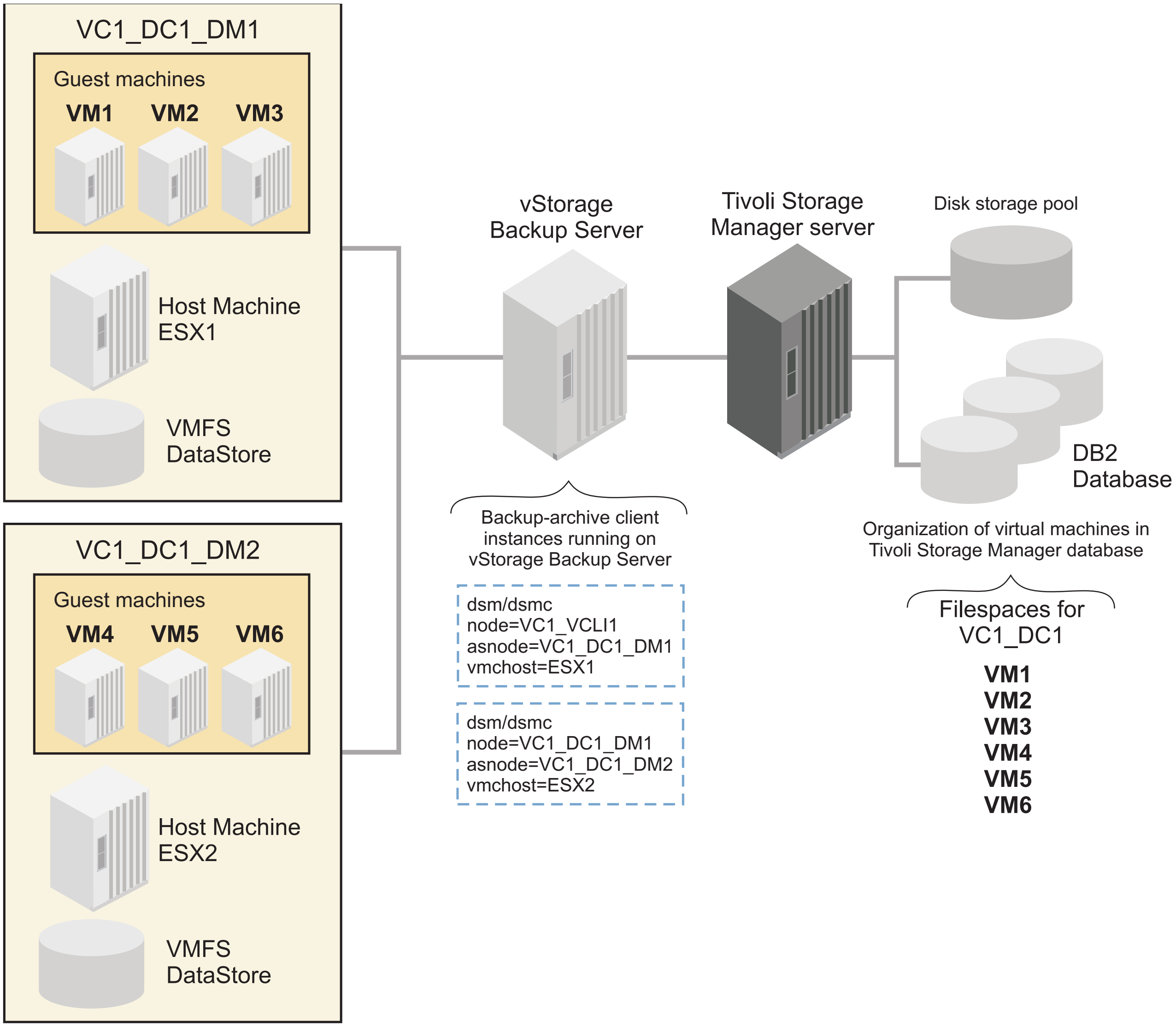
In a large vSphere virtual environment, where multiple data movers and datacenter are operative, a third node is used to communicate among the nodes and Tivoli Storage Manager server. This node is the VMCLI node.

A mount proxy node represents the Linux or Windows proxy system that accesses the mounted VM disks through an iSCSI connection. These nodes enable the file systems on the mounted VM disks to be accessible as mount points on the proxy system. You can then retrieve the files by copying them from the mount points to your local disk. Mount proxy nodes are created in pairs and are required by the datacenter node for each Windows or Linux system that serves as a proxy. To increase the number of available mount points, you can configure a datacenter node to have multiple pairs of mount proxy nodes.

Use the Data Protection for VMware vSphere GUI configuration wizard or configuration notebook to set these nodes in a vSphere environment.

Table 1. Tivoli Storage Manager nodes in a vSphere environment

Node	**Description**
vCenter node	The virtual node that represents a vCenter.
datacenter node	The virtual node that maps to a data center. The datacenter nodes hold the data.
VMCLI node	The node that connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and the data mover node. Unlike the data mover node, the VMCLI node does not require its own Tivoli Storage Manager client acceptor or scheduler service.
data mover node	The node name for the backup-archive client that is installed on the vStorage Backup Server. This node performs the data movement. Each data mover node requires its own client acceptor and scheduler service. **Important:** Data Protection for VMware stores sensitive information locally on the data mover, and the data mover might also have direct access to VM storage. Access to the data mover must be protected. Allow only trusted users access to the data mover system.
mount proxy node	This node represents the Linux or Windows proxy system that accesses the mounted VM disks through an iSCSI connection. These nodes enable the file systems on the mounted VM disks to be accessible as mount points.



```
dsm/dsmc
node=VC1_VCLI1
asnode=VC1_DC1_DM1
vmchost=ESX1
```

```
dsm/dsmc
node=VC1_DC1_DM1
asnode=VC1_DC1_DM2
vmchost=ESX2
```

Figure 3. Node relationships and applications in a vSphere production environment that contains one VMware data center and two data move nodes.

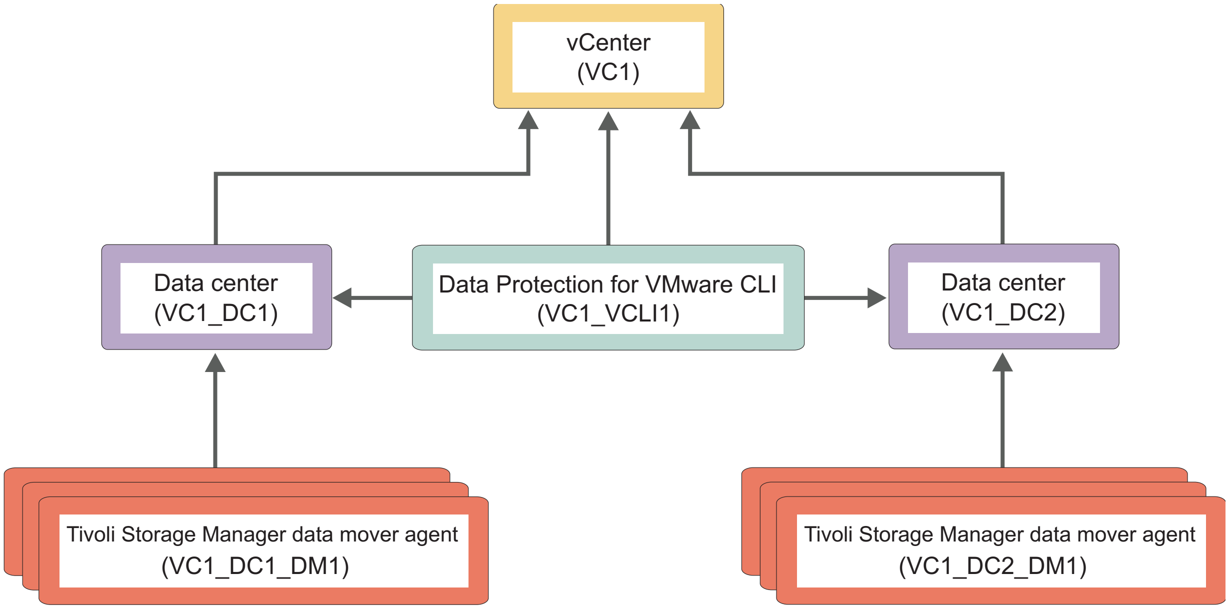

vCenter
(VC1)
Data center
(VC1_DC1)
Data Protection for VMware CLI
(VC1_VCLI1)
Data center
(VC1_DC2)
Tivoli Storage Manager data mover agent
(VC1_DC1_DM1)
Tivoli Storage Manager data mover agent
(VC1_DC2_DM1)

Figure 4. Proxy relationships among the nodes in a vSphere environment that uses two VMware datacenters. The arrows point from the proxy agent node to the proxy target node.

In a Data Protection for VMware vCloud Director production environment, several types of nodes are employed. Some nodes are used to represent vCloud entities and other nodes represent Tivoli Storage Manager entities.

The first node is the vCloud director node, which, as its name implies, represents the vCloud director. This node is the topmost node in the system. Next, vCloud provider virtual data centers (provider vDCs) are represented by corresponding provider vDC nodes. vCloud organization virtual data centers (organization vDCs) are represented by organization vDC nodes. The backup data for vApps (contained in a virtual data center) is stored in the corresponding organization vDC node.

On the Tivoli Storage Manager side, a data mover node represents a specific backup-archive client (data mover). This node "moves" data between the vCloud environment and the various data-storing organization vDC nodes. Each data mover node is associated with a single provider virtual data center (provider vDC) node, and moves data only for organization vDCs allocated from its provider. A provider vDC can have one or more data mover nodes that move data for its organization vDCs.

Finally, a central node is used to communicate among the nodes and the Data Protection for VMware vCloud GUI. This node is the VMCLI node.

Use the Data Protection for VMware vCloud GUI configuration wizard or configuration notebook to set these nodes in a vCloud Director environment.

Table 2. Tivoli Storage Manager nodes in a vCloud Director environment

Node	Description	Example
vCloud Director Node	This node represents the vCloud Director and is the top-level node.	This node typically contains the prefix `VCD_` in its name.
Provider VDC Node	This node represents a provider vDC in your vCloud environment.	This node typically contains the prefix `PVDC_` in its name.

Table 2. Tivoli Storage Manager nodes in a vCloud Director environment (continued)

Node	Description	Example
Organization VDC Node	This node represents an organization vDC in your vCloud environment.	This node holds the data and typically contains the prefix `OVDC_` in its name.
Data Mover Node	This node represents a backup-archive client and is associated with a single provider vDC and all of its organization vDCs. It is authorized to do operations for all organization vDCs that belong to the provider vDC.	This node typically contains the prefix `DM_` in its name.
VMCLI Node	This node connects the Data Protection for VMware vCloud GUI to the Tivoli Storage Manager server and the other nodes.	This node typically contains the prefix `VMCLI_` in its name.

Mount proxy node and data mover node requirements

Operations require specific node types and certain environment settings.

Consider these Data Protection for VMware node requirements before you attempt any tasks:

- Data mover nodes are required for the following operations:
  - Incremental forever backup
  - Periodic full backup
  - Full VM restore
- Mount proxy nodes are required for the following operations:
  - Full VM instant access
  - Full VM instant restore
  - Mount
- A mount operation accesses a Windows system and a Linux system that function as mount proxy systems. Each proxy system requires its own mount proxy node and client acceptor. The Windows proxy system also requires the recovery agent to be installed. These two mount proxy nodes function together during a mount operation. Mount proxy nodes are created in pairs and are required by the datacenter node for each Windows or Linux system that serves as a proxy.
- Only one mount proxy node is allowed for each physical or virtual Windows mount proxy system. If you want to use multiple mount proxy node pairs, you must install each Windows mount proxy node on a separate system, along with its own client acceptor and recovery agent.
- You cannot mount the backup of a Windows mount proxy node or Linux mount proxy node to itself.

The recovery agent is restricted to one node assignment. This node must be a mount proxy node. Although a Windows system might contain multiple data mover nodes, only one proxy mount node is allowed for the recovery agent to use. As a result, operations that use the recovery agent fail when you attempt to connect to a system with a node that is not assigned to the recovery agent.

These examples show types of operations that fail when a node that is not assigned to the recovery agent is used:

Mount operations

When you run a mount operation with the mount proxy node from VMware datacenter DC1, the recovery agent connects to that mount proxy node. Because that connection to the mount proxy node is the only correct connection, the recovery agent does not use another mount operation with any other nodes on that mount proxy system. As a result, the mount operation fails when you use a mount proxy node from VMware datacenter DC2.

Instant access or instant restore operations

You attempt to run an instant access or instant restore operation with a mount proxy node from a Windows system that is used as a mount proxy system. A Windows mount proxy system requires the recovery agent to be installed. Because the connection from the recovery agent to the Windows mount proxy node (to run the mount operation) is the only correct connection, an instant access or instant restore operation that attempts to use this mount proxy node (from the same Windows system) fails.

Mount proxy nodes and mount proxy nodes require proxy authority to the datacenter node. This proxy authority is granted automatically when you set up your nodes with the Data Protection for VMware vSphere GUI Configuration Wizard. However, if you manually set up your mount proxy nodes and data mover nodes, you must grant this proxy authority to the datacenter nodes on the Tivoli Storage Manager server with the **GRANT PROXYNODE** command. For example:

```
GRANT PROXYNODE TARGET=DC_NODE AGENT=LOCAL_MP_WIN
GRANT PROXYNODE TARGET=DC_NODE AGENT=LOCAL_MP_LNX
```

File sharing security

When you share a mounted virtual machine snapshot, certain security issues can occur that are related to NFS (Linux) and CIFS (Windows) protocols. Review these issues to better understand the security impact when you share a mounted virtual machine snapshot.

When all of the following conditions exist on Linux systems, respective users can access directories on the shared system:

- The mounted volumes that belong to Linux system (`B`) are shared to a different Linux host (`A`).
- The Linux host (`A`) has the same user names as the Linux system (`B`) that was backed up

For example, *root* user (`A`) can access all *root* user (`B`) files, and *tester* (`A`) can access all of *tester* (`B`) files. In this situation, the permission group and user are changed to `nobody`.

This output is an example of access to mounted volumes:

```
esx2vm55:/opt/tivoli/tsm/client/ba/bin # ls -la /CVT/TSM/ESX2VM21/2014-05-22-01_32_53/Volume7

total 19
drwx------   4   500   500   1024   Apr 28 23:53 .
drwxr-xr-x   8   root  root  4096   May 27 22:06 ..
drwxrwxr-x   2   500   500   1024   Apr 28 23:52 RAID_0
drwx------   2   root  root 12288   Apr 28 23:52 lost+found
```

This output is an example of access to shared volumes:

```
[tester1@ESX2VM51 Volume7]$ ls -la

total 19
drwx------   4   nobody nobody  1024   Apr 28 23:53 .
drwxr-xr-x   8   nobody nobody  4096   May 27 22:06 ..
drwxrwxr-x   2   nobody nobody  1024   Apr 28 23:52 RAID_0
drwx------   2   nobody nobody  12288  Apr 28 23:52 lost+found
```

Make sure that the correct Linux hostname/IP address or Windows user name is specified. If the correct hostname/IP address or user name is not specified, the share operation fails. This failure is identified by the operating system.

On Windows systems, a user with the same credentials as the backed up Windows virtual machine can access the shared volumes on any Windows system.

Tape media guidelines

If your environment contains virtual machine backup data on tape media (such as a tape storage pool or virtual tape library), and the data was either directly stored on tape or migrated to tape over time, consider these guidelines.

Configuration

- Ensure that virtual machine control file data is always on a disk storage pool. You can specify the destination storage pool for virtual machine control file data with the backup-archive client `vmctlmc` option. For more information, see Vmctlmc.
- Use collocation by file space to optimize the tape that contains virtual machine backup data.

  When a virtual machine is backed up to the Tivoli Storage Manager server, each backup is represented as a separate file space on the server. The collocation by file space setting saves data from multiple incremental backups of the same virtual machine to the same volume (disk file). When migration to tape occurs, these backups are together on the physical tape.

  You can enable collocation at the file space level with the Tivoli Storage Manager server **COLLOCATE=FILESPACE** parameter. For more information, see DEFINE STGPOOL
- Be aware of migration thresholds and how data availability is affected by thresholds. For example, a block in Data Protection for VMware that never changes can be migrated to tape even though the most active backup needs the block.

Recovery

You can restore files from tape media with either the Tivoli Storage Manager file restore interface or the Data Protection for VMware vSphere GUI Mount wizard. However, file restore reads data in a way that causes random read requests. As a result, processing might be slow when a sequential-access device (such as tape media) is used. File restore from disk storage is the preferred method.

Consider moving target virtual machine backup data from tape media to disk storage before you attempt a file restore operation. Do not move the virtual machine control data because this data should already be in separate disk storage pool. Also, do not move backup data to the disk storage pool on which the control data resides. If you move backup and control data to the same pool, you will have to complete an IFFULL backup to move the backup and control data to separate pools.

To move backup data, use the Tivoli Storage Manager server **MOVE NODEDATA** command and ensure that the **FROMstgpool** and **TOstgpool** parameters do not specify pools that contain control data.

Long term retention

Run traditional full VM backups to tape storage regularly as a solution for long-term storage or tape retention of your data. For example, you can run a full VM backup to tape monthly as a solution for archive needs.

For additional information related to tape media, see technote 7021081.

Controlling which disks are processed

Set include and exclude statements to control the disks to be processed.

Use Data Protection for VMware in conjunction with the Tivoli Storage Manager backup-archive client to determine which disks in the VM environment are backed up and restored. VM environments typically contain a combination of system, normal, independent, and raw device mapping (RDM) disks. The ability to extend control granularity to specific disks provides benefits in these situations:

- Recover the disk where the operating system is located in order to replace a corrupted system drive.
- Protect disks in VM environments that use Tivoli Storage Manager Data Protection applications as guests that contain large database and log files.
- VM configuration information is lost. The VM configuration information is recovered while the disks remain in place.

In previous versions of Data Protection for VMware, a new VM was required whenever a VM restore was performed. If the VM already existed, the restore failed. With this feature, you can restore selected virtual disks but leave the rest of an existing VM intact.

VM templates and vApps in a vSphere environment

Data Protection for VMware supports backing up and restoring VM templates and vApps.

A VM template is a master image of a VM. The template can include an installed guest operating system and a set of applications.

VM templates can be restored to the original VM template, or to an alternative VM template and data store location. Because Data Protection for VMware marks the VM template as one unit, a single file restore of a VM template is not feasible. A single virtual disk cannot be restored, nor can a single virtual disk backup be attached on an ESX host to a target VM.

VMs that are contained in a vApp can be backed up and restored. A vApp is a logical entity that consists of one or more VMs. By using a vApp, you can specify and include all components of a multitier application. A vApp also includes the operational policies and associated service levels of the application contained in the vApp.

The VMs in the vApp are identified in the Data Protection for VMware vSphere GUI as VMs. While you select the VM to back up, you cannot select a vApp. When you restore the VM, the VM is added to one of the following locations:

- If the vApp is present with the original full inventory path, the VM is restored to that location.
- When the original full inventory path is not present or was changed, the VM is restored to the top-level default location on the target ESX host. No containers are created during the restore operation.

When backing up a VM template, and a full backup does not exist for this VM template, the following occurs:

- If the selected backup type is incremental-forever-incremental, and the VM template contains changes, the backup type changes to incremental-forever-full.
- If the selected backup type is incremental, and the VM template contains changes, the backup type changes to full.
- If the selected backup type is full, and the VM template contains changes, the VM template is backed up.
- If the selected backup type is incremental-forever-full, this type ensures that the VM template is backed up regardless of whether it contains changes.

Automated client failover

If you backed up data to the Tivoli Storage Manager server, Data Protection for VMware can automatically fail over to the secondary server for data recovery when there is an outage on the Tivoli Storage Manager server.

The Tivoli Storage Manager server that the Tivoli Storage Manager data mover node connects to during normal production processes is called the *primary server*. When the primary server and data mover node are set up for node replication, the client data on the primary server can be replicated to another Tivoli Storage Manager server, which is the *secondary server*.

During normal operations, connection information for the secondary server is automatically sent to the data mover node from the primary server during the logon process. The secondary server information is automatically saved to the client options file on the data mover node. No manual intervention is required by you to add the information for the secondary server.

Each time the data mover node logs on to the server, it attempts to contact the primary server. If the primary server is unavailable, the data mover node automatically fails over to the secondary server, according to the secondary server information in the client options file. In failover mode, you can restore any replicated client data. When the primary server is online again, the data mover node automatically fails back to the primary server the next time the data mover node connects to the server.

Requirements: Before the connection information for the secondary server is sent to the client options file, the following processes must occur:

- The primary server, secondary server, and data mover node must be at the V7.1 level.
- The primary and secondary servers must be set up for node replication, and the client node must be configured for node replication on the server.
- You must back up VMware data at least one time to the primary server.

- Client data on the primary server must be replicated to the secondary server at least one time.

Restriction: The following restrictions apply to Data Protection for VMware during failover:

- Any operations that require data to be stored on the Tivoli Storage Manager server, such as backup operations, are not available.
- Schedules are not replicated to the secondary server. Therefore, schedules are not run while the primary server server is unavailable.
- Instant restore of virtual machines is not available.
- Validation of virtual machine backups is not available.
- The Data Protection for VMware GUI does not fail over. You must use the backup-archive client on the data mover node to restore data from the secondary server.
- For more information about the failover capabilities of Tivoli Storage Manager components, see technote 1649484.

Out-of-space errors on VMware datastores

Linux Windows

To prevent out-of-space errors during virtual machine backups, you can set a data usage threshold for VMware datastores by using the vmdatastorethreshold option.

Use the vmdatastorethreshold option to the set the threshold percentage of space usage for each VMware datastore of a virtual machine. When you initiate a virtual machine backup, the client checks the data usage of the VMware datastores before the virtual machine snapshot is created. If the threshold is exceeded in any of the VMware datastores, the virtual machine is not backed up.

For example, virtual machine vm1 spans datastore1 and datastore2. You can issue the following command to ensure that the VMware datastores of a virtual machine are at most 90% full before the virtual machine is backed up:

```
dsmc backup vm vm1 -vmdatastorethreshold=90
```

As a result, the client checks the space usage of both datastore1 and datastore2 before the snapshot operation begins. If the space usage of either VMware datastore exceeds the 90% threshold, the backup request for vm1 is not started.

Requirements:

- Ensure that the threshold is low enough so that the snapshot does not use up all the available space in the VMware datastores. Otherwise, you will run out of space on the VMware datastores and the snapshot will not be created.
- If you use multiple clients that act as data mover nodes, you must add the vmdatastorethreshold option to the options file for each data mover.

The client checks the data usage of the VMware datastore that contains the virtual machine disk snapshots. By default, the snapshots are created in the same directory as that of the parent virtual disk (.vmdk) file. The client checks the data usage only in the default location.

If you use the EXCLUDE.VMDISK option to exclude one or more disks from a backup, the threshold check is still run on these disks. Even though these disks are not backed up, VMware still takes a snapshot of these disks.

Independent disks are not checked during space verification processing because a snapshot of these disks does not use any VMware datastore space.

For more information about the vmdatastorethreshold option, see Vmdatastorethreshold.

Full VM instant restore environment requirements

Windows

Review the applications, systems, and versions that are required for full VM instant restore operations.

The following environment requirements must exist before attempting a full VM instant restore operation:

- Full VM instant restore is supported only for Tivoli Storage Manager backup-archive client 7.1 (or later) Windows 64-bit and Windows vStorage Backup servers.
- Instant access and instant restore capability is supported only for VMware VMs that are hosted on VMware ESXi 5.1 servers, or later versions.
- Full VM instant restore is supported only for disks and virtual tape libraries (VTL). Physical tape storage pools are not supported.
- The Tivoli Storage Manager recovery agent 7.1 (or later) must be installed on the same system as the Tivoli Storage Manager backup-archive client 7.1 (or later) data mover system.
- A data mover node that was used for version 7.1.0 instant restore and instant access operations cannot be used for version 7.1.8 instant restore and instant access operations. After you upgrade IBM Tivoli Storage Manager for Virtual Environments to version 7.1.8, you must create a pair of mount proxy nodes to run instant restore and instant access operations. You can create a mount proxy node pair by using either of the following methods:
  - Go to the Configuration window in the Data Protection for VMware vSphere GUI and click **Edit Configuration**. Go to the Mount Proxy Node Pairs page and follow the instructions on that page.
  - Follow the steps in Manually configuring the mount proxy nodes on a remote Windows system.
- VMs that were backed up with backup-archive client 6.3 (or later) can be restored by using full VM instant restore.
- The data mover system requires the IBM Tivoli Storage Manager for Virtual Environments 7.1 (or later) license file.
- iSCSI mount (with the Tivoli Storage Manager recovery agent) is used to expose the VM disks to the ESX as virtual RDMs. Instant access and instant restore operations require an iSCSI software or hardware adapter that is configured on the ESX host that is used for these operations.
- Storage vMotion must be installed and configured on the ESX servers that host the VMs to be used during instant restore operations. Instant access operations (that validate the VM backup data) do not require Storage vMotion.
- Instant access and instant restore operations require vSphere privileges that power on VMs (**Virtualmachine.Interaction.PowerOn**).

For detailed configuration instructions, see Configuring your environment for full virtual machine instant restore operations.

VMware vCenter Server user privilege requirements

Certain VMware vCenter Server privileges are required to run Data Protection for VMware operations.

vCenter Server privileges required to install the vSphere Client plug-in or IBM Data Protection extension view for the Data Protection for VMware vSphere GUI

To install the vSphere Client plug-in or IBM Data Protection extension view for the Data Protection for VMware vSphere GUI, the vSphere user requires the **Extension** > **Register extension, Unregister extension, Update extension** privileges. From the VMware vSphere client, you can create a role and add to the role the extension set of associated privileges. You must then assign this role to the vCenter object in the VMware vCenter Server hierarchy for the user ID that you plan to use during the installation process. You must enter this user ID when prompted for the vCenter user name on the following pages of the Tivoli Storage Manager for Virtual Environments installation wizard:

- vSphere Client plug-in: Plug-in Registration vCenter page
- IBM Data Protection extension: Data Protection for VMware vSphere GUI information page

Tip: Alternatively, rather than creating a specific role for the installation, you can enter the administrator user name when prompted for the vCenter user name.

vCenter Server privileges required to protect VMware datacenters with the web-browser or vSphere Client plug-in view for the Data Protection for VMware vSphere GUI

The vCenter Server user ID that signs on to the browser or plug-in views for the Data Protection for VMware vSphere GUI must have sufficient VMware privileges to view content for a datacenter that is managed by the GUI.

For example, a VMware vSphere environment contains five datacenters. A user, “jenn”, has sufficient privileges for only two of those datacenters. As a result, only those two datacenters where sufficient privileges exist are visible to “jenn” in the views. The other three datacenters (where “jenn” does not have privileges) are not visible to the user “jenn”.

The VMware vCenter Server defines a set of privileges collectively as a role. A role is applied to an object for a specified user or group to create a privilege. From the VMware vSphere web client, you must create a role with a set of privileges. To create a vCenter Server role for backup and restore operations, use the VMware vSphere Client **Add a Role** function. You must assign this role to a user ID for a specified vCenter Server or datacenter. If you want to propagate the privileges to all datacenters within the vCenter, specify the vCenter Server and select the `propagate to children` check box. Otherwise, you can limit the permissions if you assign the role to the required datacenters only with the `propagate to children` check box selected. Enforcement for the browser and plug-in view GUIs is at the datacenter level.

The following example shows how to control access to datacenters for two VMware user groups. First, create a role that contains all of the privileges defined in technote 7047438. The set of privileges in this example are identified by the role named “TDPVMwareManage”. Group 1 requires access to manage virtual machines for the `Primary1_DC` and `Primary2_DC` datacenters. Group 2 requires access to manage virtual machines for the `Secondary1_DC` and `Secondary2_DC` datacenters.

For Group 1, assign the “TDPVMwareManage” role to the `Primary1_DC` and `Primary2_DC` datacenters. For Group 2, assign the “TDPVMwareManage” role to the `Secondary1_DC` and `Secondary2_DC` datacenters.

The users in each VMware user group can use the Data Protection for VMware GUI to manage virtual machines in their respective datacenters only.

Tip: When you create a role, consider adding extra privileges to the role that you might need later to complete other tasks on objects.

vCenter Server privileges required to use the data mover

The Tivoli Storage Manager backup-archive client that is installed on the vStorage Backup server (the data mover node) requires the `VMCUser` and `VMCPw` options. The `VMCUser` option specifies the user ID of the vCenter or ESX server that you want to back up, restore, or query. The required privileges that are assigned to this user ID (`VMCUser`) ensure that the client can run operations on the virtual machine and the VMware environment. This user ID must have the VMware privileges that are described in technote 7047438.

To create a vCenter Server role for backup and restore operations, use the VMware vSphere Client **Add a Role** function. You must select the `propagate to children` option when you add privileges for this user ID (`VMCUser`). In addition, consider adding other privileges to this role for tasks other than backup and restore. For the `VMCUser` option, enforcement is at the top-level object.

vCenter Server privileges required to protect VMware datacenters with theIBM Data Protection extension view for the Data Protection for VMware vSphere GUI

The IBM Data Protection extension requires a set of privileges that are separate from the privileges that are required to sign in to the GUI.

During the installation the following custom privileges are created for the IBM Data Protection extension:

- **Datacenter** > **IBM Data Protection**
- **Global** > **IBM Data Protection**

Custom privileges that are required for the IBM Data Protection extension are registered as a separate extension. The privileges extension key is `com.ibm.tsm.tdpvmware.IBMDataProtection.privileges`.

These privileges allow the VMware administrator to enable and disable access to IBM Data Protection extension content. Only users with these custom privileges on the required VMware object can access the IBM Data Protection extension content. One IBM Data Protection extension is registered for each vCenter Server and is shared by all GUI hosts that are configured to support the vCenter Server.

From the VMware vSphere web client, you must create a role for users who can complete data protection functions for virtual machines by using the IBM Data Protection extension. For this role, in addition to the standard virtual machine administrator role privileges required by the web client, you must specify the **Datacenter** > **IBM Data Protection** privilege. For each datacenter, assign this role for each user or user group where you want to grant permission for the user to manage virtual machines.

The **Global** > **IBM Data Protection** privilege is required for the user at the vCenter level. This privilege allows the user to manage, edit, or clear the connection between the vCenter Server and the Data Protection for VMware vSphere GUI web server. Assign this privilege to administrators that are familiar with the Data Protection for VMware vSphere GUI that protects their respective vCenter Server. Manage your IBM Data Protection extension connections on the extension Connections page.

The following example shows how to control access to datacenters for two user groups. Group 1 requires access to manage virtual machines for the `NewYork _DC` and `Boston_DC` datacenters. Group 2 requires access to manage virtual machines for the `LosAngeles_DC` and `SanFranciso_DC` datacenters.

From the VMware vSphere client, create for example the "IBMDataProtectManage" role, assign the standard virtual machine administrator role privileges and also the **Datacenter** > **IBM Data Protection** privilege.

For Group 1, assign the "IBMDataProtectManage" role to the `NewYork _DC` and `Boston_DC` datacenters. For Group 2, assign the "IBMDataProtectManage" role to the `LosAngeles_DC` and `SanFranciso_DC` datacenters.

The users in each group can use the IBM Data Protection extension in the vSphere web client to manage virtual machines in their respective datacenters only.

Issues related to insufficient permissions

When the web browser or vSphere Client plug-in view user does not have sufficient permissions for any datacenter, access to the view is blocked. Instead, the error message GVM2013E is issued to advise that the user is not authorized to access any managed datacenters due to insufficient permissions. Other new messages are also available that inform users of issues that result from insufficient permissions. To resolve any permissions-related issues, make sure that the user role is set up as described in the previous sections. The user role must have all privileges that are identified in the Required privileges vCenter Server user ID and data mover table, and these privileges must be applied at the datacenter level with the `propagate to children` check box.

When the IBM Data Protection extension user does not have sufficient permissions for a datacenter, the data protection functions for that datacenter and its content are made unavailable in the extension.

When the Tivoli Storage Manager user ID (specified by the `VMCUser` option) contains insufficient permissions for a backup and restore operation, the following message is shown:

```
ANS9365E VMware vStorage API error.
"Permission to perform this operation was denied."
```

When the Tivoli Storage Manager user ID contains insufficient permissions to view a machine, the following messages are shown:

```
Backup VM command started.  Total number of virtual machines to process: 1
ANS4155E Virtual Machine 'tango' could not be found on VMware server.
ANS4148E Full VM backup of Virtual Machine 'foxtrot' failed with RC 4390
```

To retrieve log information through the VMware Virtual Center Server for permission problems, complete these steps:

1. In vCenter Server Settings, select **Logging Options** and set "**vCenter Logging** to **Trivia (Trivia)**.
2. Re-create the permission error.
3. Reset **vCenter Logging** to its previous value prevent recording excessive log information.
4. In System Logs, look for the most current vCenter Server log (`vpxd-`*`wxyz`*`.log`) and search for the string `NoPermission`. For example:

   ```
   [2011-04-27 15:15:35.955 03756 verbose 'App'] [VpxVmomi] Invoke error:
   vim.VirtualMachine.createSnapshot session: 92324BE3-CD53-4B5A-B7F5-96C5FAB3F0EE
   Throw: vim.fault.NoPermission
   ```

   This log message indicates that the user ID did not contain sufficient permissions to create a snapshot (`createSnapshot`).

Chapter 2. Managing data with the IBM Data Protection extension

The IBM Data Protection extension is a VMware vSphere Web Client extension that provides a view of the Data Protection for VMware vSphere GUI.

The IBM Data Protection extension is designed to integrate within the VMware vSphere Web Client, but data and commands for this extension are obtained from the Data Protection for VMware vSphere GUI web server.

The IBM Data Protection extension provides a subset of the functions that are available in the browser and plug-in views for the Data Protection for VMware vSphere GUI and some additional functions. Depending on your environment, you can use this extension to configure backup policies to fit your backup management needs, such as excluding virtual machines from scheduled backup services, and viewing the backup history of virtual machines. You can also start on-demand backup and restore operations from the extension.

Restriction: Backup management and on-demand backup functions are not available for virtual machines that are protected by IBM Tivoli Storage FlashCopy Manager.

Getting started

Learn about the tasks for installing, setting up, and using the IBM Data Protection extension to manage data protection for your VMware datacenter.

Table 3. Roadmap of installation, set up, and management tasks for the IBM Data Protection extension

Task	Description	Learn more
Check system requirements	Check the system requirements to ensure that your environment contains the required components. Learn about the features that are available by vSphere level and by the product that you are using to back up data: Tivoli Storage FlashCopy Manager or Tivoli Storage Manager.	Requirements for the IBM Data Protection extension
Install the IBM Data Protection extension	To install the IBM Data Protection extension, select **Register as an Extension in vSphere Web Client** if you are installing by using the installation wizard. If you are installing in silent mode, use the **`REGISTER_EXTENSION`** parameter.	IBM Data Protection extension Installing the Data Protection for VMware components

Table 3. Roadmap of installation, set up, and management tasks for the IBM Data Protection extension (continued)

Task	Description	Learn more
Configure the information that is required for the IBM Data Protection extension	When the installation wizard completes, the configuration wizard opens. Follow the instructions in the wizard to complete the configuration.	Configuring a new installation with the wizard
Assign privileges for the IBM Data Protection extension to roles	During installation, the custom privileges are created for the IBM Data Protection extension. You must assign these privileges to roles for VMware administrators and users.	VMware vCenter Server user privilege requirements
Connect to the Data Protection for VMware vSphere GUI	The IBM Data Protection extension relies on back-end services that are provided by the Data Protection for VMware vSphere GUI (web GUI) that has been preconfigured for a vCenter. To enable the extension for a vCenter, you must first create a connection to the web GUI for that vCenter.	Connecting to the Data Protection for VMware vSphere GUI
Enable tagging support and configure backup policies (optional)	You can use the IBM Data Protection extension to change backup policies such as excluding virtual machines (VMs) from scheduled backup services or changing the retention policy of the VM backups. To use this feature, you must enable support for VMware tagging. You can enable support for tagging from the IBM Data Protection extension or from a tool such as vSphere PowerCLI version 5.5 R2 or later.	Enabling tagging support “Configuring backup policies” on page 29
Manage data protection	Use the IBM Data Protection extension to manage data protection tasks for your VMware datacenter.	“Managing data protection” on page 30
Troubleshooting	Learn how to resolve issues such as Platform Services Controller connection problems, enable tracing, and get more details about IBM Data Protection extension messages.	“Troubleshooting IBM Data Protection extension problems” on page 177

Available features

The features that are available in the extension depend on the components and component versions that integrate with the extension.

The features that are available in the IBM Data Protection extension depend on the version of VMware vSphere that you are using and the storage products and versions that you are using to back up your data.

If you are using only Tivoli Storage Manager, the restore, backup, and backup management features are available where supported by the product versions.

If you are using any configuration that includes IBM Tivoli Storage FlashCopy Manager to back up your data, only the restore feature is available.

The following tables show the features that are available by vSphere version, Data Protection for VMware and Data Protection for VMware vSphere GUI versions, and extension version.

Important: The configurations that are shown in the table are the standard configurations. If you have a non-standard configuration in which the extension version is earlier than the Data Protection for VMware vSphere GUI version, no features are available. If you have a configuration in which the Data Protection for VMware vSphere GUI is earlier than the extension version, the features that are available are determined by the Data Protection for VMware vSphere GUI version.

Table 4. IBM Data Protection extension functions available with vSphere 6.0 or later

Data Protection for VMware Version / Data Protection for VMware vSphere GUI Version	IBM Data Protection extension version	Features Available
7.1.1 - 7.1.4/2.1.1 - 2.1.4	2.1.1 - 2.1.4	Restore
7.1.6/2.1.6	2.1.6	Restore, Backup[1], Tagging (required for backup management)[1] [2]

[1] This feature is not available if you are using any configuration that includes IBM Tivoli Storage FlashCopy Manager to back up your data.

[2] VMware Platform Services Controller must be available and configured if you want to use the VMware tagging feature to enable backup management settings in IBM Data Protection extension.

Table 5. IBM Data Protection extension functions available with vSphere 5.5

Data Protection for VMware Version / Data Protection for VMware vSphere GUI Version	IBM Data Protection extension version	Features Available
7.1.1 - 7.1.4/2.1.1 - 2.1.4	2.1.1 - 2.1.4	Restore
7.1.6/2.1.6	2.1.6	Restore, Backup[1]

[1] This feature is not available if you are using any configuration that includes IBM Tivoli Storage FlashCopy Manager to back up your data.

Related tasks:

"Enabling tagging support"

Connecting to the Data Protection for VMware vSphere GUI

The IBM Data Protection extension relies on back-end services that are provided by the Data Protection for VMware vSphere GUI (web GUI) that has been preconfigured for a vCenter. To enable the extension for a vCenter, you must first create a connection to the web GUI for that vCenter.

Procedure

To create a connection to the web GUI:

1. In the vSphere Web Client, click **IBM Data Protection**.
2. Click the **Connections** tab. The vCenters that you can manage by using the IBM Data Protection extension are shown in a table.
3. Select a vCenter, and then click the **Edit** icon.
4. Enter the host name or IP address and port for the web GUI server, and then click **Save**.

Results

If the connection is successful, **Verified Connection** is displayed in the **Connection Status** column for the vCenter.

Enabling tagging support

To use the IBM Data Protection extension for backup management, you must configure a data mover node as a tag-based node. If you do not use the IBM Data Protection extension, you must create backup management tags and categories that can be added to virtual machines.

Setting a data mover node as a tag-based node

When tagging support is enabled on a data mover node, administrators can apply backup management tags to virtual machines in the vSphere inventory.

Before you begin

Ensure that the following requirements are met:

- VMware vCenter Server must be at version 6.0 Update 1 or later.
- A data mover and the Data Protection for VMware vSphere GUI must be installed on the same server. The data mover node must be configured so that the vCenter server credentials are saved by running the configuration wizard to save the data mover node password. Other data movers can be installed elsewhere.
- Linux On Linux operating systems, the Data Protection for VMware vSphere GUI must be installed by using the default user name (`tdpvmware`).
- Linux

  For Linux data mover nodes, the default password file (`/etc/adsm/TSM.PWD`) must be used.

About this task

You can use data protection tags to change backup policy, such as excluding or including virtual machines in VMware inventory objects in scheduled backups, or changing the retention policy of backups. These data protection tags are presented as settings that can be changed in the IBM Data Protection extension. The virtual machines must be in the protection set that is defined by the `domain.vmfull` data mover option in the schedule definition. A protection set is a group of virtual machines that is added to a schedule domain.

Procedure

Use one of the following methods:

- To configure a new data mover for tagging support on Windows by using the Data Protection for VMware vSphere GUI, complete the following steps:
  1. On the Windows system where the Data Protection for VMware vSphere GUI is installed, start the GUI by opening a web browser and entering the GUI web server address. For example:

     ```
     https://<GUI web server address>:9081/TsmVMwareUI/
     ```

     Log on with the vCenter user ID and password.
  2. Go to the **Configuration** tab, and select the **Edit Tivoli Storage Manager Configuration** action.
  3. Go to the Data Mover Nodes page of the configuration notebook.
  4. Complete the steps to add a data mover node.
     a. For the data mover node that you want to set up tagging support for, select **Create Services**, then select **Tag Based Node**.
     b. Click **OK** to save your changes.
- To configure a new or existing Linux or existing Windows data mover node for tagging support, add the `vmtagdatamover yes` option in the client options file (`dsm.sys` for Linux and `dsm.opt` for Windows).

Results

After the data mover node is enabled for tagging support, the data mover queries the VMware inventory for tagging information when it runs a backup. The data mover then backs up the virtual machines according to the data protection tags that are set. If the data mover node is not configured for tagging support, any data protection tags are ignored during a backup operation.

Related tasks:

"Configuring backup policies" on page 29

Related information:

Vmtagdatamover

Creating tags in the virtual machine inventory

If you do not use the IBM Data Protection extension to manage backups, you must create backup management tags and categories that can be assigned to virtual machines (VMs).

About this task

After the backup management tags and categories are created in the VM inventory, you can use tools such as vSphere PowerCLI version 5.5 R2 or higher to apply these tags to VMs to change their backup policy.

Procedure

Use one of the following methods to create backup management tags and categories in the VM inventory:

- Use the IBM Data Protection extension to configure backup policies for a VM. Changing the backup policy of a VM automatically applies the appropriate backup management tags to the VM.
- Run the **dsmc set vmtags** command on the data mover node. You need to run this command only one time. You do not need to run the command on every data mover node.
- From the data mover node, back up a VM with the `vmtagdatamover yes` option in the client options file or as part of the **backup vm** command. For example:
  ```
  backup vm testvm -vmtagdatamover=yes
  ```

Results

The following tags are created.

Category	**Tag**	**Tag description**
Backup Management (IBM Spectrum Protect)	Excluded	The object is excluded from backups by IBM Spectrum Protect
Management Class (IBM Spectrum Protect)	*Management_class_name*	The policy used for retention settings in IBM Spectrum Protect

Where:

Excluded
: Excludes a VM from scheduled backup services.

Management_class_name
: The name of the retention policy that defines how long backup versions are kept on the Tivoli Storage Manager server or how many backup versions can exist on the server before they are expired.

  If you do not use the *Management_class_name* tag value, the default retention policy for the VMware datacenter node is used.

When the `vmtagdatamover` option is set to *yes*, all tags that are assigned to a VM are backed up when a VM is backed up to the Tivoli Storage Manager server and restored when the VM is restored.

Related tasks:

"Setting a data mover node as a tag-based node" on page 26

"Configuring backup policies" on page 29

Related information:

Vmtagdatamover

Set Vmtags

Configuring backup policies

You can change the way your virtual machine backups are managed, such as excluding virtual machines (VMs) from scheduled backup services or changing the retention policy of VM backups.

Excluding virtual machines from scheduled backup services

You can use the IBM Data Protection extension to exclude virtual machines (VMs) from scheduled backup services.

About this task

Typically, the VMs in your VMware datacenter are protected by scheduled backup services with IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware. In some scenarios, you might want to exclude a VM from scheduled backups. For example, if it is used only for testing or it is accessed infrequently.

Procedure

Exclude a VM from scheduled backup services by using one of the following methods:

Method	Steps
Exclude a single VM from scheduled backup services:	1. In the vSphere Web Client, select a VM from the tree in the navigator. 2. Complete one of the following steps: • Click **Manage** > **IBM Data Protection**. Review the data protection settings for the VM and click **Edit**. • Click **Actions** > **All IBM Data Protection Actions** > **Manage Data Protection**. 3. Select **Yes** in the **Exclude from backup** field and click **OK**.
Exclude one or more VMs from scheduled backup services:	1. In the vSphere Web Client, select one or more VMs from the inventory list in the workspace. The selected VMs must belong to the same datacenter. 2. Click **Actions** > **All IBM Data Protection Actions** > **Manage Data Protection**. 3. Select **Yes** in the **Exclude from backup** field and click **OK**.

Results

The excluded VMs will not be backed up in future scheduled backup operations. However, you can still run an on-demand backup of an excluded VM.

Related tasks:

"Starting an on-demand backup of a virtual machine" on page 32

Specifying the retention policy of virtual machine backups

You can specify how long to keep a virtual machine (VM) backup or how many versions of the backup to keep on the Tivoli Storage Manager server.

About this task

The retention policy can be either the number of days that backup versions can exist on the Tivoli Storage Manager server before they expire, or the number of backup versions that exist on the server before they expire. When backup versions expire on the server, they are removed from server storage.

If you do not specify a retention policy, the default retention policy for the VMware datacenter node is used.

Procedure

To change the retention policy of VM backups, use one of the following methods:

Method	Steps
Change the retention policy of a single VM:	1. In the vSphere Web Client, select a VM from the tree in the navigator. 2. Complete one of the following steps: • Click **Manage** > **IBM Data Protection**. Review the data protection settings for the VM and click **Edit**. • Click **Actions** > **All IBM Data Protection Actions** > **Manage Data Protection**. 3. Select a policy from the **Retention Policy** list and click **OK**. **Tip:** Retention policies cannot be selected for a VM when **Yes** is selected in the **Exclude from backup** field.
Change the retention policy of one or more VMs:	1. In the vSphere Web Client, select one or more VMs from the inventory list in the workspace. The selected VMs must belong to the same VMware datacenter. 2. Click **Actions** > **All IBM Data Protection Actions** > **Manage Data Protection**. 3. Select a policy from the **Retention Policy** list and click **OK**. **Tip:** Retention policies cannot be selected for a VM when **Yes** is selected in the **Exclude from backup** field.

Results

The retention policy that you set for the selected VMs will be used for all future backup operations.

Managing data protection

Use the IBM Data Protection extension to manage data protection of virtual machines in your VMware datacenter.

Viewing the history of backup tasks for virtual machines

You can view the recent backup history of a virtual machine (VM) to identify backup tasks that might require attention. Backup history is available only for Tivoli Storage Manager tasks.

About this task

The number of backup tasks that are shown depends on the number of days that are set by the Tivoli Storage Manager server `SET SUMMARYRETENTION` command.

Procedure

To view backup tasks for a VM:

1. In the vSphere Web Client, select a VM and click the **Monitor** tab.
2. Click **IBM Data Protection**.

   The backup tasks for the selected virtual machine are shown. Information such as the backup time, the status of the backup, and the amount of data that is transmitted is shown for each task.

   If you want to view the backups that are available for the VMs in a datacenter, select a datacenter in the vSphere Web Client and click **Manage** > **IBM Data Protection**.

Restoring a virtual machine

You can restore virtual machines (VMs) that have Tivoli Storage FlashCopy Manager or Tivoli Storage Manager backups.

Procedure

To restore a VM:

1. In the vSphere Web Client, right-click a VM and click **Actions** > **All IBM Data Protection Actions** > **Restore**.

   If you want to restore a VM that is no longer in the inventory because it is deleted, select a datacenter and click **Manage** > **IBM Data Protection**. If the VM that you want to restore is listed, select the VM and then click **Restore**.
2. Follow the instructions in the **Restore a Virtual Machine** wizard to select a restore point and destination location. You can restore to the original location of the VM or to an alternative location.

   If you want to restore to the original location, you can accept the information that is provided on the Select Destination page of the wizard. By default, the VM name is the original name appended with a date and time. You can use this name or enter another name that is not already used by another VM in the datacenter. If you want to restore to an alternative location, enter the information for that location.
3. Click **All Users' Tasks** in the **Recent Tasks** section of the vSphere Web Client to view the progress of the restore operation in a task view.

Results

After the restore operation is complete, the virtual machine is shown in the location that you selected.

Starting an on-demand backup of a virtual machine

When you start an on-demand backup of a virtual machine (VM), the backup operation begins immediately without waiting for a schedule to run.

Before you begin

You cannot run a backup operation for VMs if you are using any configuration that includes Tivoli Storage FlashCopy Manager to back up your data.

About this task

Typically, the VMs in your VMware datacenter are backed up when a schedule is run. However, you might want to start an on-demand backup if you notice that a VM was not backed up recently or if a backup completed with errors. You can also start an on-demand backup of a VM that is excluded from scheduled backup services.

Tip: Any retention policy settings are observed during an on-demand backup. The retention policy for a VM determines how many backup versions of a VM can exist on the Tivoli Storage Manager server. Depending on how many backup versions of a VM can exist on the server, running an on-demand backup of a VM might cause older backups to expire. When backup versions expire on the server, they are removed from server storage. For example, if a VM was backed up four times, and only four backup versions can exist on the server, running an on-demand backup causes the oldest backup version to expire.

To check the number of backup versions that can exist on the server, select a VM in the vSphere Web Client and click **Manage** > **IBM Data Protection**.

Procedure

To start an on-demand backup of a VM, complete the following steps:

1. In the vSphere Web Client, right-click a VM and click **Actions** > **All IBM Data Protection Actions** > **Back Up**.
2. In the Backup a Virtual Machine window, select a type of backup to run.
   - **Incremental**: Backs up VM data that changed since the last incremental or full backup. If no previous backup exists, a full backup is run.
   - **Full**: Backs up an entire VM regardless of when the last backup occurred.
3. Select a data mover node to back up the VMs. The data mover node contains the Tivoli Storage Manager backup-archive client that runs the backup operations.

   Typically, you can accept the default data mover node. However, to improve workload balancing in some situations, you might select a data mover that is not heavily used.
4. Click **OK** to begin the backup operation.
5. Click **All Users' Tasks** in the **Recent Tasks** section of the vSphere Web Client to view the progress of the backup operation in a task view.

Results

After the backup operation is completed, select a VM and click **Monitor** > **IBM Data Protection** to view the backup information for the VM.

Related tasks:

“Excluding virtual machines from scheduled backup services” on page 29

Chapter 3. Getting started with file restore

To restore files from a web-based interface without administrator assistance, file restore is available for use. After the configuration is complete, file owners can search, locate, and restore files.

The web-based interface does not require a file manager application to manually copy files. When you restore a file, you specify a restore point, search or browse to locate the file, and start the restore.

When the configuration is complete, no administrator interaction is required to access or restore files. During the configuration process, the administrator gives the file owner access to the virtual machine that contains their data. File owners access the data with local virtual machine credentials so administrators can monitor file restore resources. File owner permissions do not have to be managed.

You can view demonstration videos that help you learn about the Tivoli Storage Manager file restore interface. The *Find and Restore Files* and *Monitoring Restores* videos display when you first log in to the file restore interface. Videos are available in English only.

Common tasks for restoring files

Different types of users set up and use the file restore feature. Each user is responsible for a set of tasks.

File owner

The file owner maintains business data such as text documents, spreadsheets, and presentation files.

The file owner completes the following tasks:

- "Logging in to restore files" on page 38.
- "Restoring files from a virtual machine backup" on page 38

Administrator

The administrator creates initial software deployments, schedules virtual machine backups to the Tivoli Storage Manager server, and manages user accounts and permissions in the VMware environment.

The administrator completes the following tasks to set up the environment for file restore:

1. Enabling the environment for file restore operations
2. Backing up virtual machine data to Tivoli Storage Manager
3. Optional: Setting up file restore operations on Linux

   When running Data Protection for VMware in a Linux environment or in combination with Tivoli Storage FlashCopy Manager for VMware, the file restore feature must be installed on a Windows system to enable the file restore feature.

After the environment is ready for file restore operations, the following optional tasks can be done by the administrator:

- Modifying options for file restore operations
- Configuring log activity for file restore operations

File restore prerequisites

Before you restore files with the Tivoli Storage Manager file restore interface, ensure that your environment meets the minimum prerequisites.

To enable the file restore feature, Data Protection for VMware must be installed on a Windows system.

VMware virtual machine prerequisites

The following prerequisites apply to the VMware virtual machine that contains the files to be restored:

- Linux Windows VMware Tools must be installed on the virtual machine.
- Linux Windows The virtual machine must be running during the file restore operation.
- Windows The virtual machine must belong to the same Windows domain as the data mover system.
- Windows When a virtual machine is deleted from a Windows domain and then restored later, the virtual machine must rejoin the domain to ensure the domain trust relationship. Do not attempt a file restore from the virtual machine until the domain trust relationship is restored.
- Windows If the user does not own the file to be restored, the Microsoft Windows `Restore Files and Directories` privilege must be assigned to the user for that virtual machine.
- Linux Local user authentication is required for the virtual machine. Authentication is not available through Windows domain, Lightweight Directory Access Protocol (LDAP), Kerberos, or other network authentication methods.
- Linux On a Red Hat Enterprise Linux 6 operating system, the `ChallengeResponseAuthentication` option in the sshd daemon configuration file (`/etc/ssh/sshd_config`) must specify YES or be commented out. For example, either of the following statements are valid:

  ```
  ChallengeResponseAuthentication yes
  ```

  ```
  #ChallengeResponseAuthentication no
  ```

  Restart the sshd daemon after you modify this option.

Data mover prerequisites

The data mover system represents a specific backup-archive client that "moves data" from one system to another.

Windows The data mover system must belong to the same Windows domain as the virtual machine that contains the files to be restored.

Mount proxy prerequisites

The mount proxy system represents the Linux or Windows proxy system that accesses the mounted virtual machine disks through an iSCSI connection. This system enables the file systems on the mounted virtual machine disks to be accessible as restore points to the Tivoli Storage Manager file restore interface.

Linux Linux operating systems provide a daemon that activates Logical Volume Manager (LVM) volume groups as these groups become available to the system. Set this daemon on the Linux mount proxy system so that LVM volume groups are not activated as they become available to the system. For detailed information about how to set this daemon, see the appropriate Linux documentation.

Linux Windows The Windows mount proxy system and Linux mount proxy system must be on the same subnet.

Microsoft Windows domain account prerequisites

The following prerequisites apply to Windows domain accounts:

- Windows Windows domain administrator credentials are required to access the network share. An administrator enters these credentials in the Data Protection for VMware vSphere GUI configuration wizard or notebook to enable the environment for file restore operations.
- Windows A file owner accesses the remote virtual machine (that contains the files to be restored) with Windows domain user credentials. These credentials are entered in the Tivoli Storage Manager file restore interface during login. Domain user credentials verify that the file owner has permission to log in to the remote virtual machine and restore files into the remote virtual machine. These credentials do not require any special permissions.
- Windows If a file owner uses a Windows domain user account that limits access to specific computers (instead of access to all computers within the domain), ensure that the mount proxy system is included in the list of computers that are accessible to this domain user account. Otherwise, the file owner is unable to log in to the Tivoli Storage Manager file restore interface.

Tape media prerequisites

File restore from tape media is supported. However, recovery of individual files generates random read request patterns. As a result, processing might be slow when a sequential-access device (such as tape media) is used. File restore from disk storage is the preferred method.

Consider moving target virtual machine backup data from tape media to disk storage before you attempt a file restore operation. You can do move data with the Tivoli Storage Manager server **MOVE NODEDATA** command. You can also run traditional full VM backups regularly.

For more information related to tape media, see “Tape media guidelines” on page 13.

Logging in to restore files

Linux Windows

You can log in to the Tivoli Storage Manager file restore interface to restore your files with minimal assistance from the administrator.

About this task

When you log in to this interface, you can locate and restore your files at your convenience.

Procedure

1. Access the Tivoli Storage Manager file restore interface by opening a web browser and entering the URL that you received from your administrator.
2. Enter the network name or IP address of the virtual machine that contains your files. For example, `myhost.mycompany.com`.
3. Enter the user account that you use to access your files.

   Windows Use the `Windows_domain_name\user_name` format.
4. Enter the user account password and click **Log in**.

Restoring files from a virtual machine backup

Linux Windows

Locate your files and restore them to a preferred location.

Before you begin

Ensure that you are logged in to the Tivoli Storage Manager file restore interface. A backup must exist before you can restore your files.

About this task

Only those files and directories for which you have permission to view on the operating system are visible.

Procedure

1. Select a backup by completing the following steps:
   a. Click a date in the calendar.
   b. If necessary, select a time in the **Available backups** field.
   c. Click **Choose backup**.

   The virtual machine disks or directories are displayed in the table.
2. Optional: If the default backup is not the one you want, select a different backup by completing the following steps:
   a. Click the calendar.
   b. Click a date in the calendar.
   c. If necessary, select a time.
   d. Click **Change backup**.

Restriction: If you change the backup date or time, any file selections that you made are lost. However, the new backup loads to the directory where you previously explored. If that directory is unavailable, the backup loads to the top directory.

The virtual machine disks or directories are displayed in the table.

3. To select files to restore, complete the following steps:
   a. Click a disk or directory in the table to view the subdirectories and files.
   b. Optional: To search for a file in the current directory and subdirectories, type a name in the **Search** field and press **Enter**. The results are displayed in the order they are found.
   c. Select one or more files and directories to restore. If you select a directory that has no contents, the empty directory is not restored.
4. Select where to restore files.
   - To restore files and directories to the original location, select **Restore to** > **Original Location**.
   - To restore files and directories to a different location, select **Restore to** > **Alternate Location**.
5. After you make your selections, click **Restore**. If you are restoring files to an alternative directory, select an existing directory on your virtual machine or create a directory to place restored files. Then, click **Restore**. If a file with the same name exists, the restored file's original modification date and time is added to the file name. Subsequent restores of the same file contain a number (_*N*) after the original modification date and time. For example: `t2.2015-03-07-07-28-03_1.txt`

What to do next

Click the restore icon (⤓) to view information about active and recent restores. By default, information is kept for 7 days after a restore completes.

If a restore completed with an error or warning, view additional information by clicking **Details**. To save the error or warning information, click **Export** and save the information in .CSV format.

Chapter 4. Protection for in-guest applications

Data Protection for VMware protects Microsoft Exchange Server, Microsoft SQL Server, and Active Directory Domain Controllers that run inside VMware VM guests in a VMware vSphere environment.

Microsoft Exchange Server data protection in VMware environments

For Microsoft Exchange Server workloads that are running in a VMware ESXi virtual guest machine, you can take application-consistent backups of virtual machines that are hosting Microsoft Exchange Server data. By using IBM Tivoli Storage FlashCopy Manager software, you can recover database-level and mailbox-level backups from a virtual machine.

Before you back up data, identify your recovery point objective (RPO). The *RPO* helps you decide how often to back up data and affects the cost that is associated with data backups.

For example, you can schedule frequent virtual machine backups for necessary recovery points. The recovery point of a virtual machine backup is the time of the backup. While change-block tracking and data deduplication offer savings, virtual machine backups can be expensive if you create and delete many virtual machine snapshots.

Most traditional in-guest data protection methods provide appropriate RPOs, but these in-guest methods lose the efficiencies that are introduced by backing up data at the virtual machine level.

You can use IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware and Tivoli Storage FlashCopy Manager with Data Protection for Microsoft Exchange Server to back up data at a virtual machine level in a way that preserves backup efficiencies.

To protect Microsoft Exchange Server data in a VMware environment, ensure that the following products are installed and configured on your system:

- Tivoli Storage Manager for Virtual Environments: Data Protection for VMware V7.1.8 (which includes the Tivoli Storage Manager client)
- Tivoli Storage FlashCopy Manager with Data Protection for Microsoft Exchange Server V4.1.6

These software offerings work together to protect Microsoft Exchange Server data in a VMware environment when no other software products are used to back up Microsoft Exchange Server data. Tivoli Storage FlashCopy Manager for VMware cannot be used with this solution.

For permission required to back up and restore application data for Microsoft Exchange Server, see technote 1647986.

Application protection is supported for VMware VMs in a VMware vSphere environment only. In-guest application protection is not supported for VMware vApps in a vCloud environment.

Configuring the software for Exchange Server data protection in a VMware environment

To protect Microsoft Exchange Server workloads that are running in a VMware ESXi virtual guest machine, install and configure Data Protection for VMware. Then, install and configure Data Protection for Microsoft Exchange Server.

Before you begin

The configuration instructions that follow are based on a configuration scenario that might not match your environment. Adjust the configuration for your environment.

The following list summarizes the scenario for quick reference:

Windows host name
`EXC10`

VSS requestor node name
`EXC10_VSS`

Data Protection for Microsoft Exchange Server node name
`EXC10_EXC`

Virtual machine name
`vm_exc10`

Data mover node names
`datamover10` and `datamover20`

Datacenter node name
`datacenter10`

VM file space
`\VMFULL-vm_exc10`

About this task

The following details describe the scenario that is used.

- A single Microsoft Exchange Server database on a virtual machine that is named `vm_exc10` must be recovered.
- Virtual machine `vm_exc10` is protected by Data Protection for VMware by using the node name `datacenter10`. This node name in the Tivoli Storage Manager server represents the vSphere datacenter. The data mover nodes are called `datamover10` and `datamover20`.
- The virtual machine guest is configured with the virtual machine name of `vm_exc10` and the Microsoft Windows host name is `EXC10`.
- Data Protection for Microsoft Exchange Server is installed in the virtual guest machine and is configured to the Tivoli Storage Manager server to use node name `EXC10_EXC`.
- The Tivoli Storage Manager client in the virtual guest machine is configured as the VSS requestor node and is using the node name `EXC10_VSS`.

Procedure

1. Follow the installation and configuration instructions that are provided with each software package.

If you install Data Protection for Microsoft Exchange Server before Data Protection for VMware, you cannot specify the VMware datacenter node in the Data Protection for Microsoft Exchange Server configuration wizard because the field is disabled.

Tip: In this case, reconfigure Data Protection for Microsoft Exchange Server to enable the VMware datacenter node after Data Protection for VMware is installed.

2. Complete the tasks in this checklist:
   - Verify that Microsoft Exchange Server databases and mailboxes are hosted on VMware virtual disks.
   - Verify that no Exchange Server database is hosted on raw device mapped (RDM) disks in physical compatibility mode, independent disks, or on disks that are attached directly to the guest through in-guest iSCSI.
3. Outside of the VM guest, in the datamover, configure Data Protection for VMware to protect Microsoft Exchange Server databases and mailboxes.
4. Within the guest, take the following actions:
   - Verify that the Data Protection for VMware recovery agent command-line interface is configured to work with the recovery agent on the guest virtual machine.
   - Configure Data Protection for Microsoft Exchange Server to complete backup and restore operations from a virtual machine backup.

Related tasks:

"Configuring Data Protection for VMware"

"Configuring Data Protection for Microsoft Exchange Server" on page 45

Configuring Data Protection for VMware

You must configure Data Protection for VMware to preserve Microsoft VSS metadata information during a virtual machine backup for systems that are hosting Microsoft Exchange Server data.

About this task

Data Protection for VMware provides application consistency when you back up virtual machines that are hosting Microsoft Exchange Servers. With these backups, you can recover the virtual machine with Microsoft Exchange Server in a consistent state.

To recover only selected databases or mailboxes from this type of backup with Tivoli Storage Manager, without having to recover the entire virtual machine, preserve information about the state of the Microsoft Exchange Server at the time of the virtual machine snapshot and backup. This information is collected as part of the Microsoft Volume Shadow Copy Services (VSS) interaction that occurs during a virtual machine snapshot.

For Data Protection for VMware to collect the Microsoft VSS metadata for Microsoft Exchange Server, you must configure Data Protection for VMware to obtain this information from the virtual machine during the backup operation.

Procedure

1. Configure Data Protection for VMware to preserve the Microsoft VSS metadata information during a virtual machine backup for systems that are hosting Microsoft Exchange Server data.

   a. Locate the options file for the Data Protection for VMware data mover. On Windows systems, the options file is `dsm.opt`. On Linux systems, the options file is `dsm.sys`.
   b. Specify the `INCLUDE.VMTSMVSS` option for the virtual machine. You must set this option for virtual machine backups to preserve the Microsoft VSS metadata information. For example, specify `INCLUDE.VMTSMVSS vm_display_name` where `vm_display_name` refers to the name of the virtual machine as shown in the VMware vSphere Client and vSphere Web Client.
   c. Optional: Back up a passive copy of a database that is part of an Exchange Server Database Availability Group (DAG). Specify the `vmpreferdagpassive yes` option for the virtual machine. Backing up the passive copy typically reduces the performance impact to the active copy in the production database. If no valid passive copy is available, the active database copy is backed up.
   d. Verify that the Virtual Machine Disks (VMDK) that host the Microsoft Exchange Server database are not being excluded from the virtual machine backup operation. Repeat the preceding steps for all data movers that protect virtual machines that are hosting Microsoft Exchange Server.
2. On each data mover, for example, *datamover10*, store the guest virtual machine credentials to Data Protection for VMware by running the following command from the Tivoli Storage Manager backup-archive client command line:

   ```
   dsmc set password –type=vmguest vm_guest_display_name
   guest_admin_ID guest_admin_pw
   ```

   This command stores the guest virtual machine credentials, which are encrypted on the system that hosts the data mover. The following minimum permissions are required for *guest_admin_ID guest_admin_pw*:

   - Backup rights: Microsoft Exchange Server 2010 and 2013: Organization Management permissions (membership in the management role group, Organization Management).

What to do next

You can verify the virtual machine backup configuration and ensure that the VMDKs are included. In addition, you can view other parameters by issuing the **backup** command with the preview option from the backup-archive client, for example:

```
dsmc backup vm vm_display_name -preview -asnode=datacenter_node
```

You can also use the Tivoli Storage Manager scheduler to schedule periodic backups of your virtual machines. You can also back up the virtual machine that is hosting the Microsoft Exchange Server by using the backup-archive client command line:

```
dsmc backup vm vm_display_name -asnode=datacenter_node
```

Verifying that the configuration backs up data that can be restored

Before you can restore individual Microsoft Exchange Server databases from a Data Protection for VMware virtual machine backup, you must complete at least one successful virtual machine backup. For the restore operation to work, the backup must contain Microsoft Exchange Server database metadata.

Procedure

1. Issue the following backup-archive client **query** command on one of the data mover nodes:

   ```
   dsmc query vm vmname -detail -asnode=datacenter_node
   ```

   where:

   - *vmname* specifies the name of the virtual machine
   - *datacenter_node* specifies the name of the datacenter node

   .
2. In the command output, look for the following details:

   ```
   Application(s) protected: MS Exchange 2013 (database-level recovery)
   ```

   Ensure that `Excluded` is not indicated in any Virtual Machine Disk (VMDK) status fields for virtual disks that host Microsoft Exchange Server database files. The `Excluded` status indicates that one or more of the VMDKs that are required to recover a Microsoft Exchange Server database are not being protected. For example:

   ```
   Query Virtual Machine for Full VM backup
   # Backup Date  Mgmt Class  Size    Type    A/I   Virtual Machine
   - -----------  ----------  -----  ----    ---   -----------------
   1 02/20/2015   STANDARD   43.94GB IFFULL  A     vm_exc10
     12:43:59

    Size of this incremental backup: n/a
    Number of incremental backups since last full: 0
   Amount of extra data: 0
   TSM object fragmentation: 0
   Backup is represented by: 328 TSM objects
   Application protection type: TSM VSS
   Application(s) protected: MS EXC 2013 (database-level recovery)
   VMDK[1]Label: Hard Disk 1
   VMDK[1]Name: [ess800_dev2] vm_exc10/vm_exc10 .vmdk
   VMDK[1]Status: Protected
   ...
   VMDK[6]Label: Hard Disk 6
   VMDK[6]Name: [ess800_dev2] vm_exc10/vm_exc10_5.vmdk
   VMDK[6]Status: Protected
   ```

Configuring Data Protection for Microsoft Exchange Server

After you configure Data Protection for VMware and verify that you created a virtual machine backup that is suitable for recovery of a single Microsoft Exchange Server database, configure Data Protection for Microsoft Exchange Server in the guest virtual machine.

Procedure

1. Log on to the virtual machine that hosts the Microsoft Exchange Server database.
2. Verify that the following packages are installed:

- Tivoli Storage Manager recovery agent, recovery agent command-line interface (CLI), and license (from the Data Protection for VMware product package)
- Tivoli Storage Manager backup-archive client
- Data Protection for Microsoft Exchange Server

You can install the recovery agent, CLI, license, and backup-archive client together by using the Data Protection for VMware installation program. To install the packages together, select the following advanced installation option: **Install a complete data mover for in-guest application protection**. Data Protection for Microsoft Exchange Server is installed separately.

3. Configure Data Protection for Microsoft Exchange Server by using the Tivoli Storage Manager configuration wizard. When you open the Tivoli Storage Manager Node Names page of the wizard, enter the VMware datacenter node name, Microsoft Exchange Server node name, and VSS requestor node name. If the datacenter node name field is disabled, the Tivoli Storage Manager recovery agent is not installed correctly.
4. After Data Protection for Microsoft Exchange Server is configured, verify that the **Configuring Recovery Agent** rule status indicates Passed.
5. Log on to a data mover instance and complete the following steps. Do not repeat these steps for all data mover instances.
   a. Copy the contents of the data mover options file dsm.opt to a temporary file named dsm.setaccess.opt and make the following changes to the file. Do not make these changes in the dsm.opt file.
      1) Delete any line that contains an **ASNODE** entry.
      2) Set the **NODENAME** option to the VMware datacenter node name. For example:
         ```
         NODENAME datacenter10
         ```

      Tip: If the dsm.opt file does not contain **ASNODE** entries and the **NODENAME** option is set to the correct data center node, you can use this file rather than creating the dsm.setaccess.opt file.
   b. From the datacenter node that was defined in the **NODENAME** option, issue the **set access** command to grant the VSS requestor node access to the virtual machine backups as shown in the following example.

      You must complete this step because the VSS requestor node accesses the virtual machine backups on behalf of Data Protection for Microsoft Exchange Server.

      If the password for the datacenter node is unknown when you run the **set access** command, you will receive an error message and the Tivoli Storage Manager server administrator must reset the password to issue the command.

Example

The following example shows the required parameters for the **set access** command. The parameters specify the virtual machine name (vm_exc10), the VSS requestor node name (EXC10_VSS), and the name of the options file that defines the datacenter node name (dsm.setaccess.opt).

The example also shows the results of the **query access** command, which shows the backup access authorization for the VSS requestor node.

```
dsmc set access backup –type=VM vm_exc10 EXC10_VSS –optfile=dsm.setaccess.opt

ANS1148I "Set Access" command successfully completed.

dsmc query access
Node name: datacenter10
Type        Node   User   Path
------ ------ ------ ------
Backup      EXC10_VSS    *      \VMFULL-vm_exc10\*\*


ANS1148I "Query Access" command completed successfully
```

Managing backups

After you configure Data Protection for Microsoft Exchange Server, you can schedule virtual machine backups and separately, you can update the mailbox information in Exchange Server database backups on the virtual machine.

Scheduling virtual machine backups

To ensure that your data is protected, schedule virtual machine backups.

Before you begin

Before you back up virtual machines that are hosting Microsoft Exchange Server databases, mount the databases.

By default, the maximum size allowed for a VMDK in a backup operation is 2 TB. However, the maximum is 8 TB. To increase the maximum size, use the `vmmaxvirtualdisks` option. For more information, see Vmmaxvirtualdisks.

About this task

During backup processing, Data Protection for VMware bypasses a guest Microsoft Exchange Server database that is dismounted, corrupted, suspended, or not in a healthy state in a Database Availability Group (DAG). Databases in such invalid states are excluded from virtual machine backups and are not available to restore.

Procedure

1. Log on to the Data Protection for VMware user interface.
2. Click the **Backup** tab.
3. Click **Create Schedule** to specify a backup schedule name, source (the virtual machines to include in the backup schedule), and other scheduling options.
4. Verify that the source of the schedule includes the virtual machines that are hosting Microsoft Exchange Server.
5. Verify that one of the following services is running:
   - If you are using scheduler that is managed by a Client Acceptor Daemon (CAD), ensure that the CAD service is running on the data mover.
   - If you are using the stand-alone scheduler, ensure that the scheduler service is running.

Updating mailbox information in Microsoft Exchange Server backups

When you back up a virtual machine that is hosting Microsoft Exchange Server data, mailbox history is automatically uploaded with the virtual machine backup if Data Protection for Microsoft Exchange Server is detected on virtual machine.

About this task

Unless Data Protection for Microsoft Exchange Server is installed on the virtual machine, mailbox history information is not automatically updated in Exchange Server database backup operations. Automatic uploading of mailbox history might also be disabled by specifying the `VMBACKUPMAILBOXHISTORY No` in the data mover options file, that is, `dsm.opt` on Windows systems or `dsm.sys` on Linux systems.

You can manually update mailbox history information by using the Data Protection for Microsoft Exchange Server command-line interface.

Tip: Complete this task before you back up the virtual machines that contain Microsoft Exchange servers. In this way, you can ensure that you have consistent location information for the mailbox history and the mailboxes in database backups.

Procedure

1. To update only the mailbox history information in Exchange Server database backups, issue the **backup /UpdateMailboxInfoOnly** command as shown in the following example:

   ```
   tdpexcc backup DB1 full /UpdateMailboxInfoOnly
   ```

   where `DB1` is the database name, and `full` is the type of database backup.

   Tip: To update information for all the mailboxes in the Exchange organization, specify an asterisk (*) character as the database name.
2. Optional: Verify that the mailbox information is updated correctly by completing the following steps.
   a. Review the mailbox information for database backups on IBM Spectrum Protect server by issuing the **query /SHOWMAILBOXInfo** command as shown in the following example:

      ```
      tdpexcc query tsm /showmailboxinfo
      ```
   b. Start Microsoft Management Console (MMC), and in the **Mailbox Restore** or **Mailbox Restore Browser** view, verify the list of updated mailboxes that are available to restore.

Verifying backups

After you create a backup, verify that you can query the virtual machine backups and the database backups from the Data Protection for Microsoft Exchange Server interface.

About this task

You can recover one or more Microsoft Exchange databases based on your recovery point objectives (RPO).

Procedure

1. From Microsoft Management (MMC), select a Microsoft Exchange Server.
2. Click the **Recover** tab.
3. Select **View** > **Databases**. A list of Microsoft Exchange Server database backups that can be restored is displayed.

   Microsoft Exchange Server databases that are backed up with Data Protection for VMware are identified with the `vmvss` backup method.

Troubleshooting VSS backup operations on guest virtual machines

If you encounter a problem during Volume Shadow Copy Service (VSS) backup processing on a guest VM, try to reproduce the problem in your environment.

About this task

Contact IBM Support for further assistance if you have a problem that you are unable to solve by reproducing the issue or reviewing the information that follows.

VSS writer service causes a VM backup to fail:

You can bypass any VSS writer that is causing a VM backup to fail and exclude it from the backup.

About this task

Before a VM backup, the VSS writer is in a stable state and has no errors. During VM backup processing, a VSS writer might encounter an error that causes the entire VM backup to fail.

For example, if the Microsoft Forefront Protection VSS Writer is installed on a guest VM, the VM backup fails and the VSS writer status changes to `Retryable error`, `Waiting for completion`, or a status other than `Stable`. Complete the following steps to exclude the writer service from the VM backup.

Procedure

1. In the VSS administrative command-line tool on the guest VM, list the VSS writers by issuing the **`vssadmin list writers`** command. In the following command example, the `Microsoft Forefront Protection VSS Writer`service is identified by writer name, ID, and instance ID:

```
Writer name: 'FSCVSSWriter'
   Writer Id: {68124191-7787-401a-8afa-12d9d7ccc6ee}
   Writer Instance Id: {f4cc5385-39a5-463b-8ab4-aafb2b35e21e}
   State: [1] Stable
   Last error: No error
```

2. In the datamover options file, `dsm.opt` or `dsm.sys`, add the `EXCLUDE.VMSYSTEMSERVICE` option followed by the *Writer Name* as shown in the following example.

```
EXCLUDE.VMSYSTEMSERVICE FSCVSSWriter
```

   Tip: If the data mover machine is on a UNIX system, the option file is `dsm.sys`. If the guest VM and datamover machine use different language sets, specify the *Writer ID* or *Writer Instance Id* instead of the *Writer Name.*
   For example:

```
 EXCLUDE.VMSYSTEMSERVICE {68124191-7787-401a-8afa-12d9d7ccc6ee}
```

Results

The VM backup completes successfully even if the `Microsoft Forefront Protection VSS Writer` service is running on the guest VM.

No application protection file APPPROTECTIONDBINFO.XML and no warning messages for skipped databases:

Under certain conditions, a dismounted Exchange 2010 Server database is skipped during a backup operation and no warning is issued.

About this task

When the following conditions exist during a VM backup of a guest VM with Exchange 2010 Server:

- The Exchange 2010 Server is not a member of a Database Availability Group (DAG).
- All Exchange 2010 Server databases are dismounted.

The following warning message is generated:

```
ANS4063W IBM Tivoli Storage Manager application protection cannot copy
the application metafile 'APPPROTECTIONDBINFO.XML ' from the following VM: '<name_name>'.
Individual database restore from this backup is not supported.

ANS4063W IBM Tivoli Storage Manager application protection cannot copy the
application metafile '___________________________L' from the following VM: '<vm_name>'.
Individual database restore from this backup is not supported.
```

In this situation, the VM backup is available for only full VM restore. Individual database restore from this VM backup is not available.

To prevent this situation, mount the Exchange 2010 Server databases before you start the VM backup operation.

When Exchange 2010 Server DAG databases or Exchange Server 2013 databases are dismounted, a VM backup operation of a guest VM generates the following warning message:

```
ANS2234W Restore from virtual machine backup is not available for
dismounted database <database>
```

For a dismounted Exchange 2010 Server database that is not a member of a DAG, Tivoli Storage Manager does not detect that the databases are dismounted. As a result, warning message ANS4063W is generated instead of ANS2234W.

Transaction error due to mixing of deduplicated and non-deduplicated data in the same transaction:

Under certain conditions, a transaction error occurs when deduplicated and non-deduplicated data is mixed in the same transaction.

About this task

When data deduplication is enabled, a Data Protection for VMware backup with application protection of a virtual machine might generate the following error in the `dsmerror.log` file:

```
ANS0246E Issue dsmEndTxn and then begin a new transaction session.
ANS5250E An unexpected error was encountered.
   TSM function name : vmSendViaFile()
   TSM function      : Failed sending file
                         /tmp/tsmvmbackup/fullvm/vmtsmvss/member1/IIS CONFIG WRITER.XML
   TSM return code   : 2070
   TSM file          : vmmigration.cpp (1383)
```

This error is recoverable and can be ignored. The error occurs when Data Protection for VMware attempts to send the XML file (that was excluded from deduplication due to its small size) in the same transaction with deduplicated data. Data Protection for VMware resends the XML file (identified in the error message) in a new transaction.

Verifying that virtual machine backups do not exclude Microsoft Exchange Server volumes

The volumes in Virtual Machine Disks (VMDKs) must contain the Microsoft Exchange Server databases that are not excluded from the Data Protection for VMware backup processing.

About this task

The databases cannot be on physical compatibility mode raw device mapping (RDM) disks, independent disks, or on disks that are attached directly to the guest operating system through iSCSI.

Procedure

1. Ensure that any `EXCLUDE.VMDISK` statements in the Data Protection for VMware data mover that is used to back up the virtual machine do not inadvertently exclude VMDKs that are hosting volumes that contain Microsoft Exchange Server files, file space, database, and mailboxes.

   For example:

   - `vm_exc10.vmdk` contains logical volume C:
   - `vm_exc10.vmdk` contains logical volumes E: and F:
   - The label for `vm_exc10_1.vmdk` is *Hard Disk 1*.
   - The label for `vm_exc10_2.vmdk` is *Hard Disk 2*.
   - The Microsoft Exchange Server database files to be backed up are on the E: and F: drive.

2. Verify that no statements exclude `vm_exc10_2.vmdk` from the virtual machine backup by ensuring that the data mover does not contain the following or similar statements:

   ```
   EXCLUDE.VMDISK VM_EXC10 "Hard Disk 2"
   EXCLUDE.VMDISK * "Hard Disk 2"
   ```

   Alternatively, if you exclude most hard disks, you must explicitly include the virtual machine disks by using one of the following statements:

   ```
   INCLUDE.VMDISK VM_EXC10 "Hard Disk 2"
   INCLUDE.VMDISK * "Hard Disk 2"
   ```

   Include and exclude statements are processed from bottom to top as they are displayed in the `dsm.opt` file. To achieve the goal, enter the statements in the correct order.

   You can specify the exclusion and inclusion of a virtual machine disk from the command-line interface:

   ```
   dsmc backup vm "VM_EXC10:-vmdisk=Hard Disk 2" -asnode=datacenter10
   ```

Restoring data

After you back up data, you can recover the data based on a recovery point objective (RPO).

A recovery operation restores a full backup of the Microsoft Exchange Server database or mailbox from the Data Protection for VMware backup.

If you restore the entire virtual machine, all Microsoft Exchange Server databases and mailboxes on the virtual machine are restored and recovered to the point of the virtual machine backup.

Starting the Microsoft iSCSI Initiator Service

The iSCSI protocol is used to mount the disks that are used for a recovery operation. Ensure that the Microsoft iSCSI Initiator Service is started and is set to the automatic startup type on the system where the data is to be restored.

Procedure

1. In the Windows **Services** list, right-click **Microsoft iSCSI Initiator Service**.
2. Click **Properties**.
3. On the **General** tab, set the following options:
   a. In the **Startup type** list, select **Automatic**.
   b. Click **Start**, and then click **OK**.

Results

In the **Services** list, **Microsoft iSCSI Initiator Service** shows a status of **Started** and the startup type is **Automatic**.

Restoring database backups by using the graphical user interface

You can recover a full Microsoft Exchange Server database backup from a virtual machine backup by using the Data Protection for Microsoft Exchange Server graphical user interface.

Procedure

1. To start a full database recovery from a virtual machine, start Microsoft Management (MMC). In the navigation pane, expand the Protect and Recover node and select a Microsoft Exchange Server server.
2. On the **Recover** tab, select **Database Restore**. All backups, including all database backups from a virtual machine backup, are listed.
3. Select a full database backup to restore.
4. In the Actions pane, click **Restore**.

Restoring backups of another virtual machine

By using Data Protection for Microsoft Exchange Server, you can access backups of another virtual machine on IBM Spectrum Protect server and restore the backup.

About this task

You can restore database and mailbox backups to a different Database Availability Group (DAG) node than the original backup node. For more information about restoring a DAG database backup, see the *IBM Tivoli Storage FlashCopy Manager Installation and User's guide for Windows*.

The following scenario assumes that you have Exchange virtual machines in your virtual environment: `vm1` and `vm2`. You want to enable Data Protection for Microsoft Exchange Server on `vm2` to access and restore database and mailbox backups on `vm1` and `vm2`.

Procedure

1. Configure self-contained application protection to protect Microsoft Exchange Server data on `vm1` and `vm2`.
2. Back up `vm1` and `vm2` by issuing the **`dsmc backup vm`** command on the command-line interface.
3. On `vm2`, install Data Protection for Microsoft Exchange Server and configure the software for Exchange Server data protection in a VMware environment.
4. To enable Data Protection for Microsoft Exchange Server on `vm2` to access backups on `vm1` and `vm2`, issue the **`set access`** command as shown in the following examples:

   ```
   dsmc set access backup -type=vm vm1 vm2_vss
   ```

   ```
   dsmc set access backup -type=vm vm2 vm2_vss
   ```
5. Restore database or mailbox backups on `vm1` or `vm2`.

Related tasks:

"Configuring Data Protection for VMware" on page 43

"Configuring the software for Exchange Server data protection in a VMware environment" on page 42

"Configuring Data Protection for Microsoft Exchange Server" on page 45

Restoring mailbox data

IBM Spectrum Protect™ Snapshot backs up mailbox data at the database level, and also restores individual mailbox items from the database backup.

Before you begin

You must have role-based access control (RBAC) permissions to complete individual mailbox restore operations. For more information, see the topic that explains security requirements for backup and restore operations in the *Data Protection for Microsoft Exchange Server Installation and User's guide*.

If you plan to restore mail or folders by using a Simple Mail Transfer Protocol (SMTP) server, ensure that you configure the SMTP server before you start a restore operation. To set the configuration in the Management Console, right-click **Dashboard** in the tree view and select **Properties**. From the E-mail property page, enter the SMTP server and port.

About this task

- In Exchange Server 2013, you can restore a public folder mailbox database, a public folder mailbox, or only a part of the mailbox, for example, a specific public folder.
  - To restore an Exchange 2013 public folder mailbox, the Exchange user must have the `Public Folders` management role.
  - You can restore a public folder mailbox only to an existing public folder mailbox that is on the Exchange Server.
  - You can restore a public folder only to an existing public folder. The public folder on the Exchange Server must have the same folder path as the public folder to be restored. If the public folder is deleted from the public folder mailbox on the Exchange Server, you must re-create the public folder with the same folder path as the public folder to be restored, before you start the restore operation.
  - As a best practice, restore public folder mailboxes separately from user mailboxes. Select only one public folder mailbox to restore at a time if you want to restore a specific public folder in the mailbox, or if you want to restore to a different public folder mailbox than the original mailbox.

    If you restore multiple mailboxes in a single restore operation, and at least one of the mailboxes is a public folder mailbox, the mailboxes are restored only to their original mailbox locations. You cannot specify a filter or an alternate mailbox destination.
  - You might restore to a different public folder mailbox than the original mailbox if, for example, the public folder is relocated after the time of the backup. Before you complete the public folder restore operation, ensure that the public folder exists with the same folder path in the alternate mailbox location.
- In Exchange Server 2010 or later, you can restore an archive mailbox or a part of the mailbox, for example, a specific folder. You can restore archive mailbox messages to a mailbox that is on the Exchange Server, to an archive mailbox, or to an Exchange Server `.pst` file.

  If you enable a user mailbox to be archived, ensure that the user is logged on to that mailbox at least once before you complete a backup and restore operation on the mailbox.
- If you restore multiple mailboxes, and you want to retain the recovery database after the restore operation is complete, ensure that all the mailboxes are in the same recovery database.
- By default, IBM Spectrum Protect Snapshot restores the latest backup that is available for the specified mailbox.

The amount of time that it takes to complete the restore process depends on the size of the mailbox databases, the network speed, and the number of mailboxes to process.

Procedure

1. Start Microsoft Management Console (MMC) and select **Exchange Server** in the navigation tree.
2. On the **Recover** tab for the Exchange Server instance, select the **Mailbox Restore** view.
3. Select one or more mailboxes to restore. A list of mailboxes that are backed up is displayed. If you restore mail to a Unicode personal folder (`.pst`) file, or you restore a mailbox that is deleted or re-created after the time of the backup, IBM

Spectrum Protect Snapshot requires a temporary mailbox to store the mailbox messages. Create a temporary mailbox by setting the `Alias of temporary mailbox` option on the Properties page, under the **General** tab.

Attention: Ensure that the temporary mailbox that you create is on a database with enough disk storage capacity to accommodate all of the mailbox items that you are restoring.

4. Optional: Optional: To restore individual messages instead of the entire mailbox, select **Item-Level Mailbox Filters**.
   a. Click **Show Filter Options** and **Add Row**.
   b. In the **Column Name** field, click the down arrow and select an item to filter.
      - You can filter public mailbox folders only by the **Folder Name** column.
      - You can filter Unicode `.pst` files only by **Backup Date**, **Folder Name** and **All Content** filters.
      - You can filter by backup date, and click the default date and time to edit the table cell. To change the date, click the arrow at the end of the cell. The calendar date selection tool is displayed. After you select a date, to display the date in the field, press **Enter**. To edit the time, enter the time by using the 12-hour clock time convention such as 2 p.m.

        When you specify a backup date, Data Protection for Exchange Server searches for a backup that corresponds to that exact date. If a backup with that exact date is not found, Data Protection for Exchange Server selects the first backup after that date.
   c. In the **Operator** field, select an operator.
   d. In the **Value** field, specify a filter value.
   e. If you want to filter on more items, click **Add Row**.
5. Specify the restore options by clicking **Show Restore Options**.

Table 6. Database restore options

Task	Action
Keep Recovery Database After Restore	Use this option to retain a recovery database after a mailbox restore operation is complete. The default value is **No**. If you set the value to **Yes**, Data Protection for Exchange Server automatically retains the recovery database after mailbox restore processing.
Mailbox	If the alias of the mailbox to restore is not displayed in the list of mailboxes, specify the alias. This option overrides any selected mailboxes.
Mailbox Original Location	Use this option only if the mailbox was deleted or re-created since the time of the selected backup, and mailbox history is disabled. Specify the Exchange Server and the database where the mailbox was at the time of the backup. Use the following format: `server-name,db-name`, for example, `serv1,db1`.
Mark Restored Messages As Unread	Use this option to automatically mark the mailbox messages as unread after the restore operation is completed. The default value is **Yes**.

Table 6. Database restore options (continued)

Task	Action
Use Existing Recovery Database	Use this option to restore the mailbox from an existing recovery database. The default value is **Yes**. If you set the value to **No** and a recovery database is mounted on the server before you restore the mailbox, Data Protection for Exchange Server automatically removes the recovery database during mailbox restore processing.

6. To complete the restore operation, click one of the following **Restore** options.

Table 7. Restore options

Task	Action
Restore Mail to Original Location	Select this action to restore mail items to their location at the time of the backup operation.
Restore Mail to Alternate Location	Select this action to restore the mail items to a different mailbox.
Restore Mail to non-Unicode PST file	Select this action to restore the mail items to a non-Unicode personal folders (`.pst`) file. When you restore mail items to a `.pst` file with one selected mailbox, you are prompted for a file name. When you restore mail items to a `.pst` file with more than one selected mailbox, you are prompted for a directory location. Each mailbox is restored to a separate `.pst` file that reflects the name of the mailbox at the specified directory. If the `.pst` file exists, the file is used. Otherwise, the file is created. **Restriction:** The contents of each folder cannot exceed 16,383 mail items.

Table 7. Restore options (continued)

Task	Action
Restore Mail to Unicode PST file	Select this action to restore the mail items to a Unicode `.pst` file. When you restore mail items to a `.pst` file with one selected mailbox, you are prompted for a file name. When you restore mail items to a `.pst` file with more than one selected mailbox, you are prompted for a directory location. You can enter a standard path name (for example, `c:\PST\mailbox.pst`) or a Universal Naming Convention (UNC) path (for example, `\\server\c$\PST\mailbox.pst`). When you enter a standard path, the path is converted to a UNC path. If the UNC path is a non-default UNC path, enter the UNC path directly. Each mailbox is restored to a separate `.pst` file that reflects the name of the mailbox at the specified directory. If the `.pst` file exists, the file is used. Otherwise, the file is created.
Restore Public Folder Mailbox	Select this action to restore a public folder mailbox to an existing online public folder mailbox. You can filter the mailbox and restore a specific public folder to an existing online public folder. In the **Folder to be restored** field, enter the name of the public folder that you want to restore. If you are restoring a subfolder in a parent folder, specify the full folder path in this format: *`parent_folder_name/sub_folder_name`*. To restore all subfolders in a parent folder, use *`parent_folder_name`*`/*`. If the full folder path includes spaces, enclose the folder path in double quotation marks, and do not append a backslash character (\) at the end of the folder path. You can also restore all or part of a public folder mailbox to a different public folder mailbox than the original mailbox. In the **Target public folder mailbox** field, specify the destination public folder mailbox that you want to restore to.

Table 7. Restore options (continued)

Task	Action
Restore Mail to Archive Mailbox	This action applies to a primary mailbox or an archive mailbox. Select this action to restore all or part of either type of mailbox to the original archive mailbox or to an alternate archive mailbox. You can filter the archive mailbox and restore a specific mailbox folder. In the **Folder to be restored** field, enter the name of the folder in the archive mailbox that you want to restore. If you are restoring a subfolder in a parent folder, specify the full folder path in this format: `parent_folder_name/sub_folder_name`. To restore all subfolders in a parent folder, use `parent_folder_name/*`. If the full folder path includes spaces, enclose the folder path in double quotation marks, and do not append a backslash character (\) at the end of the folder path. In the **Target archive mailbox** field, specify the archive mailbox destination that you want to restore to.

Restoring relocated and deleted mailboxes

The Tivoli Storage Manager backup solution for restoring mailboxes that are relocated and deleted after a virtual machine backup consists of Data Protection for VMware and Data Protection for Microsoft Exchange Server.

Before you begin

Decide where the mailbox data from the deleted mailbox is to be restored.

If you restore mail to a Unicode personal folder (`.pst`) file, or you restore a mailbox that is deleted or re-created after the time of the backup, Data Protection for Exchange Server requires a temporary mailbox to store the mailbox messages. Create a temporary mailbox by setting the `Alias of temporary mailbox` option on the Properties page, under the **General** tab.

Attention: Ensure that the temporary mailbox that you create is on a database with enough disk storage capacity to accommodate all of the mailbox items that you are restoring.

About this task

When you restore the backups, and complete a full database restore operation from the backup, Data Protection for VMware restores the files to their original location.

If database or log files are relocated during the backup cycle, Data Protection for Microsoft Exchange Server restores the files in their original locations.

If any databases or mailboxes were created during the backup cycle, Data Protection for Microsoft Exchange Server re-creates the new files. If database or log files were deleted during the backup cycle, those files are not restored.

Procedure

Complete one of the following actions:

- Restore the deleted mailbox data to the original location. Before you run the mailbox restore operation, re-create the mailbox that is using Exchange.

  If the backup that contains the deleted mailbox was created with a version of FlashCopy Manager for Microsoft Exchange Server earlier than version 6.1, or if the mailbox history is disabled, and the mailbox was relocated after the time it was backed up, you must specify the Exchange Server and the database where the mailbox was at the time of backup. Use the **Mailbox Original Location** option in the GUI to specify this information. Alternatively, issue the **`restoremailbox`** command parameter, **`/MAILBOXORIGLOCATION`**.
- Restore the deleted mailbox data into an active alternative mailbox in an online Exchange Server.
- Restore the deleted mailbox data into an Exchange Server personal folders (`.pst`) file.

Restoring mailbox messages interactively with the Mailbox Restore Browser

You can use the Mailbox Restore Browser to interactively restore a mailbox or items from a mailbox on Exchange Server.

Before you begin

You must have role-based access control (RBAC) permissions to complete individual mailbox restore operations.

If you plan to restore mail or folders by using a Simple Mail Transfer Protocol (SMTP) Server, ensure that you configure the SMTP Server before you attempt a restore operation. Set the configuration in Microsoft Management Console (MMC) by right-clicking **Dashboard** in the tree view and selecting **Properties**. Then, in the E-mail property page, enter the SMTP server and port.

About this task

- In Exchange Server 2013, you can restore a public folder mailbox database, a public folder mailbox, or only a part of the mailbox, for example, a specific public folder. However, you cannot restore individual messages in a public folder by using the Mailbox Restore Browser interface.
  - To restore an Exchange 2013 public folder mailbox, the Exchange user must have the `Public Folders` management role.
  - You can restore a public folder mailbox only to an existing public folder mailbox that is on the Exchange Server.
  - You can restore a public folder only to an existing public folder. The public folder on the Exchange Server must have the same folder path as the public folder to be restored. If the public folder is deleted from the public folder mailbox on the Exchange Server, you must re-create the public folder with the same folder path as the public folder to be restored, before you start the restore operation.
  - As a best practice, restore public folder mailboxes separately from user mailboxes. Select only one public folder mailbox to restore at a time if you want to restore a specific public folder in the mailbox, or if you want to restore to a different public folder mailbox than the original mailbox.

If you restore multiple mailboxes in a single restore operation, and at least one of the mailboxes is a public folder mailbox, the mailboxes are restored only to their original mailbox locations. You cannot specify a filter or an alternate mailbox destination.

– You might restore to a different public folder mailbox than the original mailbox if, for example, the public folder is relocated after the time of the backup. Before you complete the public folder restore operation, ensure that the public folder exists with the same folder path in the alternate mailbox location.

- If you restore multiple mailboxes, and you want to retain the recovery database after the restore operation is complete, ensure that all the mailboxes are in the same recovery database.
- By default, IBM Spectrum Protect Snapshot restores the latest backup that is available for the specified mailbox.

Restriction: Only mailboxes within the same database can be restored in a single mailbox restore action.

Procedure

1. Start MMC.
2. Under the **Protect and Recover Data** node in the navigation tree, select **Exchange Server**.
3. On the Recover panel, click **View** > **Mailbox Restore Browser**.
4. In the Select Source window, specify the mailbox that you want to restore. Choose from the actions in the following table:

Table 8. Selecting mailboxes to restore

Task	Action
Browse mailboxes and select one to restore	1. From the drop-down list, select **Browse Mailboxes**. 2. Select a mailbox. 3. Click **OK**. **Tip:** Use the **Search** field to filter the mailboxes. You can also sort the mailboxes by columns.
Specify a mailbox to restore by name	1. In the **Mailbox Name** field, enter the name of the mailbox to restore. 2. Click **OK**.
Restore a mailbox backup that was created at a specific time	1. In the **Backup Date/Time** field, click the default date and time to edit the details. 2. To change the date, click the calendar icon, select a date, and press **Enter**. 3. To change the time of day, use the 12-hour system convention such as 2 p.m. 4. Click **OK**.

Table 8. Selecting mailboxes to restore (continued)

Task	Action
Review the mailbox backups that are available to restore before you complete the restore operation	1. From the drop-down list, select **Browse Mailboxes**. 2. Select a mailbox for which backups exist. 3. From the **Available Database Backups** list, review the backups that are available for the mailbox and select a backup version to restore. 4. Ensure that the **Backup Date/Time** field reflects the time stamp for the selected mailbox backup. 5. Click **OK**.
Restore a mailbox that was deleted or re-created after the time of the backup	In the Actions pane, click **Properties**, and on the General page, enter the temporary mailbox alias. **Tip:** If you do not enter the alias, the mailbox restore operation uses the administrator mailbox as a temporary storage location.
Browse all databases in a backup	1. From the drop-down list, select **Browse Databases**. 2. Select a database. 3. Click **OK**. **Tip:** Use the **Search** field to filter the databases. You can also sort the mailboxes by columns.

After the selected mailbox is restored to the recovery database, the restored mailbox and folders are displayed in the results pane.

5. In the results pane, browse the folders and messages that are contained within the selected mailbox. Choose from the following actions to select the mailbox, folder, or message to restore:

Table 9. Previewing and filtering mailbox items

Task	Action
Preview mailbox items	1. Select a mailbox item to display its contents in the preview pane. 2. When an item contains an attachment, click the attachment icon to preview its contents. Click **Open** or save the item by clicking **Save**.

Table 9. Previewing and filtering mailbox items (continued)

Task	Action
Filter mailbox items	Use the filter options to narrow the list of folders and messages in the result pane. 1. Click **Show Filter Options** and **Add Row**. 2. Click the down arrow in the **Column Name** field and select an item to filter. You can filter by folder name, subject text, and so on. You can filter public mailbox folders only by the **Folder Name** column. When you select **All Content**, the mailbox items are filtered by attachment name, sender, subject, and message body. 3. In the **Operator** field, select an operator. 4. In the **Value** field, specify a filter value. 5. If you want to filter on more items, click **Add Row**. 6. Click **Apply Filter** to filter the messages and folders.

6. In the Actions pane, click the folder or messages restore task that you want to run. If you click **Save Mail Message Content**, which becomes available only when a message is selected in the preview pane, a Windows Save File window is displayed. Specify the location and message name and click **Save**. The Restore Progress window opens and shows the progress of the restore operation. IBM Spectrum Protect Snapshot restores the mailbox backup to its original mailbox location.
7. To restore a mailbox or mailbox item to either of the following locations, complete the following steps. Choose from the actions in the following table:

Table 10. Restoring a mailbox to another mailbox or `.pst` file

Task	Action
Restore a mailbox or mailbox item to a different mailbox	1. On the Actions pane, click **Open Exchange Mailbox**. 2. Enter the alias of the mailbox to identify it as the restore destination. 3. Drag the source mailbox to the destination mailbox on the results pane.

Table 10. Restoring a mailbox to another mailbox or `.pst` file (continued)

Task	Action
Restore a mailbox to an Outlook personal folders (`.pst`) file	1. On the Actions pane, click **Open PST File**. 2. When the Windows File window opens, select an existing `.pst` file or create a `.pst` file. 3. Drag the source mailbox to the destination `.pst` file on the results pane. **Restriction:** You can use the Mailbox Restore Browser only with non-Unicode `.pst` files.
Restore Public Folder Mailbox	Select this action to restore a public folder mailbox to an existing online public folder mailbox. You can filter the mailbox and restore a specific public folder to an existing online public folder. In the **Folder to be restored** field, enter the name of the public folder that you want to restore. If you are restoring a subfolder in a parent folder, specify the full folder path in this format: *`parent_folder_name/sub_folder_name`*. To restore all subfolders in a parent folder, use *`parent_folder_name/*`*. If the full folder path includes spaces, enclose the folder path in double quotation marks, and do not append a backslash character (\) at the end of the folder path. You can also restore all or part of a public folder mailbox to a different public folder mailbox than the original mailbox. In the **Target public folder mailbox** field, specify the destination public folder mailbox that you want to restore to.

In the Actions pane, the **Close Exchange Mailbox** and **Close PST File** tasks are displayed only when a destination mailbox or `.pst` file is opened.

8. Optional: Remove the recovery database by clicking **Close Mailbox to Restore**. This option is displayed only after a recovery database is created. IBM Spectrum Protect Snapshot removes the recovery database and cleans up the restored files. If you do not select **Close Mailbox to Restore**, the recovery database is not removed even if you exit MMC.

   If MMC also detects a recovery database that is created outside of IBM Spectrum Protect Snapshot, it automatically connects to it. When you complete your mailbox restore tasks, you must manually remove the recovery database. You cannot use the **Close Mailbox to Restore** option.

Restoring data by using the command-line interface

If you prefer, you can use the command-line interface to start a full Microsoft Exchange Server database recovery from a virtual machine.

Procedure

1. Issue the **query** command to find the database full backups. The following example finds all backups for the Microsoft Exchange Server database called exc_db10.

   ```
   tdpexcc q tsm exc_db10  IBM Tivoli Storage Manager for Mail:
   Data Protection for Microsoft Exchange Server Version 7, Release 1, Level 3.0
   ...
   Querying Tivoli Storage Manager server for a list of
   data backups, please wait....

   Connecting to TSM Server as node "exc_db10"...
   Connecting to Local DSM Agent "exc"...
   Using backup node "exc_db10"...

    Exchange Server : exc

    Database    : exc_db10

    Backup Date     Size  S Type  Loc  Object Name
   ------------------- ----  - ----  --- ----------------------
   10/15/2014 19:17:26 5.40 B A full  Srv 20141015191726 (VMVSS)

   The operation completed successfully. (rc = 0)
   ```

2. To restore the database without applying transaction logs, issue the database **restore** command as shown in the following example:

   ```
    TDPEXCC RESTore databaseName FULL /BACKUPDEstination=TSM
    /BACKUPMethod=VMVSS
   ```

   The following sample output results when you issue the command with the Microsoft Exchange Server database called exc_db10.

   ```
   TDPEXCC RESTore exc_db10 FULL /BACKUPDEstination=TSM /BACKUPMethod=VMVSS
   IBM Tivoli Storage Manager for Mail:
   Data Protection for Microsoft Exchange Server
   Version 7, Release 1, Level 3.0 (C) Copyright
   IBM Corporation 1997, 2015. All rights reserved.

   Connecting to TSM Server as node "exc_db10"...

   Connecting to Local DSM Agent "exc"...
   Using backup node "exc_db10"...

   Starting Microsoft Exchange restore...
   Beginning VSS restore of "exc_db10"'...

   Restoring "exc_db10" via file-level copy from snapshot(s).
   This operation could take a while, please wait

   ...

   The operation completed successfully. (rc = 0)
   ```

   You can restore the database to a different location by adding the **/INTODB** parameter. For example:

   ```
   TDPEXCC RESTore TestDB1 FULL /INTODB=Test2
    /BACKUPDEstination=TSM /BACKUPMethod=VMVSS
   ```

What to do next

You can restore inactive backups by using the Data Protection for Microsoft Exchange Server command-line interface, **TDPEXCC**. When you issue the **restore** command, specify the database object name for the specific backup.

To obtain the database object name, issue the following command:

```
tdpexcc q tsm dbname full /all
```

After you have the database object name value, specify the database object name on the */OBJect=objectname* parameter of the **TDPEXCC restore** command, where *objectname* is the database object name. For example:

```
TDPEXCC RESTore db44 FULL /OBJect=20140311131051 /BACKUPDEstination=TSM
 /BACKUPMethod=VMVSS
```

Restoring data by using Windows PowerShell cmdlets

If you prefer, you can use Windows PowerShell cmdlets with Tivoli Storage FlashCopy Manager to start a full Microsoft Exchange Server database recovery from a virtual machine.

Procedure

1. Issue the query cmdlet to find the database full backups. For example, to find all of the database full backups, enter the following command:

   ```
   Get-DpExcBackup -Name * -FromExcServer *
   ```

2. Issue the database restore cmdlet. For example:

   ```
   Restore-DpExcBackup -Name ExchDb01 -Full
    -BACKUPDESTINATION TSM -FROMEXCSERVer PALADIN20
    -INTODB Zwen
   ```

3. Issue the restore cmdlets with parameter **intodb** to restore to an alternative location. For example:

   ```
   Restore-DpExcBackup -Name ExchDb01 -Full
    -BACKUPDESTINATION TSM -FROMEXCSERVer PALADIN20
    -OBJect 20140923100738 -INTODB ExchDb01_altRdb
   ```

Tivoli Storage Manager file space information

You might never need to know the file names or locations for your virtual machine files. However, if the underlying file structure interests you, Data Protection for VMware backups are stored under the node name of the vSphere datacenter (for example, *datacenter10*).

The following example shows the file space information for the virtual machine that is called `vm_exc10`.

```
tsm: ORION>q file datacenter10 f=d

Node Name:  DATACENTER10
Filespace Name: \VMFULL-vm_exc10
Hexadecimal Filespace Name:
FSID: 61
Collocation Group Name:
Platform: TDP VMware
Filespace Type: API:TSMVM
Is Filespace Unicode?: No
Capacity: 0 KB
Pct Util: 0.0
Last Backup Start Date/Time: 03/13/2014 21:29:17
Days Since Last Backup Started: 31
Last Full NAS Image Backup Completion Date/Time:
Days Since Last Full NAS Image Backup Completed:
Last Backup Date/Time From Client (UTC):
Last Archive Date/Time From Client (UTC):
Last Replication Start Date/Time:
Days Since Last Replication  Started:
Last Replication Completion Date/Time:
Days Since Last Replication Completed:
Backup Replication Rule Name: DEFAULT
Backup Replication Rule State: Enabled
Archive Replication Rule Name: DEFAULT
Archive Replication Rule State: Enabled
Space Management Replication Rule Name: DEFAULT
Space Management Replication Rule State: Enabled
At-risk type: Default interval
At-risk interval:
```

Microsoft SQL Server data protection in VMware environments

For Microsoft SQL Server workloads that are running in a VMware ESXi virtual guest machine, you can take application-consistent backups of virtual machines that are hosting Microsoft SQL Server data. By using Tivoli Storage Manager software, you can also recover backups from the virtual machine.

Before you back up data, identify your recovery point objective (RPO). The *RPO* helps you decide how often to back up data and affects the cost that is associated with data backups.

For example, you can schedule frequent virtual machine backups for necessary recovery points. The recovery point of a virtual machine backup is the time of the backup. While change-block tracking and data deduplication offer savings, virtual machine backups can be expensive if you create and delete many virtual machine snapshots.

Most traditional in-guest data protection methods provide appropriate RPOs, but these in-guest methods lose the efficiencies that are introduced by backing up data at the virtual machine level.

You can use IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware and Tivoli Storage FlashCopy Manager with Data Protection for Microsoft SQL Server to back up data at a virtual machine level in a way that preserves backup efficiencies.

To protect Microsoft SQL Server data in a VMware environment, ensure that the following products are installed and configured on your system:

- Tivoli Storage Manager for Virtual Environments: Data Protection for VMware V7.1.8 (which includes the Tivoli Storage Manager client)

- Tivoli Storage FlashCopy Manager with Data Protection for Microsoft SQL Server V4.1.6

For permission required to back up and restore application data for Microsoft SQL Server, see technote 1647995.

Application protection is supported for VMware VMs in a VMware vSphere environment only. In-guest application protection is not supported for VMware vApps in a vCloud environment.

Configuring the software for SQL Server data protection in a VMware environment

To protect Microsoft Exchange Server workloads that are running in a VMware ESXi virtual guest machine, install and configure Data Protection for VMware. Then, install and configure Data Protection for Microsoft SQL Server.

Before you begin

The following instructions are based on a configuration scenario that might not match your environment. Adjust the configuration for your environment.

The following list summarizes the scenario for quick reference:

Windows host name
`SQL10`

VSS requestor node name
`SQL10_VSS`

Data Protection for Microsoft SQL Server node name
`sql10_SQL`

Virtual machine name
`vm_sql10`

Data mover node names
`datamover10` and `datamover20`

Datacenter node name
`datacenter10`

VM file space
`\VMFULL-vm_sql10`

About this task

The following details describe the scenario that is used.

- A single Microsoft SQL Server database on a virtual machine that is named `vm_sql10` must be recovered.
- Virtual machine `vm_sql10` is protected by Data Protection for VMware by using the node name `datacenter10`. This node name in the Tivoli Storage Manager server represents the vSphere datacenter). The data mover nodes are called `datamover10` and `datamover20`.
- The virtual machine guest is configured with the virtual machine name of `vm_sql10` and the Microsoft Windows host name is `SQL10`.
- Data Protection for Microsoft SQL Server is installed in the guest and is configured to the Tivoli Storage Manager server to use node name `sql10_SQL`.

- The Tivoli Storage Manager client in the virtual guest machine is configured as the VSS requestor node and is using the node name `SQL10_VSS`.

Procedure

1. Follow the installation and configuration instructions that are provided with each software package.

   If you install Data Protection for Microsoft SQL Server before Data Protection for VMware, you cannot specify the VMware datacenter node in the Data Protection for Microsoft SQL Server configuration wizard because the field is disabled.
2. Complete the tasks in this checklist:
   - Verify that Microsoft SQL Server databases and mailboxes are hosted on VMware virtual disks.
   - Verify that no Microsoft SQL Server database is hosted on raw device mapped (RDM) disks in physical compatibility mode, independent disks, or on disks that are attached directly to the guest through in-guest iSCSI.
   - Verify that policies are set to keep sufficient versions of Microsoft SQL Server logs and virtual machine backups.
   - Verify that SQL Server databases are on a single server and are not participating in any type of clustering, for example, failover clusters, AlwaysOn Availability Groups or AlwaysOn Failover Cluster instances.
3. Outside of the virtual guest machine, in the datamover, configure Data Protection for VMware to protect Microsoft SQL Server databases
4. Within the virtual guest machine, take the following actions:
   - Verify that the Data Protection for VMware recovery agent command-line interface is configured to work with the recovery agent on the guest virtual machine.
   - Configure Data Protection for Microsoft SQL Server to complete SQL Server log backups and restore SQL Server databases from a virtual machine backup.

Related tasks:

"Configuring Data Protection for VMware" on page 43

"Configuring Data Protection for Microsoft SQL Server" on page 71

Configuring Data Protection for VMware

You must configure Data Protection for VMware to preserve Microsoft VSS metadata information during a virtual machine backup for systems that are hosting Microsoft SQL Server data.

About this task

Data Protection for VMware provides application consistency when you back up virtual machines that are hosting Microsoft SQL Servers. With these backups, you can recover the virtual machine with Microsoft SQL Server in a consistent state.

To recover only selected databases from this type of backup with Tivoli Storage Manager, without having to recover the entire virtual machine, preserve information about the state of the Microsoft SQL Server at the time of the virtual machine snapshot and backup. This information is collected as part of the Microsoft Volume Shadow Copy Services (VSS) interaction that occurs during a virtual machine snapshot.

For Data Protection for VMware to collect the Microsoft VSS metadata for Microsoft SQL Server, you must configure Data Protection for VMware to obtain this information from the virtual machine during the backup operation.

Procedure

1. Configure Data Protection for VMware to preserve the Microsoft VSS metadata information during a virtual machine backup for systems that are hosting Microsoft SQL Server data.
   a. Locate the options file for the Data Protection for VMware data mover. On Windows systems, the options file is `dsm.opt`. On Linux systems, the options file is `dsm.sys`.
   b. Specify the `INCLUDE.VMTSMVSS` option for the virtual machine. You must set this option for virtual machine backups to preserve the Microsoft VSS metadata information. Choose from the options in the following table:

   Table 11. `INCLUDE.VMTSMVSS` options

Option	Result
`INCLUDE.VMTSMVSS vm_display_name`	When you set this option, virtual machine applications receive a notification when a backup is going to occur. This notification allows the application to commit transactions and truncate transaction logs so that the application can resume from a consistent state when the backup completes. `vm_display_name` refers to the name of the virtual machine as shown in the VMware vSphere Client and vSphere Web Client.
`INCLUDE.VMTSMVSS vm_display_name OPTions=KEEPSqllog`	When you set this option, SQL server logs are not truncated when a data mover node backs up a virtual machine that runs a SQL server. By specifying this parameter, you can manually preserve the SQL Server logs and restore SQL transactions to a specific checkpoint after the virtual machine is restored. When you specify this option, the SQL log is not truncated.

   c. Verify that the Virtual Machine Disks (VMDK) that host the Microsoft SQL Server database are not being excluded from the virtual machine backup operation. Repeat the preceding steps for all data movers that protect virtual machines that are hosting Microsoft SQL Server.
2. On each data mover, for example, *datamover10*, store the guest virtual machine credentials to Data Protection for VMware by running the following command from the Tivoli Storage Manager backup-archive client command line:

   ```
   dsmc set password –type=vmguest vm_guest_display_name
   guest_admin_ID guest_admin_pw
   ```

   This command stores the guest virtual machine credentials, which are encrypted on the system that hosts the data mover. The following minimum permissions are required for *guest_admin_ID guest_admin_pw*:

   - Backup rights: Users with the db_backupoperator database role are granted to run the self-contained application data backup. If the user is a member of the SQL Server sysadmin fixed server role, the user can back up any databases of Microsoft SQL Server instance. The user can also back up the databases for which the user is the owner and does not have backup rights to a specific database. The guest VM user must have permission to create Volume Shadow Copies and to truncate SQL Server logs.

- Restore rights: If the database exists, you can complete the restoreoperation if you are a member of the dbcreator fixed server role, or if you are the database owner. Users with a Microsoft SQL Server sysadmin fixed server role have permission to restore a database from any backup sets. For other users, the situation depends on whether the database exists.

What to do next

You can verify the virtual machine backup configuration and ensure that the VMDKs are included. In addition, you can view other parameters by issuing the **backup** command with the preview option from the backup-archive client, for example:

```
dsmc backup vm vm_display_name -preview -asnode=datacenter_node
```

You can also use the Tivoli Storage Manager scheduler to schedule periodic backups of your virtual machines. You can also back up the virtual machine that is hosting the Microsoft SQL Server by using the backup-archive client command line:

```
dsmc backup vm vm_display_name -asnode=datacenter_node
```

Verifying that the configuration backs up data that can be restored

Before you can restore individual Microsoft SQL Server databases from a Data Protection for VMware virtual machine backup, you must complete at least one successful virtual machine backup. For the restore operation to work, the backup must contain Microsoft SQL Server database metadata.

Procedure

1. Issue the following backup-archive client **query** command on one of the data mover nodes:

   ```
   dsmc query vm vmname -detail -asnode=datacenter_node
   ```

   where:

   - *vmname* specifies the name of the virtual machine
   - *datacenter_node* specifies the name of the datacenter node

   .

2. In the command output, look for the following details:

   ```
   Application(s) protected: MS SQL 2008 (database-level recovery)
   ```

   Ensure that `Excluded` is not indicated in any Virtual Machine Disk (VMDK) status fields for virtual disks that host Microsoft SQL Server database files. The `Excluded` status indicates that one or more of the VMDKs that are required to recover a Microsoft SQL Server database are not being protected. For example:

```
Query Virtual Machine for Full VM backup
# Backup Date  Mgmt Class  Size    Type    A/I   Virtual Machine
- -----------  ----------  -----  ----    ---   ----------------
1 02/20/2014   STANDARD   43.94GB IFFULL  A     vm_sql10
  12:43:59

 Size of this incremental backup: n/a
 Number of incremental backups since last full: 0
Amount of extra data: 0
TSM object fragmentation: 0
Backup is represented by: 328 TSM objects
Application protection type: TSM VSS
Application(s) protected: MS SQL 2008 (database-level recovery)
VMDK[1]Label: Hard Disk 1
VMDK[1]Name: [ess800_dev2] vm_sql10/vm_sql10 .vmdk
VMDK[1]Status: Protected
...
VMDK[6]Label: Hard Disk 6
VMDK[6]Name: [ess800_dev2] vm_sql10/vm_sql10_5.vmdk
VMDK[6]Status: Protected
```

Configuring Data Protection for Microsoft SQL Server

After you configure Data Protection for VMware and verify that you created a virtual machine backup that is suitable for recovery of a single Microsoft SQL Server database, configure Data Protection for Microsoft SQL Server in the guest virtual machine.

Procedure

1. Log on to the virtual machine that hosts the Microsoft SQL Server database.
2. Verify that the following packages are installed:
   - Tivoli Storage Manager recovery agent, recovery agent command-line interface (CLI), and license (from the Data Protection for VMware product package)
   - Tivoli Storage Manager backup-archive client
   - Data Protection for Microsoft SQL Server

   You can install the recovery agent, CLI, license, and backup-archive client together by using the Data Protection for VMware installation program. To install the packages together, select the following advanced installation option: **Install a complete data mover for in-guest application protection**. Data Protection for Microsoft SQL Server is installed separately.
3. Configure Data Protection for Microsoft SQL Server by using the Tivoli Storage Manager configuration wizard. When you open the Tivoli Storage Manager Node Names page of the wizard, enter the VMware datacenter node name, Microsoft SQL Server node name, and VSS requestor node name. If the datacenter node name field is disabled, the Tivoli Storage Manager recovery agent is not installed correctly.
4. After Data Protection for Microsoft SQL Server is configured, verify that the **`Configuring Recovery Agent`** rule status indicates `Passed`.
5. Log on to a data mover instance and complete the following steps. Do not repeat these steps for all data mover instances.
   a. Copy the contents of the data mover options file `dsm.opt` to a temporary file named `dsm.setaccess.opt` and make the following changes to the file. Do not make these changes in the `dsm.opt` file.
      1) Delete any line that contains an **`ASNODE`** entry.
      2) Set the **`NODENAME`** option to the VMware datacenter node name. For example:

```
NODENAME datacenter10
```

Tip: If the `dsm.opt` file does not contain **`ASNODE`** entries and the **`NODENAME`** option is set to the correct datacenter node, you can use this file rather than creating the `dsm.setaccess.opt` file.

b. From the datacenter node that was defined in the **`NODENAME`** option, issue the **`set access`** command to grant the VSS requestor node access to the virtual machine backups as shown in the following example.

   You must complete this step because the VSS requestor node accesses the virtual machine backups on behalf of Data Protection for Microsoft SQL Server.

   If the password for the datacenter node is unknown when you run the **`set access`** command, you will receive an error message and the Tivoli Storage Manager server administrator must reset the password to issue the command.

Example

The following example shows the required parameters for the **`set access`** command. The parameters specify the virtual machine name (`vm_sql10`), the VSS requestor node name (`SQL10_VSS`), and the name of the options file that defines the datacenter node name (`dsm.setaccess.opt`).

The example also shows the results of the **`query access`** command, which shows the backup access authorization for the VSS requestor node.

```
dsmc set access backup –type=VM vm_sql10 SQL10_VSS –optfile=dsm.setaccess.opt

ANS1148I "Set Access" command successfully completed.

dsmc query access
Node name: datacenter10
Type   Node   User   Path
------ ------ ------ ------
Backup       SQL10_VSS    *       \VMFULL-vm_sql10\*\*


ANS1148I "Query Access" command completed successfully
```

Managing backups

After you configure Data Protection for Microsoft SQL Server, you can schedule backups. You must set up a virtual machine backup schedule and a Microsoft SQL Server log backup before you can start a backup.

Scheduling virtual machine backups

To ensure that your data is protected, schedule virtual machine backups.

Before you begin

By default, the maximum size allowed for a VMDK in a backup operation is 2 TB. However, the maximum is 8 TB. To increase the maximum size, use the `vmmaxvirtualdisks` option. For more information, see Vmmaxvirtualdisks.

Procedure

1. Log on to the Data Protection for VMware user interface.
2. Click the **Backup** tab.

3. Click **Create Schedule** to specify a backup schedule name, source (the virtual machines to include in the backup schedule), and other scheduling options.
4. Verify that the source of the schedule includes the virtual machines that are hosting Microsoft SQL Server.
5. Verify that one of the following services is running:
   - If you are using a scheduler that is managed by a Client Acceptor Daemon (CAD), ensure that the CAD service is running on the data mover.
   - If you are using the stand-alone scheduler, ensure that the scheduler service is running.

Scheduling Microsoft SQL Server log backups

After the virtual machine backup schedule is created, you can create the Microsoft SQL Server log backup schedule.

About this task

Backing up SQL server logs provides a more granular level of recovery points. You might find it unnecessary to back up SQL server logs if the frequency of your backups provides you with enough recovery points, and assuming that you did not specify the `INCLUDE.VMTSMVSS vm_display_name OPTions=KEEPSqllog` option for the backup.

Procedure

1. Start the Data Protection for Microsoft SQL Server user interface from the virtual machine that is hosting Microsoft SQL Server.
2. In the navigation pane, expand the Manage node.
3. Under the Manage node, right-click **Scheduling** > **Scheduling Wizard**.
4. Open the **Scheduling Wizard** to identify the schedule name and time.
5. For the Define the Scheduled Task page, select **Command Line**.
6. Click the icon to select the SQL Server template. Click **Next**.
7. Use the command-line interface and SQL Server template to specify the database log backup, for example:

   ```
   tdpsqlc backup * log /truncate=yes 2>&1
   ```

   Tip: Alternatively, you can schedule Microsoft SQL Server backups by using the Tivoli Storage Manager centralized scheduling service. This service helps you to create a backup schedule for all Microsoft SQL Server instances on a virtual machine.

Verifying backups

After you create a backup, verify that you can query the virtual machine backups and the database backups from the Data Protection for Microsoft SQL Server interface.

About this task

You can recover one or more Microsoft SQL databases based on your recovery point objectives.

Procedure

1. From Microsoft Management (MMC), select a Microsoft SQL Server.
2. Click the **Recover** tab.

3. Select **View** > **Databases**. A list of Microsoft SQL Server database backups that can be restored is displayed.

   Microsoft SQL Server databases that are backed up with Data Protection for VMware are identified with the backup method *vmvss*. Microsoft SQL Server logs that are backed withData Protection for Microsoft SQL Server are identified with the backup method *Legacy*.

Managing versions of backups

By using Data Protection for Microsoft SQL Server, you can manage expiration of backups. You can specify the number of snapshot backups to retain and the length of time to retain snapshots.

About this task

To set the retention for Microsoft SQL Server backups, complete the following steps. This procedure assumes that you want to retain backups for 30 days.

Procedure

1. Define the retention parameters in the management class that is used for virtual machine backups. For example:

   ```
   Retain extra versions = 30
   Retain only versions = 30
   Versions data exists = nolimit
   Versions data deleted = nolimit
   ```

   Use the `vmmc` option in the data mover option file to specify the management class that is used for the virtual machine backups.

   Scheduled virtual machine backups are associated with the Data Protection for VMware client.
2. Define the retention parameters in the management class that is used for Microsoft SQL Server backups. For example:

   ```
   Retain extra versions = 0
   Retain only versions = 1
   Versions data exists = nolimit
   Versions data deleted = nolimit
   ```

   Specify the management class for the Microsoft SQL Server backups in the `dsm.opt` file that is used by the Data Protection for Microsoft SQL Server agent. See the following `INCLUDE` options:

   ```
   INCLUDE *:\...\*log management_class_name
   INCLUDE *:\...\log\..\* management_class_name
   ```
3. With Data Protection for Microsoft SQL Server running on the virtual machine, issue the **`inactivate`** command to explicitly deactivate all active log backups for all databases on the Microsoft SQL Server. For example:

   ```
   tdpsqlc inactivate * log=* /OLDERTHAN=30
   ```

   Log backups that are created by Data Protection for Microsoft SQL Server must be explicitly deactivated because the full database backups are being completed by Data Protection for VMware. This configuration allows for a one-day grace period after the Microsoft SQL Server log backups are deactivated before the Tivoli Storage Manager server deletes them.

Tip: You can retain log backups on the Tivoli Storage Manager server only if the full database backup with which they are associated are retained. In the management class, set the **RETONLY** value for log backups to match the **RETEXTRA** parameter for full database backups.

Verifying that virtual machine backups do not exclude Microsoft SQL Server volumes

The volumes in Virtual machine disks (VMDKs) must contain the Microsoft SQL Server databases that are not excluded from the Data Protection for VMware backup processing.

About this task

The databases cannot be on physical compatibility mode raw device mapping (RDM) disks, independent disks, or on disks that are attached directly to the guest operating system through iSCSI.

Procedure

1. Ensure that any EXCLUDE.VMDISK statements in the Data Protection for VMware data mover that is used to back up the virtual machine do not inadvertently exclude VMDKs that are hosting volumes that contain Microsoft Exchange Server files, file space, database, and mailboxes.

   For example:

   - vm_sql10.vmdk contains logical volume C:
   - vm_sql10.vmdk contains logical volumes E: and F:
   - The label for vm_sql10_1.vmdk is *Hard Disk 1*.
   - The label for vm_sql10_2.vmdk is *Hard Disk 2*.
   - The Microsoft SQL Server database files to be backed up are on the E: and F: drive.

2. Verify that no statements exclude vm_exc10_2.vmdk from the virtual machine backup by ensuring that the data mover does not contain the following or similar statements:

   ```
   EXCLUDE.VMDISK VM_SQL10 "Hard Disk 2"
   EXCLUDE.VMDISK * "Hard Disk 2"
   ```

   Alternatively, if you exclude most hard disks, you must explicitly include the virtual machine disks by using one of the following statements:

   ```
   INCLUDE.VMDISK VM_SQL10 "Hard Disk 2"
   INCLUDE.VMDISK * "Hard Disk 2"
   ```

   Include and exclude statements are processed from bottom to top as they are displayed in the dsm.opt file. To achieve the goal, enter the statements in the correct order.

   You can specify the exclusion and inclusion of a virtual machine disk from the command-line interface:

   ```
   dsmc backup vm "VM_SQL10:-vmdisk=Hard Disk 2" -asnode=datacenter10
   ```

Restoring data

After you back up data, you can recover the data based on a recovery point objective (RPO).

A recovery operation restores a full backup of the Microsoft SQL Server database from the Data Protection for VMware backup.

If you restore the entire virtual machine, all Microsoft SQL Server databases on the virtual machine are restored and recovered to the point of the virtual machine backup. In this scenario, you cannot restore and recover any backups that were created after that point.

Starting the Microsoft iSCSI Initiator Service

The iSCSI protocol is used to mount the disks that are used for a recovery operation. Ensure that the Microsoft iSCSI Initiator Service is started and is set to the automatic startup type on the system where the data is to be restored.

Procedure

1. In the Windows **Services** list, right-click **Microsoft iSCSI Initiator Service**.
2. Click **Properties**.
3. On the **General** tab, set the following options:
   a. In the **Startup type** list, select **Automatic**.
   b. Click **Start**, and then click **OK**.

Results

In the **Services** list, **Microsoft iSCSI Initiator Service** shows a status of **Started** and the startup type is **Automatic**.

Restoring database backups by using the graphical user interface

You can recover a full Microsoft SQL Server database backup from a virtual machine backup by using the Data Protection for Microsoft SQL Server graphical user interface.

Procedure

1. To start a full database recovery from a virtual machine, start Microsoft Management (MMC). In the navigation pane, expand the Protect and Recover node and select a Microsoft SQL Server server.
2. On the **Recover** tab, select **Database Restore**. All backups, including all database backups from a virtual machine backup, are listed.
3. Select a full database backup to restore.
4. In the Actions pane, click **Restore**.

Restoring data by using the command-line interface

If you prefer, you can use the command-line interface to start a full Microsoft SQL Server database recovery from a virtual machine.

Procedure

1. Issue the **query** command to find the full and log database backups. The following example finds all backups for the Microsoft SQL Server database called sql_db10.

   ```
   tdpsqlc q tsm sql_db10
   IBM Tivoli Storage Manager for Databases:
   Data Protection for Microsoft SQL Server
   Version 7, Release 1, Level 3.0
   ...
   Querying TSM Server for Backups ....
   Backup Object Information ------------------------
   SQL Server Name ........................ SQL10
   SQL Database Name ........................ sql_db10
   Backup Method ........................ VMVSS
   ...
   Backup Creation Date / Time ............. 11/14/2014 13:41:18
   ...
   Backup Object Information
   ------------------------
   SQL Server Name ........................
   SQL10 SQL Database Name ........................sql_db10
   Backup Method ........................ Lgcy
   ...
   Backup on Secondary Replica .............
   No Backup Object State ......................
   Active Backup Creation Date / Time ............. 11/14/2014 15:46:07
   ...
   The operation completed successfully. (rc = 0)
   ```

2. To restore the database without applying transaction logs, issue the database **restore** command as shown in the following example:

   ```
    tdpsqlc restore databaseName /backupMethod=vmvss
   ```

   The following examples show the output of the command when you specify the Microsoft SQL Server database called sql_db10.

   ```
   tdpsqlc restore sql_db10 /backupmethod=vmvss /sqlserver=sql10
   /fromsqlserver=sql10 /recovery=no
   IBM Tivoli Storage Manager for Databases:
   Data Protection for Microsoft SQL Server
   Version 7, Release 1, Level 3.0
   (C) Copyright IBM Corporation 1997, 2015. All rights reserved.

   Connecting to SQL Server, please wait...
   Querying TSM Server for Backups ....
   Connecting to TSM Server as node "SQL10_SQL"...
   Connecting to Local DSM Agent "SQL10"...
   Using backup node "SQL10_SQL"...
   Starting Sql database restore...

   Beginning VSS restore of "sql_db10"...

   Restoring "sql_db10" via file-level copy from snapshot(s). This
    process may take some time. Please wait

   Files Examined/Completed/Failed: [ 2 / 2 / 0 ] Total Bytes: 3146070

   VSS Restore operation completed with rc = 0
    Files Examined : 2
    Files Completed : 2
    Files Failed : 0
    Total Bytes : 3146070
   ```

```
 Total LanFree Bytes : 0

The operation completed successfully. (rc = 0)
```

3. After the full database restore operation is completed successfully, issue the command to restore the logs. For example, to restore all logs based on the restored Microsoft SQL database `sql_db10`, issue the following command.

   ```
    tdpsqlc restore databaseName /backupMethod=vmvss
   /recovery=no
   ```

   You can also use the `/stopat` option to specify a more granular point in time.

   ```
   tdpsqlc restore sql_db10 log=* /sqlserver=sql10
   /fromsqlserver=sql10 /recovery=yes
   IBM Tivoli Storage Manager for Databases:
   Data Protection for Microsoft SQL Server
   Version 7, Release 1, Level 3.0
   (C) Copyright IBM Corporation 1997, 2015. All rights reserved.

   Connecting to SQL Server, please wait...
   Starting Sql database restore...
   Connecting to TSM Server as node "SQL10_SQL"...
   Querying Tivoli Storage Manager server for a list
   of database backups, please wait...

   Beginning log restore of backup object sql_db10\20131114154607\00000DB0,
   1 of 3, to database sql_db10 ...

   Beginning log restore of backup object sql_db10\20131114155130\00000DB0,
   2 of 3, to database sql_db10 ....

   Total database backups inspected: 3
   Total database backups requested for restore: 3
   Total database backups restored: 3
   Total database skipped: 0
   Throughput rate: 134.32 Kb/Sec
   Total bytes transferred: 385,536
   Total LanFree bytes transferred: 0
   Elapsed processing time: 2.80 Secs
   The operation completed successfully. (rc = 0)
   ```

What to do next

You can restore inactive backups by using the Data Protection for Microsoft SQL Server command-line interface, **TDPSQLC**. When you issue the **restore** command, specify the database object name for the specific backup.

To obtain the database object name, issue the following command:

```
tdpsqlc q tsm dbname full /all
```

After you have the database object name value, specify the database object name on the */OBJect=objectname* parameter of the **TDPSQLC restore** command, where *objectname* is the database object name. For example:

```
tdpsqlc restore db44 /object=20140311131051 /backupdestination=tsm
 /backupmethod=vmvss
```

Restriction: You cannot recover a Microsoft SQL database to an alternative location on the virtual machine.

Restoring Microsoft SQL Server log backups

After the full database is restored successfully, you can restore transaction logs.

Procedure

1. Select a Microsoft SQL Server, and click the **Recover** tab.
2. Verify that the **`AutoSelect`** option is set to `False`.
3. Change the **`RunRecovery`** option to `True`.
4. Select all the logs that you want to recover.
5. Click **Restore**.

Restoring relocated and deleted mailboxes

The Tivoli Storage Manager backup solution for restoring databases and log files that are relocated and deleted after a virtual machine backup consists of Data Protection for VMware and Data Protection for Microsoft SQL Server.

Before you begin

Decide where the database and log file data is to be restored.

About this task

When you restore the backups, and complete a full database restore operation from the backup, Data Protection for VMware restores the files to their original location.

If database or log files are relocated during the backup cycle, Data Protection for Microsoft SQL Server restores the files in their original locations.

If any databases or log files were created during the backup cycle, Data Protection for Microsoft SQL Server re-creates the new files. If database or log files were deleted during the backup cycle, those files are not restored.

Procedure

1. Use Data Protection for VMware to back up the virtual machine. Consider the following example. You back up virtual machine `vm_sql10` that includes Microsoft SQL Server database `moose` at 2:00 p.m. The Microsoft SQL Server database consists of the following files at 2:00 p.m:
   - `C:\sqldbs\moose\moose.mdf`
   - `C:\sqldbs\moose\moose_log.ldf`
2. Relocate a database backup to an alternate location. Consider the following example. You want to relocate the database `moose` at 6:00 p.m. to the following location:
   - `E:\sqldbs\moose\moose.mdf`
   - `F:\sqldbs\moose\moose_log.ldf`
3. Add files to the database backup. Consider the following example. You want to add two new files to database `moose` at 7:00 p.m. The database now consists of the following files:
   - `E:\sqldbs\moose\moose.mdf`
   - `F:\sqldbs\moose\moose_log.ldf`
   - `E:\sqldbs\moose\moose2.ndf`
   - `F:\sqldbs\moose\moose2_log.ldf`
4. Use Data Protection for Microsoft SQL Server to complete a log backup. Consider the following example. You start a log backup at 9:00 p.m.

5. Restore the database backup. Consider the following example. You want to restore the entire `moose` database.
   - You restore the full database from the Data Protection for VMware backup with **runrecovery**=false.
   - At 9:00 p.m, you restore the log backup and apply it.

   The `moose` database is restored to the following location:
   - `C:\sqldbs\moose\moose.mdf`
   - `C:\sqldbs\moose\moose_log.ldf`
   - `E:\ sqldbs\moose\moose2.ndf`
   - `F:\ sqldbs\moose\moose2_log.ldf`

   The full virtual machine restore restores the files to their original location. When you applied the log backup, the files that were added after the relocation are restored.

Sample script for validating full virtual machine backups

Before you back up Microsoft SQL Server logs, verify that you have a valid full virtual machine backup. One procedure for checking for the existence of a full virtual machine backup is to schedule the usage of a script.

This sample script checks for the instance of a full backup and then runs the Microsoft SQL Server log backups if a full virtual machine backup exists. This script can be used with a scheduler service such as the Tivoli Storage Manager scheduler.

```
@echo off
dsmc q vm sql01_SQL -detail -asnode=datacenter01 | find /c
 "database-level recovery" > c:\temp.txt
SET /p VAR=<c:\temp.txt

if %VAR% == "1" (
tdpsqlc back * log
) ELSE (
echo "There is no full backup"
set ERRORLEVEL=1
)
```

This script produces the following output:

```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 7, Release 1, Level 3.0
(C) Copyright IBM Corporation 1997, 2015. All rights reserved.
Connecting to SQL Server, please wait...
Starting SQL database backup...
Connecting to TSM Server as node 'SQL01_SQL'...
Using backup node 'SQL01_SQL...
ACO5458W The TSM Server 'backup delete' setting for node (SQL01_SQL) is set to
NO. It should be set to YES for proper operation. Processing will continue.
Beginning log backup for database model, 1 of 2.
Full: 0 Read: 87808 Written: 87808 Rate: 32.54 Kb/Sec
Database Object Name: 20140303011509\000007CC
Backup of model completed successfully.
Beginning log backup for database sqldb test2, 2 of 2.
Full: 0 Read: 88832 Written: 88832 Rate: 132.44 Kb/Sec
Database Object Name: 20140303011511\000007CC
Backup of sqldb test2 completed successfully.
Total SQL backups selected: 4
Total SQL backups attempted: 2
Total SQL backups completed: 2
Total SQL backups excluded: 2
Total SQL backups deduplicated: 0
Throughput rate: 51.85 Kb/Sec
Total bytes inspected: 176,640
Total bytes transferred: 176,640
Total LanFree bytes transferred: 0
Total bytes before deduplication: 0
Total bytes after deduplication: 0
Data compressed by: 0%
Deduplication reduction: 0.00%
Total data reduction ratio: 0.00%
Elapsed processing time: 3.33 Secs
The operation completed successfully. (rc = 0)
```

You can also use the Tivoli Storage Manager activity log and extended summary table to determine whether virtual machine backups are successful.

Tivoli Storage Manager file space information

You might never need to know the file names or locations for your virtual machine files. However, if the underlying file structure interests you, Data Protection for VMware backups are stored under the node name of the vSphere datacenter (for example, `datacenter10`).

The following example shows the file space information for the virtual machine that is called `vm_sql10`.

```
tsm: ORION>q file datacenter10 f=d

Node Name:  DATACENTER10
Filespace Name: \VMFULL-vm_sql10
Hexadecimal Filespace Name:
FSID: 61
Collocation Group Name:
Platform: TDP VMware
Filespace Type: API:TSMVM
Is Filespace Unicode?: No
Capacity: 0 KB
Pct Util: 0.0
Last Backup Start Date/Time: 03/13/2014 21:29:17
Days Since Last Backup Started: 31
Last Full NAS Image Backup Completion Date/Time:
Days Since Last Full NAS Image Backup Completed:
Last Backup Date/Time From Client (UTC):
Last Archive Date/Time From Client (UTC):
Last Replication Start Date/Time:
Days Since Last Replication  Started:
Last Replication Completion Date/Time:
Days Since Last Replication Completed:
Backup Replication Rule Name: DEFAULT
Backup Replication Rule State: Enabled
Archive Replication Rule Name: DEFAULT
Archive Replication Rule State: Enabled
Space Management Replication Rule Name: DEFAULT
Space Management Replication Rule State: Enabled
At-risk type: Default interval
At-risk interval:
```

Application protection for Active Directory domain controllers

Data Protection for VMware provides back up and restore protection for VMs that host Microsoft Active Directory Domain Controllers in both stand-alone and clustered environments. A clustered environment contains multiple domain controllers that participate in Active Directory. This protection prevents USN rollback.

USN rollback is a condition that results from restoring the Active Directory domain controller in an improper manner. When the domain controller is locally restored, this condition prevents any of its changes from being replicated to other domain controllers. These changes are not replicated because the restored USN is earlier than the USN that is tracked by the other domain controllers. Similar changes on other remote domain controllers are not replicated back to the locally restored domain controller. As a result, the topology remains in an unsynchronized state.

To prevent USN rollbacks, Data Protection for VMware protects guest VMs in a clustered environment where multiple domain controllers participate in Active Directory replication. The backed up VM guest that hosts the Active Directory domain controller is recovered by implementing non-authoritative restore.

Non-authoritative restore recovers the Active Directory (or domain controller) to the version taken at the time of the backup. When the recovered Active Directory (or domain controller) is restored, it is updated with information from the other domain controllers through the existing replication process.

Environment requirements

Data Protection for VMware protects Windows VM guests that host Active Directory Domain Controllers. The following guest versions that host Active Directory Domain Controllers are supported:

- Windows Microsoft Windows 2008 (32-bit, 64-bit), Microsoft Windows 2008 R2 (64-bit), or Microsoft Windows Server 2012

  Important: To protect Active Directory on a VM guest that is running on Microsoft Windows Server 2012, one of the following levels of VMware are required:
  - VMWare vSphere 5.0 Update 2 (vCenter Server and ESXi must both be at 5.0 Update 2)
  - VMWare vSphere 5.1 (ESXi 5.0 Update 2 or later)
- Windows A current version of VMware Tools must be installed and must be running on the VM guest at the time that it is backed up. This VM guest must be powered on for Data Protection for VMware to detect Active Directory. Otherwise, Active Directory will not be detected and restore protection will be unavailable.
- Windows The Data Protection for VMware Enablement File must be installed on the vStorage Backup server for successful restore of VMs that host Active Directory Domain Controllers.

Restriction:

When a VM guest contains Active Directory or a domain controller, ensure that Windows NT Directory Services (NTDS) is running so that the VSS backups and domain controller discovery can function correctly. You cannot use application protection for domain controllers to complete these tasks:

- Restore backups that are created by Tivoli Storage FlashCopy Manager for VMware
- Restore backups that are created by Data Protection for VMware and Tivoli Storage FlashCopy Manager for VMware.
- Restore from a Tivoli Storage Manager data mover if the data mover is on Linux, and the version of Microsoft Windows operating system is 2008 or 2008 R2. Because of an Active Directory limitation in this environment, the restore task cannot be completed successfully.
- Run a file restore of Active Directory objects
- Back up and restore VMs that run Active Directory Lightweight Directory Services (AD LDS)
- Recover expired Active Directory tombstone objects

  Tip: To help prevent Active Directory objects from expiring, run backups more frequently than the default tombstone life of 60 days.
- Run a full VM instant restore operation

  Instant access and instant verification processing is prevented when the Active Directory domain controller is detected on the VM backup to be restored and the VM guest is on Windows 2008 or Windows 2008 R2.

Chapter 5. Data Protection for VMware command-line interface

Use the Data Protection for VMware command-line interface to back up, restore, or view configuration information in a vSphere or vCloud environment.

Linux Windows

About this task

The Data Protection for VMware command-line interface provides these commands:

"Backup" on page 86
Initiate® full and incremental backups of your VMs.

"Restore" on page 89
Restore backups of your VMs.

"Inquire_config" on page 95
View configuration information about the backup database.

"Inquire_detail" on page 100
View configuration information about the backup environment.

"Set_domain" on page 103
Apply changes to the domain settings.

"Set_mapping" on page 104
Set mapping between the vCloud objects and Tivoli Storage Manager node name.

"Set_option" on page 105
Set a parameter in the `vmcliprofile`.

"Set_password" on page 107
Set the password for the Data Protection for VMware command-line interface node name.

"Get_password_info" on page 109
View the status of guest credentials that are set for the managed data centers.

"Start_guest_scan" on page 110
Scan guest VMs for application information.

Example

Access the Data Protection for VMware command-line interface in the following directories:

Linux

```
/opt/tivoli/tsm/tdpvmware/common/scripts
```

Windows (32-bit)
`C:\Program Files\Common Files\Tivoli\TDPVMware\VMwarePlugin\scripts`

Windows (64-bit)
`C:\Program Files (x86)\Common Files\Tivoli\TDPVMware\VMwarePlugin\scripts`

For Data Protection for VMware command-line interface messages that contain the FMM prefix, message information is available in the IBM Knowledge Center: FMM, FMF, FMV, FMX, FMY: Tivoli Storage FlashCopy Manager messages

Backup

Use this **vmcli** command to start full and incremental backups of your VMs or VM templates.

Syntax

The **vmcli -f backup** command uses this syntax:

vmcli -f backup -t *backupType* **-I** *backupObjectListFile* **-d** *datacenternodename* | *providervDCnodename* **-o** *datamovernodename* [**--name** *taskName*] [**--description** *descriptionInFile.txt*] [**-s** *tsmserverhostname*][**-n** *vctrclinodename*] [**-p** *tsmserverport*]

Linux
You must issue the **vmcli -f backup** command as tdpvmware user, and not as root.

Parameters

Before you issue a **vmcli -f backup** command, issue the **vmcli -f inquire_config** command to verify that your configuration is correct. Also, use the information from the **vmcli -f inquire_config** command output as a guide for setting your backup parameters.

When a backup operation is running, there is no command or method available to stop the backup, including the Ctrl + C command. You must wait for the operation to complete on its own.

The **vmcli -f backup** command requires that the **VE_VCENTER_NODE_NAME** is set correctly in the vmcliprofile. You cannot overwrite this parameter with a command-line entry.

The data mover system (the vStorage Backup Server where the Tivoli Storage Manager backup-archive client is installed) must not set the ASNODENAME option.

-t *backupType*
Specify the type of backup to complete. You can choose from one of the following types:

TSM_INCR
Creates an incremental backup of the specified backup object. This parameter is valid only in vSphere mode.

TSM_FULL
Creates a full image backup of the specified backup objects. This parameter is valid only in vSphere mode.

TSM_IFFULL

Creates an incremental forever full backup of the specified backup objects. When TSM_IFFULL is specified, template VMs that are unchanged since the last backup are also included. This parameter is valid in both vSphere and vCloud mode.

TSM_IFINCR

Creates an incremental forever incremental backup of the specified backup object. This type backs up only the changed data since the last backup. This parameter is valid in both vSphere and vCloud mode. This type is the default.

The backup process does not create a snapshot of template VMs in the same manner that a snapshot is created for regular VMs. As a result, VMware VDDK advanced transports (SAN, HotAdd mode), change block tracking (CBT), and incremental backups are not available.

-I *backupObjectListFile*

Specify the file that contains the list of objects to back up. Each line contains one specification for backup.

In vCloud mode, the *backupObjectListFile* uses the following format:

```
vappname:Org=organization,OrgvDC=organization VDC[,vApp=vApp]
```

The org, orgvdc, and vapp keywords must be followed by an equal sign (=) and separated from the next keyword by a comma (,).

In vCloud mode, the *backupObjectListFile* uses the following keywords:

vappname

Specify the name of the vApp to back up. Each line in the *backupObjectListFile* must start with this keyword. You can repeat this keyword for each vApp you want to back up.

org

Specify the name of the organization from which the vApps are backed up. This parameter must be specified immediately after the vappname keyword. If you backup vApps from different organizations, create multiple lines.

orgvdc

Specify the name of the organization vDC from which the vApps are backed up. This parameter must be specified as the third parameter of an input line (after the org keyword). If you backup vApps from different organization vDCs, create multiple lines.

vapp

Specify the name of the vApp to back up. This parameter must be specified as the fourth parameter of an input line (after the orgvdc keyword). If you backup multiple vApps, create multiple lines. If this parameter is not specified, all vApps from the organization vDC (orgvdc) of the organization (org) are backed up.

In vSphere mode, the *backupObjectListFile* uses the following keyword:

vmname

Specify the name of the VM to back up. You can specify this keyword for each VM you want to back up. For example:

```
vmname:vm1
vmname:vm2
```

Restrictions:

- Do not specify a VM host name in the *backupObjectListFile*. Data Protection for VMware does not support backing up a VM that is identified by the VM host name.
- When you specify the name of a VM by using the vmname keyword in the *backupObjectListFile*, Data Protection for VMware does not differentiate between a colon (:) used as a keyword separator or a colon that is used in the VM name. Therefore, use caution when you specify keyword values. In addition, backing up a VM that contains a comma in its name is not supported.
- Data Protection for VMware support for VM backup operations is limited to VM names and datacenter names that contain English 7-bit ASCII characters only. VM names and datacenter names that use other language characters are not currently supported. More character restrictions are listed in Appendix A, "Troubleshooting," on page 165.
- A VMware vCenter allows the existence of two VMs with the same name. However, Data Protection for VMware does not support backing up two VMs with the same name. To prevent errors or backup failures, do not have two VMs with the same name in a vCenter.

-d *datacenternodename* | *providervDCnodename* | *organizationvDCnodename*
When the **VE_TSM_MODE** parameter specifies VSPHERE, specify the datacenter node name.

When the **VE_TSM_MODE** parameter specifies vCloud, specify the provider vDC node name (backup and restore operations) or the organization vDC node name (query operations).

-o *datamovernodename*
Specify the data mover node name. This name is the node name for the Tivoli Storage Manager backup-archive client that is installed on the vStorage Backup Server. This node performs the data movement.

[**--name** *taskName*]
Specify the string that identifies the backup task.

[**--description** *descriptionInFile.txt*]
Specify the name of the text file that contains a description of the backup task.

[**-s** *tsmserverhostname*]
Specify the host name or IP address of the Tivoli Storage Manager server. If this parameter is not specified, the value in the profile is used.

[**-n** *vmclinodename*]
Specify the VMCLI node name. This node connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and the data mover node. If this parameter is not specified, the value in the profile is used.

[**-p** *tsmserverport*]
Specify the port of the Tivoli Storage Manager server.

- If this parameter is not specified in the Data Protection for VMware command-line interface and not specified in the profile, the default port (*1500*) is used.

- If this parameter is not specified in the Data Protection for VMware command-line interface, but is specified in the profile, the value in the profile is used.

Restore

Use this **vmcli** command to restore backups of your VMs, VM templates, or vApps.

Syntax

The **vmcli -f restore** command uses this syntax:

vmcli -f restore [**-c** *tsm_mode*] **-I** *restoreObjectListFile* **-d** *datacenternodename* **-o** *datamovernodename* [**-s** *tsmserverhostname*] [**-n** *vmclinodename*] [**-p** *tsmserverport*] [**-vmrestoretype** (**noninstant** | **instantrestore** | **instantaccess** | **mount** | **vmcleanup** | **vmfullcleanup** | **mountcleanup**)]

Linux

You must issue the **vmcli -f restore** command as tdpvmware user, and not as root.

Parameters

The **vmcli -f restore** command requires that the **VE_VCENTER_NODE_NAME** is set correctly in the vmcliprofile. You cannot overwrite this parameter with a command-line entry.

The data mover system (the vStorage Backup Server where the backup-archive client is installed) must not set the ASNODENAME option.

-c *tsm_mode*

Specify the mode in which Tivoli Storage Manager restores up the virtual environment. The value is set in the **VE_TSM_MODE** parameter in the vmcliprofile. You can choose from one of the following modes:

VSPHERE

Specify this value when Tivoli Storage Manager restores individual VMs from a vCenter.

VCloud

Specify this value when Tivoli Storage Manager restores vApps from a vCloud director.

If the mode is not set in the vmcliprofile, the VSPHERE mode is used with the **vmcli** command.

-I *restoreObjectListFile*

Specify the file that contains the list of VMs or vApps to restore. Each line can contain only one VM identifier (vSphere mode) or one restore specification for a vApps (vCloud mode).

The *restoreObjectListFile* uses the following keyword in vSphere mode and vCloud mode:

backupid

Each line must begin with the backupid. The syntax is backupid:*your_backup_ID*. Specify the Tivoli Storage Manager Object ID for a specific VM backup (vSphere mode) or vApps backup (vCloud mode). Locate the Object ID by using the **`vmcli -f inquire_detail`** command. This keyword is required for a restore operation.

The *restoreObjectListFile* uses the following keywords in vSphere mode only:

vmname

In vSphere mode, specify the name of the VM that was originally backed up. If this keyword is not specified, the name vmname is used for the restore.

Restriction: Restrictions: When you specify a keyword in the *restoreObjectListFile*, Data Protection for VMware does not differentiate between a colon (:) used as a keyword separator or a colon that is used in a keyword value. Therefore, use caution when you specify keyword values. In addition, Data Protection for VMware support for VM restore operations is limited to VM names and VMware datacenter names that contain English 7-bit ASCII characters only. VM names and datacenter names that use other language characters are not currently supported. Additional character restrictions are listed in Appendix A, "Troubleshooting," on page 165.

The restore process does not create a snapshot of template VMs in the same manner that a snapshot is created for regular VMs. As a result, VMware VDDK advanced transports (SAN, HotAdd mode), change block tracking (CBT), and incremental backups are not available.

vmname

In vSphere mode, specify the name that you want the restored VM to be named. This keyword is the second entry. Existing VMs are not overwritten. Therefore, either rename the VM (by using this keyword) or delete the original VM before you issue the **`vmcli -f restore`** command.

-vmdk=cnfg

In vSphere mode, specify that the virtual machine configuration information is restored. The configuration information is always restored when the entire virtual machine is restored. However, by default the configuration is not restored when you restore only selected disks with the **`vmdk=`***disk label* option.

Ordinarily, restoring configuration information to an existing virtual machine fails because the restored configuration information conflicts with the existing virtual machine configuration information. Use this option if the existing configuration file for a virtual machine on the ESX server was deleted, and you want to use the backed up configuration to re-create it.

For example, this entry in *restoreObjectListFile* restores all VMDKs for virtual machine VM1 and keeps the same name:

```
backupid:26801107 vmname:VM1:-vmdk=cnfg
```

vmdk=*disk label*

In vSphere mode, specify the disk label of the virtual disks to include in the restore operation. You specify this option only if you want to partially restore virtual machine data by restoring only specific disks.

For example, this entry in *restoreObjectListFile* restores only the VMDK named Hard Disk 1 as a new virtual machine:

```
backupid:26801107 vmanme:myvm:vmdk=Hard Disk 1::vmname:newname
```

-vmdk=*disk label*

In vSphere mode, specify the disk label of one or more virtual disks to exclude from the restore operation.

For example, this entry in *restoreObjectListFile* restores all VMDKs except the one named Hard Disk 1 as a new virtual machine:

```
backupid:26801107 vmanme:myvm:-vmdk=Hard Disk 4::vmname:newname
```

This entry restores VMDKs for the virtual machine as a new virtual machine without configuration information:

```
backupid:26801107 vmname:oldvmname:-vmdk=cnfg::vmname:newname
```

newdatacentername

In vSphere mode, when you want the restore destination to be a different datacenter, specify the name of that datacenter with this keyword.

newesxhostname

In vSphere mode, when you want the restore destination to be a different ESX host, specify the name of that ESX host with this keyword.

newdatastoreurl

In vSphere mode, specify the name (not the URL) of the VMware datastore where the VM is to be restored. For example, a datastore name such as `datastore1` is supported. A datastore URL such as `sanfs://vmfs_uuid:4d90pa2d-e9ju45ab-065d-00101a7f1a1d/` is not supported. The datastore can be on a SAN, NAS, iSCSI device, or VMware virtual volume (vVol).

vmtempdatastore

In vSphere mode, when you want to issue an instant restore operation, specify a temporary datastore on the ESX host. This temporary datastore contains the configuration information and data of the VM that is created during the operation.

vmautostartvm

In vSphere mode, when a VM is created for instant access (**`vmrestoretype instantaccess`**), specify whether to automatically start the VM:

YES The VM created for instant access is automatically started.

NO The VM created for instant access is not automatically started. It must be manually started by the user. This value is the default.

vmdiskprovision

In vSphere mode, specify the type of provisioning for the VM disk that is restored during an instant restore process (**`vmrestoretype instant`**):

THICK

The disk is created with thick provisioning. This value is the default.

THIN The disk is created with thin provisioning.

An example *restoreObjectListFile* in vSphere mode is provided here:

```
# restore of VM "678912345" named "vmName6" to new vmname "vm6newName" to datacenter
"DataCenter2" to ESX esxhostname:esxHost1Name to new datastore "datastore2"
backupid:678912345 vmname:vmName6::vmname:vm6newName newdatacentername:DataCenter2
newesxhostname:esxHost1Name newdatastoreurl:datastore2 vmtempdatastore:datastore2temp
 vmdiskprovision:thin
```

Each restore specification must be on a single line. However, for the sake of page formatting, the restore specification in this example is on multiple lines.

The *restoreObjectListFile* uses the following keywords in vSphere mode for mount operations:

vmostype
Specify the type of operating system for the backed up VM.

AUTOMATIC
The operating system of the backed up VM is automatically detected. This value is the default.

LINUX
The operating system of the backed up VM is Linux.

WINDOWS
The operating system of the backed up VM is Windows.

exportfs
Exports the mounted file system to the location specified by the value of the **`exportparameter`**.

YES The mounted file system is exported.

NO The mounted file system is not exported. This value is the default.

exportparameter
The location where the file system is exported.

Linux ***IP or machine name***
The IP address or name of the machine that mounts the exported file system.

Windows ***user name***
The user name that is allowed to access Windows Share. It is the user's responsibility to be aware of which users and groups have access to their shared files.

mountpoint ***mount point path***
Specify the path of the mount point.

Linux The default value is `/mnt/`*`vmname`*.

Windows The default value is `D:\tsmvemount\`*`vmname`*.

mounttag ***string***
This string is text that you enter to make the mount point name easier to identify when you search on the local file system. Specify this string as part of the mount path.

Linux The full path to a disk is */mount root/tag/vmname/snapshot date and time/file system number*. For example:

```
/mnt/tickel-4711/VM1/2013-12-12-12:12:12/disk1
```

Windows The full path to a disk is *mount root\tag\vmname\snapshot date and time\file system number*. For example:

```
C:\Users\Admin\tickel-4711\VM1\2013-12-12-12:12:12\disk1
```

An example *restoreObjectListFile* in vSphere mode for mount operations is provided here:

Linux

```
backupid:1167852  vmname:VM-Lin4 mounttag:limor exportparameters:9.123.456.78
exportfs:yes vmostype:linux  mountpoint:/tmp/tsm-mounts
```

Windows

```
backupid:1167850  vmname:VM-Name3 mounttag:limor exportparameters:WinUser1
exportfs:yes vmostype:windows  mountpoint:C:\temp\mnt
```

The *restoreObjectListFile* uses the following keywords in vCloud mode only:

vappname

In vCloud mode, specify the restore spec for one vApps. This keyword is specified after the backupid keyword. The vappname value is consisted of this triplet entry:

org=*organization name*,orgvdc=*organization vDC node name*,vapp=*vApp name*

For example, the following *restoreObjectListFile* entry restores vApps named "vApp1" from organization "Mainz_org" and organization virtual datacenter "MZ_Silver" to a new vApps named "vApp1_restore":

```
vappname "vApp1_restore"
backupid:47110815 vappname:org=Mainz_org,orgvdc=MZ_Silver,vapp=vApp1
vappname_new:vApp1_restore
```

org=*organization*,orgvdc=*organization vdc*,vapp=*name of vApp backup*

In vCloud mode, use this triplet to specify the following information:

org The name of the organization to which the vApps belongs.

orgvdc

The name of the organization vDC to which the vApps belongs.

vapp The name of the vApps that was originally backed up.

vappname_new

In vCloud mode, specify the new name for vApps to be restored. Existing vApps are not overwritten. As a result, use the vappname_new keyword to rename the restore vApps or delete the original vApps before you start the restore operation. If this keyword is not specified, the vappname value is used for the restore.

An example *restoreObjectListFile* is provided here:

```
# restore of VM "678912345" named "vmName6" to new vmname "vm6newName" to datacenter
"DataCenter2" to ESX esxhostname:esxHost1Name to new datastore "datastore2"
backupid:678912345 vmname:vmName6::vmname:vm6newName newdatacentername:DataCenter2
newesxhostname:esxHost1Name newdatastoreurl:datastore2 vmtempdatastore:datastore2temp
 vmdiskprovision:thin
```

Each restore specification must be on a single line. However, for the sake of page formatting, the restore specification in this example is on multiple lines.

Tip: To make sure that correct information is specified in the *restoreObjectListFile*, you can issue the **inquire_detail** command. "Inquire_detail" on page 100 provides current configuration information about the backup environment.

-d *datacenternodename* **|** *providervDCnodename*
When the **VE_TSM_MODE** parameter specifies VSPHERE, specify the datacenter node name.

When the **VE_TSM_MODE** parameter specifies VCloud, specify the provider vDC node name.

-o *datamovernodename*
Specify the data mover node name. This name is for the backup-archive client node that is installed on the vStorage Backup Server. This node performs the data movement.

[**-s** *tsmserverhostname*]
Specify the host name or IP address of the Tivoli Storage Manager server. If this parameter is not specified, the value in the profile is used.

[**-n** *vmclinodename*]
Specify the VMCLI node name. This name is the node that connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and the data mover node. If this parameter is not specified, the value in the profile is used.

[**-p** *tsmserverport*]
Specify the port of the Tivoli Storage Manager server.

- If this parameter is not specified in the Data Protection for VMware command-line interface and not specified in the profile, the default port (*1500*) is used.
- If this parameter is not specified in the Data Protection for VMware command-line interface but is specified in the profile, the value in the profile is used.

Windows [**-vmrestoretype** (**noninstant** | **instantrestore** | **instantaccess** | **mount** | **vmcleanup** | **vmfullcleanup** | **mountcleanup**)]
In a vSphere environment, specify this option to switch between the following operations: existing restore, instant access, or instant restore. Instant access and instant restore capability is supported only for VMware VMs that are hosted on VMware ESXi 5.1 servers, or later versions. The **vmrestoretype** parameter uses the following keywords:

noninstant
A full VM restore is issued.

instantrestore
The VM is started during the restore process.

instantaccess
The VM might be started but it is not restored.

mount The volumes of the VM defined in the input file are mounted in read-only mode on the data mover. On Linux, all the volumes of the VM are mounted as a Network File System (NFS). On Windows, all the volumes of the VM are mounted as a Common Internet File System (CIFS).

vmcleanup
Components that are no longer needed are cleaned up.

vmfullcleanup
The VM and all its components are cleaned up, regardless of the current state.

mountcleanup
All mounted volumes of the selected VM are cleaned up. This cleanup task includes removing file systems that were exposed for the restore operation and the file shares (CIFS, NFS).

Restriction: When an instant restore or instant access operation that is issued from the backup-archive client (**`dsmc`**) is followed by an instant restore or instant access operation that is issued from the Data Protection for VMware command-line interface (**`vmcli`**) or Data Protection for VMware vSphere GUI, the TDPVMwareMount service must be restarted. This situation applies only when the Data Protection for VMware command-line interface accesses the Tivoli Storage Manager server with a node name different from the one used by the backup-archive client. This restriction applies to any order of operations between the two products.

Restart the service by going to **Start** > **Administrative Tools** > **Computer Management** > **Services and Applications** > **Services**. Look for service name `Tivoli Storage Manager recovery agent` in the Services window. The path to the Services window might vary depending on your operating system.

The service does not have to be restarted when the VMware datacenter name is specified with the `asnodename` option in the `dsm.opt` file.

Inquire_config

Use this **`vmcli`** command to view configuration information about the Tivoli Storage Manager nodes associated with Data Protection for VMware.

Syntax

The **`vmcli -f inquire_config`** command uses this syntax:

vmcli -f inquire_config [**-t** *backuptype*] [**-v** *vcenternodename* | *vcloudnodename*] [**-s** *tsmserverhostname*] [**-n** *vctrclinodename*] [**-p** *tsmserverport*]

Linux

You must issue the **`vmcli -f inquire_config`** command as `tdpvmware` user, and not as root.

Parameters

[**-t** *backuptype*]

Specify the type of backup. You can choose from one of the following types:

TSM Select a backup that was created with Tivoli Storage Manager for Virtual Environments. This type must be specified when in vCloud mode.

FCM Select a backup that was created with IBM Tivoli Storage FlashCopy Manager for VMware.

[**-v** *vcenternodename* **|** *vcloudnodename*]

Depending on the backup environment, specify the virtual node that represents either a vCenter or the vCloud Director. If this parameter is not specified in the Data Protection for VMware command-line interface, the value in the profile is used.

[**-s** *tsmserverhostname*]

Specify the host name or IP address of the Tivoli Storage Manager server. If this parameter is not specified, the value in the profile is used.

[**-n** *vctrclinodename*]

Specify the VMCLI node name. This name is the node that connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and the data mover node. If this parameter is not specified, the value in the profile is used.

[**-p** *tsmserverport*]

Specify the port of the Tivoli Storage Manager server.

- If this parameter is not specified in the Data Protection for VMware command-line interface and not specified in the profile, the default port (*1500*) is used.
- If this parameter is not specified in the Data Protection for VMware command-line interface but is specified in the profile, the value in the profile is used.

vSphere environment example

The parameter values in this output for the `vmcli -f inquire_config -s TSM` command show that the Data Protection for VMware command-line interface recognizes the Tivoli Storage Manager node configuration. As a result, the configuration is correct:

```
#TASK 38 inquire_config 20140108213337381
#PARAM INSTALLED=TSM
#RUN 32 20140108213337381
#LANG en_US
#PARAM BACKEND=TSM
#PARAM OPERATION_TYPE 5
#PHASE_COUNT 4
#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=FVTSERIES11ESX6.STORAGE.MYCOMPANY.COM
#PARAM TSM_SERVER_PORT=1500
#PARAM TSMCLI_NODE_NAME=DPM02_VMCLI
#PARAM VCENTER_NODE_NAME=DPM02_VC1
#PARAM DATACENTER_NODE_NAME=
#PARAM OFFLOAD_HOST_NAME=
#PARAM PASSWORD_TYPE=CLINODE
#PARAM TSM_OPTFILE=C:\Users\ADMINI~1\AppData\Local\Temp\2\T4VBE42.tmp
#PARAM INPUT_FILE=
#PARAM TRACEFILE=
#PARAM TRACEFLAGS=
#PARAM RUNID=38
#PHASE INITIALIZE
#PHASE INQUIRE_DATACENTER_NODES
#CHILD datacenternode:DC1::DPM02_DC1
#PARENT vcenternode:DPM02_VC1
#PHASE INQUIRE_PROXY_NODES
#CHILD targetnode:DPM02_DC1
#PARENT peernode:DPM02_DC1_DM
#CHILD hladdress:tsmveesx2vm50.storage.mycompany.com
#PARENT peernode:DPM02_DC1_DM
#CHILD lladdress:49394
#PARENT peernode:DPM02_DC1_DM
#CHILD nodetype:DMNODE
#PARENT peernode:DPM02_DC1_DM
#CHILD partner:
#PARENT peernode:DPM02_DC1_DM
#CHILD targetnode:DPM02_DC1
#PARENT peernode:DPM02_DC1_2_MP_WIN
#CHILD hladdress:tsmveesx2vm50.storage.mycompany.com
#PARENT peernode:DPM02_DC1_2_MP_WIN
#CHILD lladdress:49453
#PARENT peernode:DPM02_DC1_2_MP_WIN
#CHILD nodetype:MPNODE
#PARENT peernode:DPM02_DC1_2_MP_WIN
#CHILD partner:DPM02_DC1_2_MP_LNX
#PARENT peernode:DPM02_DC1_2_MP_WIN
#CHILD targetnode:DPM02_DC1
#PARENT peernode:DPM02_DC1_2_MP_LNX
#CHILD hladdress:
#PARENT peernode:DPM02_DC1_2_MP_LNX
#CHILD lladdress:
#PARENT peernode:DPM02_DC1_2_MP_LNX
#CHILD nodetype:MPNODE
#PARENT peernode:DPM02_DC1_2_MP_LNX
#CHILD partner:DPM02_DC1_2_MP_WIN
#PARENT peernode:DPM02_DC1_2_MP_LNX
#PARAM STATUS=success
#PARAM STATUS=success
#END RUN 32 20140108213340100
#END TASK 38
#INFO FMM16014I The return code is 0.
#END
```

The PHASE INQUIRE_DATACENTER_NODES section shows the mapping of the datacenter name (DC1) from vSphere to the Tivoli Storage Manager node name for that datacenter (DPM02_DC1). The datacenter name is case sensitive and must be identical to the name shown in vSphere for the mapping to function.

The PHASE INQUIRE_PROXY_NODES section shows the data mover nodes with proxy access to each data center node. The format for this proxy relationship is shown in pairs:

```
#CHILD targetnode::<datacenter node name>
#PARENT peernode::<data mover node name>
```

Two types of proxy nodes are identified in the PHASE INQUIRE_PROXY_NODES section:

- The CHILD nodetype:DMNODE subsection identifies the data mover nodes and their proxy relationships.
- The CHILD nodetype:MPNODE subsection identifies the mount proxy nodes and their proxy relationships. These nodes represent the proxy system that accesses mounted VM disks through an iSCSI connection. Mount proxy nodes are required for file restore operations.

vCloud environment example

The parameter values in this output for the `vmcli -f inquire_config -s TSM` command show that the Data Protection for VMware command-line interface recognizes the Tivoli Storage Manager node configuration. As a result, the configuration is correct:

```
#TASK 3 inquire_config 20130109143746117
#PARAM INSTALLED=TSM
#RUN 2 20130109143746117
#LANG en_US
#PARAM BACKEND=TSM
#PARAM OPERATION_TYPE 4
#PHASE_COUNT 5

#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=VM-08R2-TSMDEV2
#PARAM TSM_SERVER_PORT=1500
#PARAM VCLOUD
#PARAM TSMCLI_NODE_NAME=VMCLI_OFIR
#PARAM VCLOUD_NODE_NAME=VCD_EUROPE
#PARAM DATACENTER_NODE_NAME=
#PARAM OFFLOAD_HOST_NAME=
#PARAM PASSWORD_TYPE=CLINODE
#PARAM TSM_OPTFILE=C:\Users\qa\AppData\Local\Temp\1\T4VEEF3.tmp
#PARAM INPUT_FILE=
#PARAM TRACEFILE=tsmcli.trace
#PARAM TRACEFLAGS=api api_detail

#PHASE INITIALIZE

#PHASE INQUIRE_PVDC_NODES

#CHILD  targetnode:VCD_EUROPE
#PARENT peernode:PVDC_GOLD
#CHILD  pvdcname:Gold provider vDC
#PARENT peernode:PVDC_GOLD
#CHILD  targetnode:VCD_EUROPE
#PARENT peernode:PVDC_SILVER
#CHILD  pvdcname:Silver provider vDC
#PARENT peernode:PVDC_SILVER

#PHASE INQUIRE_OVDC_NODES

#CHILD  targetnode:PVDC_GOLD
#PARENT peernode:OVDC_HAIFA
#CHILD  orgname:Israel
#PARENT peernode:OVDC_HAIFA
#CHILD  orgvdcname:Haifa organization virtual data center
#PARENT peernode:OVDC_HAIFA
#CHILD  targetnode:PVDC_SILVER
#PARENT peernode:OVDC_JERUSALEM
#CHILD  orgname:Israel
#PARENT peernode:OVDC_JERUSALEM
#CHILD  orgvdcname:Jerusalem organization virtual data center
#PARENT peernode:OVDC_JERUSALEM
#CHILD  targetnode:PVDC_GOLD
#PARENT peernode:OVDC_MUNICH
#CHILD  orgname:Germany
#PARENT peernode:OVDC_MUNICH
#CHILD  orgvdcname:Munich organization virtual data center
#PARENT peernode:OVDC_MUNICH
#CHILD  targetnode:PVDC_SILVER
#PARENT peernode:OVDC_MAINZ
```

```
#CHILD  orgname:Germany
#PARENT peernode:OVDC_MAINZ
#CHILD  orgvdcname:Mainz organization virtual data center
#PARENT peernode:OVDC_MAINZ
#PHASE INQUIRE_DM_NODES

#CHILD  targetnode:PVDC_GOLD
#PARENT peernode:DM_DM1
#CHILD  targetnode:OVDC_HAIFA
#PARENT peernode:DM_DM1
#CHILD  targetnode:OVDC_MUNICH
#PARENT peernode:DM_DM1
#CHILD  hladdress:vm-DM1.com
#PARENT peernode:DM_DM1
#CHILD  lladdress:49391
#PARENT peernode:DM_DM1

#CHILD  targetnode:PVDC_GOLD
#PARENT peernode:DM_DM2
#CHILD  targetnode:OVDC_HAIFA
#PARENT peernode:DM_DM2
#CHILD  targetnode:OVDC_MUNICH
#PARENT peernode:DM_DM2
#CHILD  hladdress:vm-DM2.com
#PARENT peernode:DM_DM2
#CHILD  lladdress:49392
#PARENT peernode:DM_DM2

#CHILD  targetnode:PVDC_SILVER
#PARENT peernode:DM_DM3
#CHILD  targetnode:OVDC_JERUSALEM
#PARENT peernode:DM_DM3
#CHILD  targetnode:OVDC_MAINZ
#PARENT peernode:DM_DM3
#CHILD  hladdress:vm-DM3.com
#PARENT peernode:DM_DM3
#CHILD  lladdress:49391
#PARENT peernode:DM_DM3

#CHILD  targetnode:PVDC_SILVER
#PARENT peernode:DM_DM4
#CHILD  targetnode:OVDC_JERUSALEM
#PARENT peernode:DM_DM4
#CHILD  targetnode:OVDC_MAINZ
#PARENT peernode:DM_DM4
#CHILD  hladdress:vm-DM4.com
#PARENT peernode:DM_DM4
#CHILD  lladdress:49392
#PARENT peernode:DM_DM4

#PARAM STATUS=success
#END RUN 2 20130109143749906
#END TASK 3
#INFO FMM16014I The return code is 0.
#END
```

The PHASE INQUIRE_PVDC_NODES section shows the provider VDC nodes with proxy access to each vCloud Director node. The format for this proxy relationship is shown in pairs:

```
#CHILD targetnode::<vCloud Director node name>
#PARENT peernode::<provider VDC name>
```

The PHASE INQUIRE_OVDC_NODES section shows the organization VDC nodes with proxy access to each provider VDC node. The format for this proxy relationship is shown in pairs:

```
#CHILD targetnode::<provider VDC node name>
#PARENT peernode::<organization VDC node name>
```

The `PHASE INQUIRE_DM_NODES` section shows the data mover nodes with proxy access to each provider VDC node and organization VDC node. The format for this proxy relationship is shown in pairs:

```
#CHILD targetnode::<provider VDC node name> OR <organization VDC node name>
#PARENT peernode::<data mover node name>
```

Inquire_detail

Use this **`vmcli`** command to view configuration information about the backup environment that is associated with Data Protection for VMware.

Syntax

The **`vmcli -f inquire_detail`** command uses this syntax:

vmcli -f inquire_detail -d *datacenternodename* | *organizationvDCnodename* [**-a**] [**-n** *vmclinodename*] [**-o** *datamovernodename*] [**-p** *tsmserverport*] [**-e vmdetail | vappdetail**] [**-q dmverify | vmfs | vmsingle | vappfs | vappsingle** (**-I** *inputfile*)] [**-s** *tsmserverhostname*] [**-t** *backupType*] [**-vmrestoretype** (**instantrestore** | **instantaccess** | **alltype** | **mount**)]

Linux

You must issue the **`vmcli -f inquire_detail`** command as `tdpvmware` user, and not as root.

Parameters

-d *datacenternodename* **|** *organizationvDCnodename*

When the **`VE_TSM_MODE`** parameter specifies VSPHERE, specify the datacenter node name.

When the **`VE_TSM_MODE`** parameter specifies vCloud, specify the organization vDC node name.

[-a]

Specify to show only the active backups on the Tivoli Storage Manager server.

[**-n** *vmclinodename*]

Specify the VMCLI node name. This name is the node that connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and the data mover node. If this parameter is not specified, the value in the profile is used.

[**-o** *datamovernodename*]

Specify the data mover node name.

[**-p** *tsmserverport*]

Specify the port of the Tivoli Storage Manager server.

- If this parameter is not specified in the Data Protection for VMware command-line interface and not specified in the profile, the default port (*1500*) is used.
- If this parameter is not specified in the Data Protection for VMware command-line interface but is specified in the profile, the value in the profile is used.

[-e vmdetail | vmappdetail

Specify vmdetail to show more detailed information about the backed up VMs. For example, the parameter shows information about disks that are attached to the VM. This parameter is valid only when the **VE_TSM_MODE** parameter specifies VSPHERE.

Specify vmappdetail to show more detailed information about the backed up vApps. For example, this parameter shows the following information:

- VMs that are attached to the vApp.
- VM name as it appears in both vCloud and vSphere mode.
- Success or fail status for the VM backup.

This parameter is valid only when the **VE_TSM_MODE** parameter specifies vCloud.

[-q dmverify | vmfs | vmsingle | vappfs | vappsingle (-I *inputfile*)]

dmverify
Specify to query the status of the data mover node identified by the **-o** parameter. You must specify the **-d** and **-o** parameters when you specify dmverify.

vmfs
Specify to query all VMware Virtual Machine File Systems (VMFS). This parameter shows high-level information about all VMs. This parameter is valid only in vSphere mode.

vmsingle
Specify to query individual VMs that are being restored during an instant access or instant restore operation. This parameter is valid only in vSphere mode.

vappfs
Specify to show high-level information about all vApps. This parameter is valid only in vCloud mode.

vappsingle
Specify to show information about individual vApps that are identified in the *inputfile*. This parameter is valid only in vCloud mode.

-I ***inputfile***
The *inputfile* value defines the full path and name of the input file. This keyword is valid with the **vmsingle** and **vappsingle** parameters only.

In vSphere mode, specify the name of the VM to query. You can specify this keyword for each VM that you want to query: vmname:*vmname*. For example:

```
vmname:vm1
vmname:vm2
```

In vCloud mode, specify the name of the VM to query. You can specify this keyword for each VM you want to query: vappname:*vappname*. For example:

```
vappname:vapp1
vappname:vapp2
```

When the **q** option is not specified, the default value is vmfs (in vSphere mode) and vappfs (in vCloud mode). When the *inputfile* entry contains spaces, enclose the entry with quotation marks. For example:

```
-I "/my dir/my file"
```

[**-s** *tsmserverhostname*]

Specify the host name or IP address of the Tivoli Storage Manager server. If this parameter is not specified, the value in the profile is used.

[**-t** *backupType*]

Specify one of the following backup types to query:

ALL Specifies that the **inquire_detail** command is applied to all registered backup types.

FCM Specifies that the **inquire_detail** command is applied to only Tivoli Storage FlashCopy Manager for VMware backups.

Tivoli Storage FlashCopy Manager for VMware is a separately licensed product that contains its own user documentation. Familiarity with this product and its documentation is necessary to adequately implement a comprehensive plan for protecting your VMs.

TSM Specifies that the **inquire_detail** command is applied to only Data Protection for VMware backups. This value must be specified when in vCloud mode.

Windows [**-vmrestoretype** (**instantrestore** | **instantaccess** | **alltype** | **mount**)]

Specify this option to query active instant access or restore operations. This option also queries stale or orphan artifacts after a failure. The **vmrestoretype** parameter uses the following keywords:

instantrestore

The query lists VMs that are active in an instant restore operation.

instantaccess

The query lists VMs that are active in an instant access process.

alltype

The query lists VMs that are active in all instant operations.

mount The query lists all active mount operations. For each mount operation, the output lists the mounted snapshots (restore points) that were created during a restore operation for a particular VM.

Restriction: When an instant restore or instant access operation that is issued from the backup-archive client (**dsmc**) is followed by an instant restore or instant access operation that is issued from the Data Protection for VMware command-line interface (**vmcli**) or Data Protection for VMware vSphere GUI, the recovery agent service must be restarted. This situation applies only when the **vmcli** accesses the server with a node name different from the one used by the backup-archive client. This restriction applies to any order of operations between the two products.

Restart the service by going to **Start** > **Administrative Tools** > **Computer Management** > **Services and Applications** > **Services**. Look for service name `Tivoli Storage Manager recovery agent` in the Services window. The path to the Services window might vary depending on your operating system.

The service does not have to be restarted when the VMware datacenter name is specified with the `asnodename` option in the `dsm.opt` file.

Example

In this example, the **vmcli -f inquire_detail** command is issued to query the VM named antures for details:

```
vmcli -f inquire_detail -s BORODIN.MAINZ.DE.IBM.COM -p 1505 -n JF_VMCLI_HANNE
-v CHRISTO.MAINZ.DE.IBM.COM -o JF_MAINZ_DEVELOPMENT_DC_DM -d JF_MAINZ_DEVELOPMENT_DC
-q vmsingle -I .\inputfile.txt --vmrestoretype (instantrestore | instantaccess)
```

The *inputfile* contains this statement:

```
vmname:antures
```

Set_domain

Use this vmcli command to apply changes to the domain settings.

Syntax

The **vmcli -f set_domain** command uses this syntax:

vmcli -f set_domain -I *domainObjectListFile*

Linux

You must issue the **vmcli -f set_domain** command as tdpvmware user, and not as root.

The new domain value is stored in the vmcli database.

Parameters

-I *domain ObjectListFile*

The *domainObjectListFile* has the following requirements:

- The file contains one VMware datacenter identifier per line.
- The valid identifier is the datacenter name.

If no domain is configured, the current instance is used to manage all datacenters that are available in the vCenter. When the vmcli -f set_domain command is run without -I parameter, the domain configuration is deleted.

An example *domainObjectListFile* is provided here:

```
#datacentername:datacenterName
datacentername:datacenterXYZ
datacentername:datacenterA*
datacentername:datacenterB*
...
```

Set_mapping

Use this **vmcli** command to set mapping between the vCloud objects and Tivoli Storage Manager node name.

Syntax

The **vmcli -f set_mapping** command uses this syntax:

vmcli -f set_mapping -I *mappingInputFile* [**-s** *tsmserverhostname*] [**-n** *vmclinodename*] [**-p** *tsmserverport*]

Linux

You must issue the **vmcli -f set_mapping** command as the tdpvmware user, and not as root.

To confirm that the mapping is set correctly, issue the **vmcli -f inquire_config** command.

The **vmcli -f set_mapping** command is valid only in a vCloud environment.

Parameters

-I *mappingInputFile*

Specify the following mapping information in this file:

pvdcnode: *provider vDC node name*

Specify the provider vDC node name.

pvdcname: *provider vDC name*

Specify the provider vDC name. The name is case sensitive.

orgname: *organization name*

Specify the name of the organization. The name is case sensitive.

orgvdcname: *organization vDC*

Specify the name of the organization vDC. The name is case sensitive.

orgvdcnode: *organization vDC node name*

Specify the organization vDC node name. The name is converted to upper case.

The following keywords are required to set the provider vDC name:

- pvdcnode
- pvdcname

The following keywords are required to set the organization and organization vDC name:

- pvdcnode
- orgname
- orgvdcname
- orgvdcnodename

When the *mappingInputFile* entry contains more spaces, enclose the entry with quotation marks. For example:

```
-I "/my dir/my input file"
```

[**-s** *tsmserverhostname*]
Specify the host name or IP address of the Tivoli Storage Manager server. If this parameter is not specified, the value in the profile is used.

[**-p** *tsmserverport*]
Specify the port of the Tivoli Storage Manager server.

- If this parameter is not specified in the Data Protection for VMware command-line interface and not specified in the profile, the default port (1500) is used.
- If this parameter is not specified in the Data Protection for VMware command-line interface, but is specified in the profile, the value in the profile is used.

[**-n** *vmclinodename*]
Specify the VMCLI node name. This is the node that connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and the data mover node. If this parameter is not specified, the value in the profile is used.

Example

In this example, the `vmcli -f set_mapping` command is issued to set the mapping between the Tivoli Storage Manager node "pvdc_oslo" and the real provider vDC, "Oslo Norway". The *mappingInputFile* contains this entry:

```
pvdcnode:pvdc_oslo
pvdcname:Oslo Norway
```

In this example, the `vmcli -f set_mapping` command is issued to set the mapping for the provider vDC node pvdc_oslo, the organization "Production", the organization vDC "Oslo 1", and the organization vDC node "ovdc_oslo1". The *mappingInputFile* contains this entry:

```
pvdcnode:pvdc_oslo
orgname:Production
orgvdcname:Oslo1
orgvdcnode:ovdc_oslo1
```

Related reference:
"Inquire_config" on page 95

Set_option

Use this **vmcli** command to set a parameter in the `vmcliprofile`.

Syntax

The **vmcli -f set_option** command uses this syntax:

vmcli -f set_option [**-c** *tsm_mode*] [**-m** *datacentermapping*][**-n** *datamovernodename*] [**-p** *tsmserverport*] [**-s** *tsmserverhostname*] [**-v** *vctrnodename*]

Linux
You must issue the **vmcli -f set_option** command as the tdpvmware user, and not as root.

Parameters

-c *tsm_mode*

Specify the mode in which Tivoli Storage Manager backs up the virtual environment. The value is set in the `VE_TSM_MODE` parameter in the `vmcliprofile`. You can choose from one of the following modes:

VSPHERE

Specify this value when Tivoli Storage Manager backs up and restores individual VMs from a vCenter.

VCloud

Specify this value when Tivoli Storage Manager backs up and restores vApps from a vCloud director.

If the mode is not set in the `vmcliprofile`, the `VSPHERE` mode is used with the **vmcli** command.

-m *datacentermapping*

Specify the name of the data center that is associated with the datacenter node name (`DC_name::DC_nodename`). The `DC_name` value is case sensitive and must match the name of your datacenter.

[**-n** *datamovernodename*]

Specify the data mover node name. This name is the node name for the Tivoli Storage Manager backup-archive client that is installed on the vStorage Backup Server. This node performs the data movement.

[**-p** *tsmserverport*]

Specify the port of the Tivoli Storage Manager server.

- If this parameter is not specified in the Data Protection for VMware command-line interface and not specified in the profile, the default port (`1500`) is used.
- If this parameter is not specified in the Data Protection for VMware command-line interface, but is specified in the profile, the value in the profile is used.

[**-s** *tsmserverhostname*]

Specify the host name or IP address of the Tivoli Storage Manager server. If this parameter is not specified, the value in the profile is used.

[**-v** *vcenternodename*]

Specify the vCenter node name. This node is the virtual node that represents a vCenter. If this parameter is not specified in the Data Protection for VMware command-line interface, the value in the profile is used.

Example

In this example, the `vmcli -f set_option` command is issued to set the Tivoli Storage Manager server and its port:

```
vmcli -f set_option -s TEMPLE.MYCOMPANY.XYZ.COM -p 1650
```

The following output is displayed:

```
Setting VE_TSM_SERVER_NAME to: TEMPLE.MYCOMPANY.XYZ.COM
Setting VE_TSM_SERVER_PORT to: 1650
#INFO FMM16014I The return code is 0.
```

In this example, the `vmcli -f set_option` command is issued to set the data center mapping:

```
vmcli -f set_option -m DataCenter2::NANO_DATACENTER123
```

The following mapping is set in the profile:

```
VE_DATACENTER_NAME   DataCenter2::NANO_DATACENTER123
```

Set_password

Use this **`vmcli`** command to set the password for the guest VM.

Syntax

The **`vmcli -f set_password`** command uses this syntax:

vmcli -f set_password [-type VMGuest] -I *passwordfile*

The **`-type VMGuest`** parameter is required when you set the password for application protection reporting.

Linux

You must issue the **`vmcli -f set_password`** command as tdpvmware user, and not as root.

Linux Windows

You must issue the **`vmcli -f set_password`** command before you run a guest scan operation.

Parameters

`-type VMGuest`

This parameter identifies that the password applies to a VM. This parameter is required when you set the password for application protection reporting.

`-I` *`passwordfile`*

Specify the following information in this file:

datacentername: ***data center in vmcliprofile***

Specify the datacenter that contains the VM guests. The datacenter must be defined in the *vmcliprofile*. The password is applied to that datacenter only. For example:

```
datacentername:DataCenter1
```

username: ***common VM guest user***

Specify the user name that logs in to the VM guest. For Windows, the *DOMAIN\User* format is allowed for the user name. For example:

```
username:Domain1\Administrator
```

password: ***password***

Specify the password to log in to the VM guest.

The settings in the *passwordfile* must be specified on the same line.

Examples

Linux This example creates (or sets) a common VM guest name and password that is associated with DataCenter3. The *vmcliprofile* contains the following **VE_DATACENTER_NAME** settings:

```
VE_DATACENTER_NAME DataCenter1::TSM_DC1
VE_DATACENTER_NAME DataCenter2::TSM_DC2
VE_DATACENTER_NAME DataCenter3::TSM_DC3
VE_DATACENTER_NAME DataCenter4::TSM_DC4
```

The *passwordfile* contains the following settings. The settings in the *passwordfile* must be specified on the same line:

```
datacentername:DataCenter3 username:tdpvmwareuserY password:tdpvmwareuserYpwd
```

As a result, the **vmcli -f set_password -type VMGuest -I password.txt** sets the password as shown in the command output:

```
Tivoli Storage Manager Command Line Wrapper for Virtual Environments Version: 7.1.8
Build Date: Mon Jul 11 20:03:31 2016
Tivoli Storage Manager API Version 71600
Tivoli Storage Manager Command Line Wrapper Compile Version 71600
#PARAM OPERATION_TYPE 8
#PHASE_COUNT 3
#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=ORION.FINANCE.MYCOMPANY.COM
#PARAM TSM_SERVER_PORT=1500
#PARAM TSMCLI_NODE_NAME=KA3095_TSMCLI_SLUDGE
#PARAM VCENTER_NODE_NAME=
#PARAM DATACENTER_NODE_NAME=
#PARAM OFFLOAD_HOST_NAME=
#PARAM TSM_OPTFILE=/tmp/T4VE_OD3PZ9
#PARAM INPUT_FILE=/opt/tivoli/tsm/tdpvmware/common/scripts/password.txt
#PARAM TRACEFILE=
#PARAM TRACEFLAGS=
#PHASE INITIALIZE
#PHASE SET_PASSWORD
STATUS=success
#END
```

Windows This example creates (or sets) a common VM guest name and password that is associated with DataCenter1. The *vmcliprofile* contains the following **VE_DATACENTER_NAME** settings:

```
VE_DATACENTER_NAME DataCenter1::TSM_DC1
VE_DATACENTER_NAME DataCenter2::TSM_DC2
```

The *passwordfile* contains the following settings. The settings in the *passwordfile* must be specified on the same line:

```
datacentername:DataCenter1 username:Domain1\Administrator password:secret1
```

As a result, the **vmcli -f set_password -type VMGuest -I password.txt** sets the password as shown in the command output:

```
Tivoli Storage Manager Command Line Wrapper for Virtual Environments Version: 7.1.8
Build Date: Mon Jul 11 20:03:31 2016
Tivoli Storage Manager API Version 71600
Tivoli Storage Manager Command Line Wrapper Compile Version 71600
#PARAM OPERATION_TYPE 8
#PHASE_COUNT 3
#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=ORION.FINANCE.MYCOMPANY.COM
#PARAM TSM_SERVER_PORT=1500
#PARAM TSMCLI_NODE_NAME=KA3095_TSMCLI_SLUDGE
#PARAM VCENTER_NODE_NAME=
#PARAM DATACENTER_NODE_NAME=
#PARAM OFFLOAD_HOST_NAME=
#PARAM TSM_OPTFILE=/tmp/T4VE_OD3PZ9
#PARAM INPUT_FILE=C:\Program Files\Common Files\Tivoli\TDPVMware\VMwarePlugin\
scripts\password.txt
#PARAM TRACEFILE=
#PARAM TRACEFLAGS=
#PHASE INITIALIZE
#PHASE SET_PASSWORD
STATUS=success
#END
```

Windows When you create the password file by using the **echo** command, make sure that a space does not exist between the password (*password1*) and the greater-than sign (>). For example:

```
echo password1> pwd.txt
```

or

```
echo password1>pwd.txt
```

This example sets the password (*password1*) in file pwd.txt:

```
vmcli -f set_password -I pwd.txt
```

Linux Create the password file (pwd.txt) by specifying the **echo** command:

```
echo password1 > pwd.txt
```

This example sets the password (*password1*) in file pwd.txt:

```
vmcli -f set_password -I pwd.txt
```

Linux Windows This example sets the password in file pwd.txt for domain *mydomain* and user *user1*:

```
set -f set_password -I pwd.txt -pwtype domain -domain mydomain -user user1
```

Get_password_info

Use this **vmcli** command to view the status of guest credentials that are set for the managed datacenters.

Syntax

The **vmcli -f get_password_info** command uses this syntax:

vmcli -f get_password_info -type VMGuest

Linux

You must issue the **vmcli -f get_password_info** command as tdpvmware user, and not as root.

Parameters

-type VMGuest
This required parameter identifies that the password information is returned for a guest VM. The **username** value (shown in the #CHILD statement) of the command output confirms that the password is set for that **username**. The **datacentername** value (shown in the #PARENT statement) of the command output identifies the associated datacenter for which the password is set.

Example

Windows This example shows the status of the managed datacenters that are associated with the VM guest:

```
vmcli -f get_password_info  -type VMGuest
```

```
#TASK 0 get_password_info 20130129162344670
#RUN 0 20130129162344685
#LANG en_US
#PARAM BACKEND=TSM
#PARAM OPERATION_TYPE 4
#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=
#PARAM TSM_SERVER_PORT=
#PARAM TSMCLI_NODE_NAME=
#PARAM VCENTER_NODE_NAME=
#PARAM DATACENTER_NODE_NAME=
#PARAM OFFLOAD_HOST_NAME=
#PARAM PASSWORD_TYPE=VMGUEST
#PARAM TSM_OPTFILE=C:\Users\ADMINI~1\AppData\Local\Temp\2\T4V3B15.tmp
#PARAM INPUT_FILE=
#PARAM TRACEFILE=
#PARAM TRACEFLAGS=
#CHILD username:<mydomain\myuser>
#PARENT datacentername:DataCenter1
#CHILD username:<mydomain\myuser>
#PARENT datacentername:DataCenter2
#CHILD username:<mydomain\myuser>
#PARENT datacentername:DataCenter3
#PARAM STATUS=success
#END RUN 0 2013012916234513
#END TASK 0
#INFO FMM16014I The return code is 0.
#END
```

Start_guest_scan

Use this **vmcli** command to scan guest VMs for application information.

The **vmcli -f start_guest_scan** command saves VM name, application, and globally unique identifier (GUID) information to the Tivoli Storage Manager server.

You must issue the **vmcli -f set_password** command before you run a guest scan operation.

Syntax

The **vmcli -f start_guest_scan** command uses this syntax:

vmcli -f start_guest_scan -dcscan *"datacenterNvmcliprofile,...,"* | **ALL_DC -o** *datamovernodename*

Required Parameters

-dcscan *datacenterNvmcliprofile* **| ALL_DC**

Specify one or more datacenter names that are defined in the *vmcliprofile*. Repeat datacenter names with a comma. Double quotation marks (") must be specified at the beginning and at the end of the datacenter name list. For example:

```
-dcscan "Local DC,svc"
```

To scan all VM guests in all datacenters, specify the **ALL_DC** parameter.

-o *datamovernodename*

Specify the data mover node that is configured with proxy authority access to the datacenters specified by **-dcscan**.

During a **vmcli -f start_guest_scan** operation, Data Protection for VMware copies files to a temporary subdirectory in the remote directory ($TEMP_REMOTE\TSMSCAN) on the guest VM. The remote directory must be unlocked and not used by another application. Data Protection for VMware determines the location of the remote directory in the following order:

1. If the **TEMP** environment variable is set, **TEMP_REMOTE** is set as the **TEMP** environment variable.
2. If the **TEMP** environment variable is not set, **TEMP_REMOTE** is set as C:\TEMP.

Example

Windows In this example, the *vmcliprofile* contains the following **VE_DATACENTER_NAME** settings:

```
VE_DATACENTER_NAME: DataCenter1:TSM_DC1
VE_DATACENTER_NAME: DataCenter2:TSM_DC2
```

The data mover node, VC1_DC1_DM1, is configured with proxy authority access to DataCenter1 and DataCenter2.

Windows The following command is issued to scan all guest VMs in DataCenter1 and DataCenter2:

```
vmcli -f start_guest_scan -dcscan "DataCenter1,DataCenter2" -o VC1_DC1_DM1
```

The following application information is displayed:

```
Tivoli Storage Manager Command Line Wrapper for Virtual Environments
Version: 7.1.8
Build Date: Mon Jul 11 20:03:31 2016
Tivoli Storage Manager API Version 71600
Tivoli Storage Manager Command Line Wrapper Compile Version 71600
#PARAM OPERATION_TYPE 9
#PHASE_COUNT 4
#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=OREO.STORE.XYZ.COM
#PARAM TSM_SERVER_PORT=1500
#PARAM TSMCLI_NODE_NAME=VC1_VCLI1
#PARAM VCENTER_NODE_NAME=VC1
#PARAM DATACENTER_NODE_NAME=VC1_DC1
#PARAM OFFLOAD_HOST_NAME=VC1_DC1_DM1
#PARAM PASSWORD_TYPE=CLINODE
```

```
#PARAM TSM_OPTFILE=C:\Users\ADMINI~1\AppData\Local\Temp\2\T4V9393.tmp
#PARAM INPUT_FILE=
#PARAM TRACEFILE=c:\amd64_unicode\tsmcli.trace
#PARAM TRACEFLAGS=service,VMVCB,VMTSMVSS,verbdetail,C2C
#PHASE INITIALIZE
#CHILD targetnode:VC1_DC1
#PARENT peernode:VC1_DC1_DM1
#CHILD hladdress:9.52.62.65
#PARENT peernode:VC1_DC1_DM1
#CHILD lladdress:50408
#PARENT peernode:VC1_DC1_DM1
#PHASE READ_DATACENTER_GUEST_PASSWORD
#PHASE SCANGUEST
#PARAM STATUS=success
#CHILD scanid: DataCenter1::VC1_DC1.1358316054281
#PARENT datacentername: DataCenter1::VC1_DC1
#PARAM OPERATION_TYPE 9 #PHASE_COUNT 4
#PHASE PREPARE
#PARAM BACKUP_TYPE=0
#PARAM TSM_SERVER_NAME=OREO.STORE.XYZ.COM
#PARAM TSM_SERVER_PORT=1500
#PARAM TSMCLI_NODE_NAME=VC1_VCLI1
#PARAM VCENTER_NODE_NAME=VC1
#PARAM DATACENTER_NODE_NAME=VC1_DC2
#PARAM OFFLOAD_HOST_NAME=VC1_DC1_DM1
#PARAM PASSWORD_TYPE=CLINODE
#PARAM TSM_OPTFILE=C:\Users\ADMINI~1\AppData\Local\Temp\2\T4V50B.tmp
#PARAM INPUT_FILE= #PARAM TRACEFILE=c:\amd64_unicode\tsmcli.trace
#PARAM TRACEFLAGS=service,VMVCB,VMTSMVSS,verbdetail,C2C
#PHASE INITIALIZE #CHILD targetnode:VC1_DC2
#PARENT peernode:VC1_DC1_DM1
#CHILD hladdress:9.52.62.65
#PARENT peernode:J_VC1_DC1_DM1
#CHILD lladdress:50408
#PARENT peernode:VC1_DC1_DM1
#PHASE READ_DATACENTER_GUEST_PASSWORD
#PHASE SCANGUEST
#PARAM STATUS=success
#CHILD scanid: DataCenter2::VC1_DC2.1358316054281
#PARENT datacentername:DataCenter2::VC1_DC2
#INFO FMM16014I The return code is 0.
#END
```

Windows The #PARAM STATUS=success message (in the #PHASE SCANGUEST section) confirms only that the datacenter was successfully submitted for processing by the data mover. The actual scan status for each VM is available only after the data mover completed processing that VM. To view the scan status of an individual VM, see the value in the Scan Status column of the Data Protection for VMware vSphere GUI Application Configuration Status report. To view the overall status of the scan operation, see the **Overall Scan Status** value in the Data Protection for VMware vSphere GUI Report window.

Important: If you receive an error after you run the **vmcli -f start_guest_scan** command, view the contents of the dsmerror.log file for more information. The dsmerror.log file is on the system that is associated with the data mover node defined by the **OFFLOAD_HOST_NAME** parameter in the command output. By default, error log files are in the installation directory:
C:\Program Files\Tivoli\TSM\baclient

Profile parameters

Use the Data Protection for VMware command-line interface profile to configure settings for backup and restore tasks in your environment.

The profile is located in this directory on the system where the Data Protection for VMware vSphere GUI is installed:

Linux `/home/tdpvmware/tdpvmware/config`

Windows `C:\Program Files\Common Files\Tivoli\TDPVMware\VMwarePlugin\scripts`

DERBY_HOME *<path to Derby database>*

This parameter specifies the location of the Derby database that is used by the Data Protection for VMware command-line interface.

Example:

Linux

```
DERBY_HOME  /home/tdpvmware/tdpvmware
```

Windows

```
DERBY_HOME  C:\Program Files\Common Files\Tivoli\TDPVMware\VMwarePlugin\derby
```

This parameter is valid in a vSphere or vCloud Director environment.

VE_DATACENTER_NAME *<data_center_name*::*DATA_CENTER_NODE_NAME>*

Specify the VMware datacenter (`datacenter name`) with a value that is case-sensitive and that matches the datacenter name used in the vCenter. Specify the virtual node (`DATA_CENTER_NODE_NAME`) that maps to the datacenter. If the vCenter manages several datacenters, you can specify this parameter for each datacenter. However, the Data Protection for VMware vSphere GUI does not support datacenters with the same name in the vCenter.

Example:

```
VE_DATACENTER_NAME  DataCenter1::Fin_Datacenter1
VE_DATACENTER_NAME  DataCenter2::Fin_Datacenter2
```

This parameter is valid only in a vSphere environment.

Restriction: Data Protection for VMware support for VM backup and restore operations is limited to VM names and datacenter names that contain English 7-bit ASCII characters only. VM names and datacenter names that use other language characters are not currently supported. Additional character restrictions are listed in Appendix A, “Troubleshooting,” on page 165.

After a datacenter name is created and associated with a Tivoli Storage Manager node, be aware of these restrictions:

- Do not change the datacenter name in the vCenter without also creating a Tivoli Storage Manager node name and associating it with the new datacenter name.
- Do not change the datacenter name and the profile without also changing the Tivoli Storage Manager node name.

- Do not create a datacenter mapping value in the profile with a previously used Tivoli Storage Manager node.

When the datacenter name in the vCenter has changed, you must complete these steps before attempting any operations:

1. Register a datacenter node for the new datacenter name.
2. Grant proxy authority to the new datacenter node to perform tasks on behalf of the vCenter node.
3. Update the profile with the new datacenter mapping.
4. Grant proxy authority to the data mover nodes to perform tasks on behalf of the new datacenter node.
5. Remove any entry from the profile that used the previous datacenter node or vCenter node name.

VE_TRACE_FILE *<path and name of trace file>*

Specify the full path and name of the file to be used to contain trace information. Activate tracing only when instructed to do so by IBM Software Support.

This parameter is valid in a vSphere or vCloud Director environment.

VE_TRACE_FLAGS *<flags>*

Specify one or more trace flags. Multiple trace flags are separated with a space. Activate tracing only when instructed to do so by IBM Software Support.

This parameter is valid in a vSphere or vCloud Director environment.

VE_TSMCLI_NODE_NAME *<VMCLI node>*

Specify the VMCLI node. This node connects the Data Protection for VMware command-line interface to the Tivoli Storage Manager server and data mover node.

Example:

```
VE_TSMCLI_NODE_NAME  VC1_VCLI1
```

This parameter is valid in a vSphere or vCloud Director environment.

Restriction: The VMCLI node does not support the SSL protocol or LDAP authentication when communicating with the Tivoli Storage Manager server.

VE_TSM_MODE *VCLOUD* **I** *VSPHERE*

Specify the VMware environment that Data Protection for VMware protects. You can specify one of the following environments:

VCLOUD

Specify this value when Data Protection for VMware protects data in a vCloud Director environment.

VSPHERE

Specify this value when Data Protection for VMware protects data in a vSphere environment.

Example:

```
VE_TSM_MODE VCLOUD
```

This parameter is valid in a vSphere or vCloud Director environment.

VE_TSM_SERVER_NAME *<server host name or IP address>*

Specify the host name or IP address of the Tivoli Storage Manager server used for backup operations. There is no default value.

Example:

```
VE_TSM_SERVER_NAME  tsmserver.xyz.yourcompany.com
```

This parameter is valid in a vSphere or vCloud Director environment.

VE_TSM_SERVER_PORT *<port name>*

Specify the port name to use for the Tivoli Storage Manager server. The default value is `1500`.

Example:

```
VE_TSM_SERVER_PORT  1500
```

This parameter is valid in a vSphere or vCloud Director environment.

VE_TSM_SSL *YES*|*NO*

Specify whether to enable Secure Sockets Layer (SSL) to provide secure client and server communications. `No` is the default.

VE_TSM_SSLACCEPTCERTFROMSERV *YES*|*NO*

Specify whether the backup-archive client or the API application accept and trust the Tivoli Storage Manager server's Secure Sockets Layer (SSL) public certificate the first time they connect. `YES` is the default. You can use this option to connect only to a Tivoli Storage Manager server V7.1.8 and later V7 levels, and V8.1.2 and later levels.

VE_TSM_SSLREQUIRED *DEFAULT*|*YES*|*NO*|*SERVERONLY*

Specify the conditions when SSL is or is not required when the client logs on to the Tivoli Storage Manager server or storage agents. `DEFAULT` is the default. When communicating with the Tivoli Storage Manager server V7.1.8 and later V7 levels, and V8.1.2 and later levels, this option no longer applies since SSL is always used.

VE_VCENTER_NODE_NAME *<vCenter node>*

Specify the vCenter node. This virtual node represents a vCenter.

Example:

```
VE_VCENTER_NODE_NAME  VC1
```

In vCloud mode, the **VE_VCENTER_NODE_NAME** parameter is the top-level node that represents the vCloud.

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_DB_BACKUP *NO AT*[*day*[, *day*[,.....]]] *time TO backup location*

This parameter controls the backup of the Derby database containing the metadata of the Data Protection for VMware command-line interface. Specify one of these values:

NO This option does not perform a backup of the Derby database.

AT [*day*[, *day*[,....]]] *time_in _24_H*

This option creates a backup on the specified day or days at the specified time, which is triggered by the scheduler. If the day value is not specified, a daily backup is created. Specify one of these values:

MON, TUE, WED, THU, FRI, SAT, SUN.
You can separate these values by a comma or a blank space.

AFTER_BACKUP
This option creates a backup of the Derby database after each Data Protection for VMware backup operation.

The default location for the backups of the Derby database is *install_dir*/derby_backups. Specify TO *path* to set a custom path.

Example:

```
VMCLI_DB_BACKUP  AT 00:00
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_DB_BACKUP_VERSIONS <*number*>
Specify the maximum number of backup generations that are maintained for the Derby database, before the oldest version is overwritten by a new version. This parameter applies only to the backups of the Derby database containing metadata. It has no effect on the number of backup generations that are maintained for the backups of a vSphere environment. The default value is 3.

Example:

```
VMCLI_DB_BACKUP_VERSIONS 3
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_DB_HOST <*Derby database local host name*>
Specify the local host name of the Derby database. You can specify the host name (localhost) or the IP address (0.0.0.0).

Example:

```
VMCLI_DB_HOST localhost
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_DB_NAME <*Derby database name*>
Specify the name of the Derby database. The default value is VMCLIDB.

Example:

```
VMCLI_DB_NAME  VMCLIDB
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_DB_PORT <*Derby database port number*>
Specify the Derby database port on which the Data Protection for VMware command-line interface starts and connects to the database. The default value is 1527. If this port is in use by another application, specify a different port.

Example:

```
VMCLI_DB_PORT  1527
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_GRACE_PERIOD <*seconds*>
When a backup is no longer available on Tivoli Storage Manager, the backup is

marked for deletion as defined by a deletion date. However, before the backup is deleted, a grace period exists. Use this parameter to specify the grace period (length of time) between the deletion date and the date the backup is deleted from the Derby database. The default value is `2592000` seconds (30 days).

Example:

```
VMCLI_GRACE_PERIOD  1296000
```

This parameter is valid in a vSphere or vCloud Director environment.

`VMCLI_LOG_DIR` *`<path of log file>`*

Specify the absolute location or the relative location of the installation directory where the Data Protection for VMware command-line interface writes its log files. The default value is `logs`. If the default value `logs` is used, then all logs (and trace information) are written to these locations:.

Linux `/opt/tivoli/tsm/tdpvmware/common/logs`

Windows `C:\Program Files\Common Files\Tivoli\TDPVMware\logs`

Example:

```
VMCLI_LOG_DIR  logs
```

This parameter is valid in a vSphere or vCloud Director environment.

`VMCLI_RECON_INTERVAL_TSM` *`<seconds>`*

This parameter specifies the interval between *reconciliation* operations on the Derby database with Data Protection for VMware. Reconciliation operations delete metadata for backups that are no longer available. This action ensures the Derby database remains synchronized with the Data Protection for VMware repository. The default value is `1200` seconds.

Example:

```
VMCLI_RECON_INTERVAL_TSM  1200
```

This parameter is valid in a vSphere or vCloud Director environment.

`VMCLI_RESTORE_TASK_EXPIRATION_TIME` *`<seconds>`*

Specify the time that a Data Protection for VMware command-line interface restore task is stored in the Derby database. The default value is `2592000` seconds (30 days).

Example:

```
VMCLI_RESTORE_TASK_EXPIRATION_TIME  2592000
```

This parameter is valid in a vSphere or vCloud Director environment.

`VMCLI_SCHEDULER_INTERVAL` *`<seconds>`*

Specify the interval, in seconds, between scheduler checks for scheduled tasks due to begin. The default value is 1 second.

Example:

```
VMCLI_SCHEDULER_INTERVAL 60
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_TASK_EXPIRATION_TIME *<seconds>*

This parameter specifies the time that a task is stored in the Data Protection for VMware command-line interface Derby database. This parameter applies only to the **inquire_config** command. The default value is 864000 seconds (10 days).

Example:

```
VMCLI_TASK_EXPIRATION_TIME  864000
```

This parameter is valid in a vSphere or vCloud Director environment.

VMCLI_TRACE *YES*|*NO*

Specify that tracing files are activated. Activate tracing only when instructed to do so by IBM Software Support.

This parameter is valid in a vSphere or vCloud Director environment.

Example Linux profile in a vSphere environment

Linux

```
VE_TSM_SERVER_NAME      9.11.90.28
VE_TSM_SERVER_PORT      1500
VE_TSMCLI_NODE_NAME     my_vc1_vcli1
VE_VCENTER_NODE_NAME    my_vc1
VE_DATACENTER_NAME               Clovis Lab::MY_VC1_DC1
VMCLI_TASK_EXPIRATION_TIME         864000 # in seconds, defaults to 864000s = 10 days
VMCLI_RESTORE_TASK_EXPIRATION_TIME 2592000 # in seconds, defaults to 2592000s = 30 days
VMCLI_GRACE_PERIOD                 2592000 # in seconds, defaults to 2592000s = 30 days
VMCLI_SCHEDULER_INTERVAL           60     # in seconds, defaults to 1s
VMCLI_DB_HOST                      localhost
VMCLI_DB_PORT   1527
VMCLI_CACHE_EXPIRATION_TIME        600  # in seconds, defaults to 600s = 10 min
VMCLI_DB_NAME                      VMCLIDB
VMCLI_RECON_INTERVAL_FCM           600   # setting in seconds default 600s = 10 min
VMCLI_RECON_INTERVAL_TSM           1200  # setting in seconds default 1200s = 20 min
VMCLI_DB_BACKUP                    AT 00:00
VMCLI_DB_BACKUP_VERSIONS           3
VMCLI_LOG_DIR                      logs
DERBY_HOME      /home/tdpvmware/tdpvmware
```

Example Windows profile in a vSphere environment

Windows

```
VE_TSM_SERVER_NAME                 philadelphia                  # -s
VE_TSM_SERVER_PORT                 1500                          # -p
VE_TSMCLI_NODE_NAME                CLI_WIN8x32                   # -n
VE_VCENTER_NODE_NAME               VC_WIN8x32                    # -v
VE_DATACENTER_NAME                 DC_CVT::DC_Win8x32
VMCLI_TASK_EXPIRATION_TIME         864000 # in seconds, defaults to 864000s = 10 days
VMCLI_RESTORE_TASK_EXPIRATION_TIME 2592000  # in seconds, defaults to 2592000s = 30 days
VMCLI_GRACE_PERIOD                 2592000 # in seconds, defaults to 2592000s = 30 days
VMCLI_SCHEDULER_INTERVAL           60  # in seconds, defaults to 1s
VMCLI_DB_HOST                      localhost
VMCLI_DB_PORT                      1527
VMCLI_CACHE_EXPIRATION_TIME        600  # in seconds, defaults to 600s = 10 min
VMCLI_DB_NAME                      VMCLIDB
VMCLI_RECON_INTERVAL_FCM           600  # setting in seconds default 600s = 10 min
VMCLI_RECON_INTERVAL_TSM           1200 # setting in seconds default 1200s = 20 min
VMCLI_DB_BACKUP                    AT 00:00
VMCLI_DB_BACKUP_VERSIONS           3
VMCLI_LOG_DIR                      logs
DERBY_HOME  C:\Program Files\Common Files\Tivoli\TDPVMware\VMwarePlugin\derby
```

Example Linux profile in a vCloud environment

Linux

```
VE_TSM_SERVER_NAME       fvtseries11esx6
VE_TSM_SERVER_PORT      1500
VE_TSMCLI_NODE_NAME      VMCLI_LNX_TEST2
VE_VCENTER_NODE_NAME     VCD_LNX_TEST2
VMCLI_TRACE                        NO
#VE_TSM_SERVER_NAME                tsmservername                  # -s
#VE_TSM_SERVER_PORT                1500                           # -p
#VE_TSMCLI_NODE_NAME               tsmclinodename                 # -n
#VE_VCENTER_NODE_NAME              vcenternodename                # -v
#VE_TRACE_FILE                     tsmcli.trace                   # -x tsmcli trace file
#VE_TRACE_FLAGS                    api api_detail                 # -y trace flags
#VE_DATACENTER_NAME                datacentername::datacenternodename
VMCLI_TASK_EXPIRATION_TIME         864000   # in seconds, defaults to 864000s = 10 days
VMCLI_RESTORE_TASK_EXPIRATION_TIME 2592000  # in seconds, defaults to 2592000s = 30 days
VMCLI_GRACE_PERIOD                 2592000  # in seconds, defaults to 2592000s = 30 days
VMCLI_SCHEDULER_INTERVAL           60       # in seconds, defaults to 1s
VMCLI_DB_HOST                      localhost
VMCLI_DB_PORT   1527
VMCLI_CACHE_EXPIRATION_TIME        600      # in seconds, defaults to 600s = 10 min
VMCLI_DB_NAME                      VMCLIDB
VMCLI_RECON_INTERVAL_FCM           600  # in seconds default 600s = 10 min
VMCLI_RECON_INTERVAL_TSM           1200 # in seconds default 1200s = 20 min
VMCLI_DB_BACKUP                    AT 00:00
VMCLI_DB_BACKUP_VERSIONS           3
```

Example Windows profile in a vCloud environment

Windows

```
VE_TSM_SERVER_NAME harding
VE_TSM_SERVER_PORT 1500
VE_TSMCLI_NODE_NAME VMCLI_WINSTR
VE_VCENTER_NODE_NAME VCD_WINSTR
VMCLI_TRACE                        NO
#VE_TSM_SERVER_NAME                tsmservername                  # -s
#VE_TSM_SERVER_PORT                1500                           # -p
#VE_TSMCLI_NODE_NAME               tsmclinodename                 # -n
#VE_VCENTER_NODE_NAME              vcenternodename                # -v
#VE_TRACE_FILE                     tsmcli.trace                   # -x tsmcli trace file
#VE_TRACE_FLAGS                    api api_detail                 # -y trace flags
#VE_DATACENTER_NAME                datacentername::datacenternodename
VMCLI_TASK_EXPIRATION_TIME         864000   # in seconds, defaults to 864000s = 10 days
VMCLI_RESTORE_TASK_EXPIRATION_TIME 2592000  # in seconds, defaults to 2592000s = 30 days
VMCLI_GRACE_PERIOD                 2592000  # in seconds, defaults to 2592000s = 30 days
VMCLI_SCHEDULER_INTERVAL           60       # in seconds, defaults to 1s
VMCLI_DB_HOST                      localhost
VMCLI_DB_PORT                      1527
VMCLI_CACHE_EXPIRATION_TIME        600      # in seconds, defaults to 600s = 10 min
VMCLI_DB_NAME                      VMCLIDB
VMCLI_RECON_INTERVAL_FCM           600 # in seconds default 600s = 10 min
VMCLI_RECON_INTERVAL_TSM           1200 # in seconds default 1200s = 20 min
VMCLI_DB_BACKUP                    AT 00:00
VMCLI_DB_BACKUP_VERSIONS           3
VMCLI_LOG_DIR                      logs
DERBY_HOME   C:\Program Files (x86)\Common Files\Tivoli\TDPVMware\VMwarePlugin\derby
VE_TSM_MODE        VCLOUD
VE_DATACENTER_NAME Local DC::WINMA_LOCAL_DC
```

Chapter 6. Recovery Agent command-line interface

Use the Recovery Agent command-line interface (CLI) to access Data Protection for VMware functions.

The Recovery Agent CLI can be viewed as a command-line API to the Tivoli Storage Manager recovery agent. Changes completed with the Recovery Agent CLI to the Tivoli Storage Manager recovery agent take effect immediately.

You can use the Recovery Agent CLI to manage only one system running the Tivoli Storage Manager recovery agent.

Starting the Recovery Agent command-line interface

Start the Recovery Agent CLI from the Windows Start menu.

About this task

To start the Recovery Agent CLI, complete the following steps:

Procedure

1. From the Windows Start menu, click **Programs** > **Tivoli Storage Manager** > **Data Protection for VMware** > **Tivoli Storage Manager recovery agent**.
2. In the command prompt window, enter one of the following commands:
   - To run the Recovery Agent CLI:

     ```
     RecoveryAgentShell.exe -c command type tag parameter
     ```

   - Windows To display the help for the Recovery Agent CLI:

     ```
     RecoveryAgentShell.exe -h
     ```

Recovery Agent command-line interface overview

When you use the commands, some parameters are not required. See the following sections for details regrading required parameters.

For the parameters that are not required and not entered, default values are used. Parameters with spaces must be enclosed in quotation marks. For example, if you want to use the *Accounting, Daily* parameter, type "Accounting, Daily".

To read a syntax diagram for entering a command, follow the path of the line. Read from left to right, and from top to bottom, and use the following guidelines:

- The >>- character sequence indicates the beginning of a syntax diagram.
- The --> character sequence at the end of a line indicates that the syntax diagram continues on the next line.
- The >-- character sequence at the beginning of a line indicates that a syntax diagram continues from the previous line.
- The --->< character sequence indicates the end of a syntax diagram.

Symbols

Enter these symbols exactly as they are displayed in the syntax diagram:

*	Asterisk
{}	Braces
:	Colon
,	Comma
=	Equal sign
-	Hyphen
()	Parentheses
.	Period
	Space
"	Quotation mark
'	Single quotation mark

Variables

Italicized lowercase items such as <*variable_name*> indicate variables. In this example, you can specify a <*variable_name*> when you enter the **cmd_name** command.

```
►►──-cmd_name──<variable_name>──────────────────────────────────────────►◄
```

Required choices

When two or more items are in a stack and one of them is on the line, you must specify one item. In the following example, you must choose either *A*, *B*, or *C*:

```
►►──-cmd_name───┬─A─┬───────────────────────────────────────────────────►◄
                ├─B─┤
                └─C─┘
```

Optional choices

When an item is below the line, that item is optional. In the following example, you can select either *A* or nothing at all:

```
►►──-cmd_name───┬───┬───────────────────────────────────────────────────►◄
                └─A─┘
```

When two or more items are in a stack below the line, all items are optional. In the following example, you can choose either *A*, *B*,*C*, or nothing.

```
►►──-cmd_name───┬───┬───────────────────────────────────────────────────►◄
                ├─A─┤
                ├─B─┤
                └─C─┘
```

Mount command

Use the **mount** command to complete various Tivoli Storage Manager recovery agent tasks.

The Recovery Agent CLI can be used to mount (**mount add**) and unmount (**mount del**) volumes and disks, and to view a list of mounted volumes (**mount view**).To use the **mount** command, Tivoli Storage Manager recovery agent must be running. Use the **set_connection** command to connect a RecoveryAgentShell.exe to the mount application.

Snapshots are mounted or unmounted on the system where Tivoli Storage Manager recovery agent is running.

The **mount** command is supported in command mode. The following command types are available. The appropriate tags and parameters are listed alongside each command type.

add Use this command type to mount a disk or volume of a snapshot to the system where Tivoli Storage Manager recovery agent is running. The following list identifies the tags and parameters for the **add** type:

- **-target** - This tag is required.

  Use this tag to specify the following targets:

  – Windows Virtual volume - only for a partition mount

  – Windows Reparse point - only for a partition mount

  – Windows Linux iSCSI target

  The following examples use the **-target** tag:

  – Windows In the following example *V:* is the virtual volume mount target:

  ```
  -target "V:"
  ```

  – In the following example a reparse point volume mount target is specified:

  ```
  -target "C:\SNOWBIRD@FASTBACK\SnowbirtK\Snowbird\K\\"
  ```

  – Windows Linux In the following example an iSCSI target is specified:

  ```
  -target "ISCSI: target=<target_name> initiator=<initiator_name>"
  ```

  When you use the Tivoli Storage Manager recovery agent in an iSCSI network, and the Recovery Agent does not use a data mover, go to the `C:\ProgramData\Tivoli\TSM\RecoveryAgent\mount\RecoveryAgent.conf file` and specify the `[IMOUNT]` tag and **Target IP** parameter:

  ```
  [IMOUNT config]
  Target IP=<IP address of the network card on the system
  that exposes the iSCSI targets.>
  ```

  For example:

  ```
  [General config]
  param1
  param2
  ...
  [IMount config]
  Target IP=9.11.153.39
  ```

After you add or change the Target IP parameter, restart the Recovery Agent GUI or Recovery Agent CLI.

- **-rep** - This tag is required.

  Use it to specify the Tivoli Storage Manager server that is storing the VMware snapshots, and the Tivoli Storage Manager node that has access to the VMware backups. For example:

  ```
  tsm: ip=<ip/host_name> port=<port_number>
   node=<node_name> pass=<node_password>
  ```

  You can also specify the `as_node` and `from_node` options. If the `password` field is empty, the Tivoli Storage Manager recovery agent attempts to use the password for the stored node.
- **-type** - This tag is required. Use it to specify that you want to mount a disk or a partition. The options are:

  -type disk

  -type partition
- **-VMname** - This tag is required. Use it to specify the VMware machine name that is source of the snapshot. The specified value is case-sensitive.
- **-disk** - This tag is required. Use it to specify the disk number of the source backed up VMware machine to be mounted.
- **-date** - This tag is required. Use it to specify the date of the snapshot that you want to mount. The date format is `yyyy-Mmm-dd hh:mm:ss`. For example:

  ```
  -date "2013-Apr-12 22:42:52 AM"
  ```

  To view the active (or latest) snapshot, specify `last snapshot`.
- **-PartitionNumber** - This tag is optional. If the -type is partition, enter the partition number to mount.
- **-ro|-fw** - Use this tag to specify whether the mounted volume is read-only (**-ro**) or fake-write (**-fw**).
- **-disk** - This tag is required. Use it to specify the disk number of the source backed up VMware machine to be mounted.
- **-ExpireProtect** - This tag is optional. During a mount operation, the snapshot on the Tivoli Storage Manager server is locked to prevent it from expiring during the operation. Expiration might occur because another snapshot is added to the mounted snapshot sequence. This value specifies whether to disable expiration protection during the mount operation. You can specify one of the following values:

  Yes Specify `Yes` to protect the snapshot from expiration. This value is the default. The snapshot on the Tivoli Storage Manager server is locked and the snapshot is protected from expiration during the mount operation.

  No Specify `No` to disable expiration protection. The snapshot on the Tivoli Storage Manager server is not locked and the snapshot is not protected from expiration during the mount operation. As a result, the snapshot might expire during the mount operation. This expiration can produce unexpected results and negatively impact the mount point. For example, the mount point can become unusable or contain errors. However, expiration does not affect the current active copy. The active copy cannot expire during an operation.

When the snapshot is on a target replication server, the snapshot cannot be locked because it is in read-only mode. A lock attempt by the server causes the mount operation to fail. To avoid the lock attempt and prevent such a failure, disable expiration protection by specifying `No`.

The following example shows how to specify the **add** type to mount a disk:

```
mount add -rep "tsm: ip=10.10.10.01 port=1500 node=tsm-ba pass=password"
-target "iscsi: target=test1 initiator=initiator_name" -type disk
-vmname VM-03ENT -disk 1 -date "2014-Jan-21 10:46:57 AM -ExpireProtect=Yes"
```

In this example, a snapshot of VMware named VM-03ent is located on a Tivoli Storage Manager server with IP 10.10.10.01. Disk number 1 of this snapshot is mounted to the system where Tivoli Storage Manager recovery agent is running.

del Use this command type to dismount one or all mounted backups from the system where Tivoli Storage Manager recovery agent is running. The following list identifies the tags and parameters for the **del** type:

- **-target** - This tag is required. Use this tag to specify the target for dismounting. The target for dismounting can be a virtual volume, reparse point, or iSCSI target created using the **mount** command. Use the *everything* variable to dismount all mounted backups.
- **-force** - Use this tag to force an unmount. The default option is not to force an unmount if the target is currently in use.

For example, to force an unmount of a snapshot that is currently mounted at the directory, *c:\gever*, use the following command:

```
mount del -target "c:\gever" -force
```

To dismount a snapshot currently mounted as volume *V:*, use the following command:

```
mount del -target V:
```

To dismount a snapshot currently mounted as an iSCSI target, use the following command:

```
mount del -target "ISCSI:<target_name>"
```

dump Use this command type to get a list of all the available backups to mount.

- **-rep** - This tag is required. Use this tag to specify the Tivoli Storage Manager server storing the VMware snapshots, and to specify the Tivoli Storage Manager node that has access to the VMware backups. For example:

  ```
  tsm: ip=<IP/host name> port=<PortNumber>
  node=<NodeName> pass=<NodePassword>
  ```

- **-file** - This tag is optional. Use this tag to identify a file name to store the dump text. If this tag is not specified, the dump text is printed only to stdout.

The following examples show how to specify the dump type:

- List all the available backed up VMs.

  ```
  mount dump –type TSM –for TSMVE -rep P -request
  ListVM [–file <FileNameAndPath>]
  ```

- List all the available disk snapshots of a VMware.

  ```
  mount dump –type TSM –for TSMVE -rep P -request
  ListSnapshots -VMName P [-file <FileNameAndPath>]
  ```

- List all the available partitions of a disk snapshot.

  ```
  mount dump –type TSM –for TSMVE -rep P -request
  ListPartitions -VMName P -disk P -date P [-file <FileNameAndPath>]
  ```

remove

Use this type to remove the connection to a Tivoli Storage Manager server. A connection cannot be removed when it is in use, such as when mounted volumes exist. There is only one tag for the **remove** type:

> **-rep** - This tag is required. Use this tag to specify the Tivoli Storage Manager server connection to be removed.

In the following example, remove the connection to a Tivoli Storage Manager server (10.10.10.01) using node NodeName:

```
mount remove -rep "tsm: NodeName@ip"
```

view Use this type to view a list of all mounted snapshots. This type has no tags. The following example uses the **view** type:

```
mount view
```

Mounting a disk

The following syntax diagram is for the command for mounting a disk:

```
►►──RecoveryAgentShell.exe -c──mount──add──-rep──"tsm:──ip──=──┬─IP────────┬──────────►
                                                               └─host_name─┘

►─port──=──portNumber──node──=──nodeName──┬──────────────────────────┬─────────────────►
                                          └─-as_node──=──nodeName────┘

►─pass──=──NodePassword"──-vmname──vmname──-type──disk──-disk────disk_number──────────►

►─date──date_format───────────────────────────────────────────────────────────────────►

►─-target──"ISCSI:──target──=──target_name──initiator──=──initiator_name"────────────►◄
```

Mounting a partition

The following syntax diagram is for the command for mounting a partition:

```
►►──RecoveryAgentShell.exe -c──mount──add──-rep "tsm:──ip──=──┬─IP─────────┬──────────►
                                                              └─ host_name─┘

►─port──=──portNumber──node──=──nodeName──┬──────────────────────────┬─────────────────►
                                          └─-as_node──=──nodeName────┘

►─pass──=──NodePassword"──-vmname──vmname──-disk──┬─disk_number─┬─────────────────────►
                                                  └─vmdk────────┘

►─date──date_format──-type partition──-PartitionNumber──partNum──────────────────────►

►─-target──┬─volume_letter──────────────────────────────────────────────────┬────────►◄
           └─"ISCSI:──target──=──target_name──initiator──=──initiator_name"─┘
```

Set_connection command

The **set_connection** command sets the Recovery Agent CLI to work with a specified Tivoli Storage Manager recovery agent.

Use the following format for the **set_connection** command:

```
RecoveryAgentShell.exe -c set_connection Command_Tag <hostname or IP address>
```

The following tag can be used with the **set_connection** command:

mount_computer - Use to set the Tivoli Storage Manager recovery agent connection.

In the following example, the Recovery Agent CLI is set to work with Tivoli Storage Manager recovery agent on the *ComputerName* host.

```
set_connection mount_computer ComputerName
```

Help command

The **help** command displays the help for all of the supported Recovery Agent CLI commands.

Use the following format for the **help** command:

```
RecoveryAgentShell.exe -h
```

Recovery Agent command-line interface return codes

Return codes help identify the results of Recovery Agent CLI operations.

Use these return codes to check the status of your Recovery Agent CLI operations.

Table 12. Recovery Agent CLI return codes

Return Code	Value	Description
0	FBC_MSG_MOUNT_SUCCESS	Command submitted successfully to Data Protection for VMware mount.
0	FBC_MSG_DISMOUNT_SUCCESS	Successfully dismounted a snapshot.
0	FBC_MSG_VIEW_SUCCESS	View operation successful.
0	FBC_MSG_DUMP_SUCCESS	Dump operation successful.
0	FBC_MSG_REMOVE_SUCCESS	Remove operation successful.
1	FBC_MSG_MOUNT_FAIL	Mount failed (See the mount logs for details).
2	FBC_MSG_MOUNT_DRIVER_ERROR	Mount driver error.
3	FBC_MSG_VOLUME_LETTER_BUSY	Volume letter or reparse point is in use.
4	FBC_MSG_MOUNT_WRONG_ PARAMETERS	Incorrect parameters assigned to the mount command (See the mount logs for details).
5	FBC_MSG_MOUNT_ALREADY_ MOUNTED	Job is already mounted on the requested target.
6	FBC_MSG_MOUNT_WRONG_ PERMISSIONS	Insufficient permissions.
7	FBC_MSG_MOUNT_NETWORK_ DRIVE	Cannot mount on network mapped volume.

Table 12. Recovery Agent CLI return codes (continued)

Return Code	Value	Description
8	FBC_MSG_MOUNT_LOCKED_BY_SERVER	Snapshot locked by the server.
9	FBC_MSG_CAN_NOT_CHANGE_REPOSITORY	Cannot change repository.
11	FBC_MSG_DISMOUNT_FAIL	Failed to dismount a mounted snapshot.
13	FBC_MSG_VIEW_FAIL	Retrieving list of virtual volumes failed.
15	FBC_MSG_DUMP_FAIL	Dump command list creation failed.
16	FBC_MSG_CONNECTION_FAILED	Disconnected from Data Protection for VMware mount.
17	FBC_MSG_CONNECTION_TIMEOUT	Operation timed out.
18	FBC_MSG_MOUNT_FAILED_TO_FIND_REPOSITORY	Failed to find a valid repository with snapshots.
19	FBC_MSG_MOUNT_JOB_NOT_FOUND	Failed to find the requested snapshot.
20	FBC_MSG_MOUNT_JOB_FOLDER_NOT_FOUND	Failed to find the requested snapshot data.
22	FBC_MSG_CAN_NOT_REMOVE_REPOSITORY	Cannot remove selected repository.
23	FBC_MSG_REPOSITORY_GOT_MOUNTS	Repository has mounted snapshots.
38	FBC_MSG_MOUNT_NOT_WRITABLE_VOLUME	The mount volume is not writable
39	FBC_MSG_NO_TSM_REPOSITORY	No Tivoli Storage Manager repository was located.
40	FBC_MSG_MOUNT_NOT_ALLOWED_AS_READONLY	Mounting the iSCSI target as read only is not allowed.
41	FBC_MSG_RESOURCE_BUSY_IN_TAPE_MODE	Data Protection for VMware is running in tape mode - media is busy.
42	FBC_MSG_DISK_TYPE_NOT_SUPPORTED	Partition operation not supported for this type of disk.
43	FBC_MSG_MOUNT_INITIALIZING	The operation failed, Data Protection for VMware mount is currently initializing. Try again later.
44	FBC_MSG_CANNOT_LOCK_SNAPSHOT	The snapshot cannot be protected against expiration during this operation. For more information, see the documentation.

Chapter 7. Backing up VMware data

Use Data Protection for VMware to store backup versions of your VMware virtual machines on the Tivoli Storage Manager server.

Restriction: The following restrictions apply to VMware VMDKs that are involved in a backup operation:

- For incremental forever backup mode, each individual VMDK involved in a backup operation cannot exceed 8 TB. If a VMDK exceeds 8 TB, the backup operation fails. To increase the size of the VMDK to be larger than the default 2 TB, specify the maximum size with the `vmmaxvirtualdisks` option. For more information, see Vmmaxvirtualdisks.
- For periodic full backup mode, each individual VMDK involved in a backup operation cannot exceed 2 TB. If a VMDK exceeds 2 TB, the backup operation fails.

To prevent a failure during either backup mode, you can skip processing the VMDK by specifying `vmskipmaxvirtualdisks yes` in the backup-archive client options file. For more information, see Vmskipmaxvirtualdisks.

Backing up virtual machine data to Tivoli Storage Manager

Create a run now backup task or scheduled backup task for your virtual machine data. The data is stored on Tivoli Storage Manager server storage.

Before you begin

Before you back up virtual machines that are hosting Microsoft Exchange Server databases, mount the Exchange databases.

About this task

- During backup processing, Data Protection for VMware bypasses a guest Exchange Server database that is dismounted, corrupted, or in a Suspend state in a Database Availability Group (DAG). Databases in these states are excluded from virtual machine backups and are not available to restore.
- A run now backup task can be issued immediately or at a later time. A scheduled backup task is issued by the Tivoli Storage Manager server at the scheduled time. It cannot be issued immediately.

Procedure

Back up your virtual machine by following these steps:

1. Start the Data Protection for VMware vSphere GUI with either of these methods:
   - Click the Data Protection for VMware vSphere GUI icon in the Solutions and Applications window of the vSphere Client.
   - Open a web browser, and go to the GUI web server. For example:

     ```
     https://guihost.mycompany.com:9081/TsmVMwareUI/
     ```

     Log on with the vCenter user ID and password.

2. In the Getting Started window, click **Define a backup task** to open the Schedule a Backup wizard. Review the welcome information and click **Next** to create the backup task.
3. Click **Next** to begin the wizard. Follow the instructions in each page of the wizard and click **Next** to continue to the next page.
4. In the General page, specify a name for the backup schedule you are creating in the **Backup schedule name** field. The schedule name must not contain any spaces. You can optionally add a description for the schedule.
5. In the Source page, select a VMware datacenter and expand the branches in the navigation tree. Select the virtual machines, virtual machine templates, host cluster, or host that you want to back up.
   If you want to include newly added or discovered virtual machines to future runs of this task, check **Newly added virtual machines are included in this backup task**. This check box has the following characteristics:
   - If you select all of the virtual machines on one ESX host and you select this option, the schedule backs up that ESX host. That is, all virtual machines on that host, present and future, are backed up.
   - If you select one or more virtual machines on an ESX host (but not all), and you select this option, then the schedule includes only the selected virtual machines and any future virtual machines that are added to the host. The remaining virtual machines on that host that are not selected are excluded.
   - If you rename a virtual machine, and you select this option, the schedule backs up the renamed virtual machine.
   - If you do not select this option, only virtual machines can be selected for backup. Host clusters and hosts cannot be selected.
   - To easily exclude virtual machines that follow a naming convention from being added, expand the **Advanced VM filter option**. Enter a text pattern that identifies the virtual machines to exclude. Specify an asterisk (*) to match any character. Specify a question mark (?) to match a single character. For example:

     ```
     vm=prod1*,*testvm,*dept*, dept4?prod
     ```

     Click **Apply filter** to disable selection for these virtual machines. If you enter a virtual machine name without wildcard characters, and the virtual machine is known in the source tree, then this virtual machine is removed from the filter display. However, it is shown in the tree as not checked.
6. In the Destination page, select the data mover node that runs the backup operation. Select a data mover node that is not currently used in a backup or restore operation.
7. In the Schedule page, specify when to run the backup by clicking **Run the backup now** or **Schedule for later**. If your user authority is insufficient, **Schedule for later** is unavailable. Select the appropriate **Backup strategy** from the drop-down list:

   Incremental Forever Backup Strategy (Default)

   After an initial full backup is taken, an ongoing (forever) sequence of incremental backups occurs. This strategy requires no additional schedules to be defined.

   Select the appropriate **Backup type**:
   - Click **Incremental** to back up the blocks that changed since the previous backup (full or incremental). The most recent incremental is appended to the previous backup. If a full backup does not exist for

this virtual machine, a full backup is automatically performed. As a result, you do not have to verify that a full backup exists.

- Click **Full** to create an image of an entire virtual machine. After the full backup is taken, there is no requirement to schedule additional full backups. When full is selected, virtual machine templates that are unchanged since the last backup are also included.

Periodic Full Backup Strategy

Backs up an image of an entire virtual machine. Additional periodic full backups are required in order to expire the old versions.

Select the appropriate **Backup type**:

- Click **Incremental** to back up the data that changed since the last backup. If a full backup does not exist for this virtual machine, a full backup is performed.
- Click **Full** to create an image of an entire virtual machine. After the full backup is taken, there is no requirement to schedule additional full backups.

If you selected **Schedule for later**, click **A full backup, followed by six incremental backups** to run a full backup weekly followed by six daily incremental backups. You must enter the name of the incremental backup schedule.

- If you selected **Schedule for later**, click **Next** and proceed to Step 8.
- If you selected **Run the backup now**, click **Next**, and proceed to Step 9.

8. In the Repetition page, specify the following information:
   a. If you selected **A full backup, followed by six incremental backups** in the previous step:
      1) Specify the date and time to run the first backup. The first full backup is scheduled to run at this date and time.
      2) The six incremental backups are scheduled to run on the remaining six days of the week and at the selected time.
   b. If you selected **Incremental** or **Full** in the previous step:
      1) Specify the date and time to run the first backup.
      2) Specify the interval that you want the backup to run.
   c. Click **Next**.
9. In the Summary page, review your backup settings and click **Finish** to save your task. If you selected **Run the backup now**, the backup operation begins immediately when you click **Finish**.

What to do next

After the backup schedule has completed, you can verify that the virtual machines have been backed up in the **Reports** tab.

Setting options for an incremental forever backup schedule

When you schedule incremental forever backups, you can ensure that there are frequent backups of the VMs and reduce the size of each backup.

Before you begin

Ensure that client-side data deduplication is enabled for the storage pool.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Edit the Tivoli Storage Manager client backup-archive client options file.
   - Windows Specify these options in the `dsm.opt` options file.
   - Linux Specify these options in the `dsm.sys` file in the stanza for the data mover node.

   a. Enable compression by adding the option `compression yes` to the file.

   b. Enable deduplication by adding the option `deduplication yes` to the file.

   c. Modify the trigger values for megablock refreshes by setting one of the following options:
      - Enable a number of objects as the trigger by adding `mbobjrefreshthresh` *number* to the file.
      - Enable a percentage of objects as the trigger by adding `mbpctrefreshthresh` *percentage* to the file.

      For more information, see the backup-archive client `mbobjrefreshthresh` and `mbpctrefreshthresh` options in Client options reference.
3. Repeat Step 2 for each VMware guest.

Backing up virtual machine data to local disks

You can create a schedule to back up your VM data and store it on a storage device that is configured in the Tivoli Storage FlashCopy Manager for VMware profile. You can run the schedule immediately or at a later time.

Before you begin

Before you back up virtual machines that are hosting Microsoft Exchange Server databases, mount the Exchange databases.

About this task

During backup processing, Data Protection for VMware bypasses a guest Exchange Server database that is dismounted, corrupted, or in a Suspend state in a Database Availability Group (DAG). Databases in these states are excluded from virtual machine backups and are not available to restore.

Procedure

Create a schedule to back up VM by following these steps:

1. Start the Tivoli Storage FlashCopy Manager for VMware GUI with either of these methods:
   - Click the Tivoli Storage FlashCopy Manager for VMware GUI icon in the Solutions and Applications window of the vSphere Client.
   - Open a web browser, and go to the GUI web server. For example:

     ```
     https://guihost.mycompany.com:9081/TsmVMwareUI/
     ```

     Log on with the vCenter user ID and password.
2. In the Getting Started window, click **Define a backup task** to open the Schedule a Backup wizard. Review the welcome information and click **Next** to create the backup task.
3. In the Backup settings page, select **Back up to Tivoli Storage FlashCopy Manager** as the Type of backup to run.
4. In the General page, specify a name for the backup schedule you are creating in the **Backup Schedule Name** field. The schedule name must not contain any spaces. You can optionally add a description for the schedule.
5. In the Source page, select a VMware datacenter to view all VMs available for that datacenter. You can also expand the datacenter and select a VMware datastore to view all VMs available for that datastore. Select the VMs or VM templates to back up in the selection table. If you do not know the location of a VM, select a datacenter to view all its VMs.

   Tip: Fine-tune the list of VMs by entering text in the **Filter** field. The wildcard character (*) is not allowed.
6. In the Settings page, select the type of VMware snapshot to take when backing up to the local Tivoli Storage FlashCopy Manager for VMware disk.
7. In the Destination page, select the device class on the local disk of Tivoli Storage FlashCopy Manager for VMware to back up to. The device class defines the storage device and target disks that are used to create the hardware snapshot of the logical units (LUNs) that are used for the datastores. The device classes must be defined in the Tivoli Storage FlashCopy Manager for VMware configuration before they are available in the list.
8. In the Schedule page, you can select to run the backup immediately or schedule the backup to run at a later time.
   - To begin the backup at the completion of this wizard, select **Execute immediately**.
   - To schedule your backup to run at a later time, do the following steps:
     a. Select **Schedule for later (repeated) execution**.
     b. In the **Date and time of the first backup** field, specify when you want to run the schedule for the first time.
     c. Specify the interval that you want the schedule to run in the **How often to run the backup** field.
     d. In the **Date and time of the last backup** field, specify when you want to stop the schedule from running. If you do not specify the date and time of the last backup, the schedule creation cannot continue.
     e. If you want to include newly added or discovered VMs to future runs of this schedule, select **Newly added virtual machines are included in this backup task**. The table lists the datastores that contain the newly added VMs. This check box has the following characteristics when selected:

- If you select all of the VMs on one datastore or datacenter, the schedule backs up that datastore or datacenter. That is, all VMs on that datastore or datacenter, present and future, are backed up.
- If you select one or more VMs on a datastore or datacenter (but not all), then the schedule includes only the selected VMs and any future VMs that are added to the datastore or datacenter. The remaining VMs on that datastore or datacenter that are not selected are excluded.
- If you rename a VM, and you select this option, the schedule backs up the renamed VM.

To modify the list of datastores, go to the Source page and select VMs from only the preferred datastores. Clear the selected VMs from the non-preferred datastores.

9. In the Summary page, review your backup settings and click **Finish** to save your schedule. If you selected to run the backup now, the backup operation begins immediately when you click **Finish**.

What to do next

After the backup schedule completes, you can verify that the VMs were backed up in the **Reports** tab.

Backing up virtual machine data to Tivoli Storage Manager and local disks

You can create a schedule to back up VM data and store the backups to both Tivoli Storage FlashCopy Manager for VMware and Data Protection for VMware. You can run the schedule immediately or at a later time.

Before you begin

Before you back up virtual machines that are hosting Microsoft Exchange Server databases, mount the Exchange databases.

About this task

During backup processing, Data Protection for VMware bypasses a guest Exchange Server database that is dismounted, corrupted, or in a Suspend state in a Database Availability Group (DAG). Databases in these states are excluded from virtual machine backups and are not available to restore.

Procedure

Create a schedule to back up a VM by following these steps:

1. Start the Data Protection for VMware vSphere GUI with either of these methods:
   - Click the Data Protection for VMware vSphere GUI icon in the Solutions and Applications window of the vSphere Client.
   - Open a web browser, and go to the GUI web server. For example:
     ```
     https://guihost.mycompany.com:9081/TsmVMwareUI/
     ```
     Log on with the vCenter user ID and password.

2. In the Getting Started window, click **Define a backup task** to open the Schedule a Backup wizard. Review the welcome information and click **Next** to create the backup task.
3. Click **Next** to begin the wizard. Follow the instructions in each page of the wizard and click **Next** to continue to the next page.
4. In the Backup settings page, do the following steps:
   a. In the Type of backup to run list, select **Back up to Tivoli Storage FlashCopy Manager for VMware and to Tivoli Storage Manager**.
   b. In the Type of VMware snapshot to take list, select the snapshot for your operation.
5. In the General page, specify a name for the backup schedule you are creating in the **Backup schedule name** field. The schedule name must not contain any spaces. You can optionally add a description for the schedule.
6. In the Source page, select a VMware datacenter to view all VMs available for that datacenter. You can also expand the datacenter and select a VMware datastore to view all VMs available for that datastore. Select the VMs or VM templates to back up in the selection table. If you do not know the location of a VM, select a datacenter to view all its VMs.

   Tip: Fine-tune the list of VMs by entering text in the **Filter** field. The wildcard character (*) is not allowed.
7. In the Additional backup settings page, make the following selections:
   a. Select the backup strategy that you want to implement.
   b. Select the type of backup that you want to run.
   c. If you back up with Tivoli Storage Manager, select the action to take when there is an active backup on Tivoli Storage Manager.
8. In the Destination page, select a destination to send the backup version of the VM:
   - Select the device class on the local disk of Tivoli Storage FlashCopy Manager for VMware to back up to. The device class defines the storage device and target disks that are used to create the hardware snapshot of the logical units (LUNs) that are used for the datastores. The device classes must be defined in the Tivoli Storage FlashCopy Manager for VMware configuration before they are available in the list.
   - If you also back up to Data Protection for VMware, select the data mover node that runs the backup.
9. In the Schedule page, you can select to run the backup immediately or schedule the backup to run at a later time.
   - To begin the backup at the completion of this wizard, select **Execute immediately**.
   - To schedule your backup to run at a later time, do the following steps:
     a. Select **Schedule for later (repeated) execution**.
     b. In the **Date and time of the first backup** field, specify when you want to run the schedule for the first time.
     c. Specify the interval that you want the schedule to run in the **How often to run the backup** field.
     d. In the **Date and time of the last backup** field, specify when you want to stop the schedule from running. If you do not specify the date and time of the last backup, the schedule creation cannot continue.
     e. If you want to include newly added or discovered VMs to future runs of this schedule, select **Newly added virtual machines are included in this**

backup task. The table lists the datastores that contain the newly added VMs. This check box has the following characteristics when selected:

- If you select all of the VMs on one datastore or datacenter, the schedule backs up that datastore or datacenter. That is, all VMs on that datastore or datacenter, present and future, are backed up.
- If you select one or more VMs on a datastore or datacenter (but not all), then the schedule includes only the selected VMs and any future VMs that are added to the datastore or datacenter. The remaining VMs on that datastore or datacenter that are not selected are excluded.
- If you rename a VM, and you select this option, the schedule backs up the renamed VM.

To modify the list of datastores, go to the Source page and select VMs from only the preferred datastores. Clear the selected VMs from the non-preferred datastores.

10. In the Summary page, review your backup settings and click **Finish** to save your schedule. If you selected to run the backup now, the backup operation begins immediately when you click **Finish**.

    Tip: The Summary page lists selected VMs that contain RDM disks.

What to do next

After the backup schedule completes, you can verify that the VMs were backed up in the **Reports** tab.

Backing up migrated virtual machines

When you migrate virtual machines to a different VMware datacenter or vCenter server, you can back up the virtual machines.

Before you begin

To back up migrated virtual machines, meet the following prerequisites:

- The migrated virtual machine must be running in a VMware vSphere 6 environment.
- Before you migrate the virtual machine, back up the virtual machine with Data Protection for VMware V7.1.3 or later. Verify that the backup completed without error.
- On the virtual machine, verify that VMware Storage vMotion is installed.

The following environment migrations are supported:

- Migrate from one vCenter to another vCenter. For example: vCenter A, datacenter A, and data mover A migrated to vCenter B, datacenter B, and data mover B.
- Migrate from one datacenter to another datacenter within the same vCenter. For example: vCenter A, datacenter A, and data mover A migrated to vCenter A, datacenter C, and data mover C.

About this task

To migrate a virtual machine from one VMware datacenter to another datacenter within the same vCenter server, complete the following steps:

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:

     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```

   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:

     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```

2. Create a full VM backup of the migrated virtual machine. Store the backup on the original datacenter node from where the virtual machine was migrated.

   For example, if virtual machine VM_1 was migrated from VMware datacenter DC_A to datacenter DC_C, then back up VM_1 from data mover DM_A to datacenter DC_C directly. The following sample command is provided:

   ```
   dsmc backup vm VM_1 -vmbackuptype=fullvm -nodename=DC_C nodename
   -password=DC_C nodename_password
   ```

3. Deactivate the active backup of the migrated virtual machine on the original datacenter. Issue this command on the original datacenter node from where the virtual machine was migrated. For example, if virtual machine VM_1 was migrated from VMware datacenter DC_A to datacenter DC_C, then issue this command on datacenter node DC_A. The following sample command is provided:

   ```
   dsmc expire -objtype=vm VM_1 -nodename=DC_A nodename
   -password=DC_A nodename_password
   ```

Backing up organization vDCs to Tivoli Storage Manager

You can create an immediate backup (**Back Up Now**) or schedule a backup (**Create Backup Schedule**) for an organization vDC. The data that is backed up is stored on Tivoli Storage Manager server storage.

Procedure

Back up your organization vDCs by following these steps:

1. In the Cloud Resources window, click **Organization VDCs**. You can also click **Organizations** (in the Cloud Resources window), then drill down to the organization that contains the organization vDC.
2. Select one or more organization vDCs to back up and click one of the following backup tasks:
   - To start an immediate organization vDC backup to Tivoli Storage Manager server storage, click **Back Up Now**.
   - To create a scheduled organization vDC backup to Tivoli Storage Manager server storage, click **Create Backup Schedule**.
3. In the wizard, complete the following steps:
   a. Select the backup type:

      Incremental Forever - Incremental (Default)

      Backs up the blocks that changed since the previous backup (full or incremental). If a full backup does not exist for a vApp in this organization vDC, a full backup is automatically started. As a result, you do not have to verify that a full backup exists. After the initial full backup is taken, an ongoing (forever) sequence of incremental backups occurs. This strategy requires no additional backup tasks to be defined.

Incremental Forever - Full
Creates an image of all vApps in this organization vDC. After the full backup is taken, there is no requirement to schedule more full backups.

b. Select the data mover node that runs the backup operation. Select a data mover node that is not currently used in a backup or restore operation.

c. If you clicked **Create Backup Schedule**, enter a name to identify this task. The task name must not contain any spaces. You can add a description for the task. If you clicked **Back Up Now**, you can change the default backup name (`BackUpNow`) and also add a description.

d. Click **Next**.

- If you clicked **Back Up Now**, click **Next** and proceed to Step 5.
- If you clicked **Create Backup Schedule**, click **Next**, and proceed to Step 4.

4. In the Schedule page of the Create Schedule wizard, complete the following steps:
   a. Specify the date and time to run the first backup.
   b. Specify the interval that you want the backup to run.
5. Review the Summary page. If the information reflects your backup objective, click **Finish** to start the backup task or to create the schedule. Otherwise, click **Back** to make revisions.

Backing up vApps to Tivoli Storage Manager

You can create an immediate backup (**Back Up Now**) or schedule a backup (**Create Backup Schedule**) for a vApp. The data that is backed up is stored on Tivoli Storage Manager server storage.

Before you begin

Review the following information before you attempt a backup operation:

- When you use vCloud Administrator authority, you can back up and restore all vApps in the vCloud regardless of the organization in which they belong.
- You can back up only a complete vApp. You cannot include or exclude a specific VM or specific VM disk. However, vApp backup processing completes successfully even when the backup of some of the VMs that belong to the vApp fails.

About this task

A vApp backup contains vApp properties such as name, physical location, VM boot order, and networks. It also includes snapshots of all the VMs contained in the vApp.

Procedure

Back up vApps by completing the following steps:

1. In the Cloud Resources window, click **Organization VDCs**. You can also click **Organizations** or **Provider VDCs** (in the Cloud Resources window), then drill down to the organization vDC that contains the vApp.
2. Select the organization vDC that contains the vApp to back up.

3. The Organization VDC page shows all the vApps that are available in the organization vDC. Select one or more vApps and click one of the following backup tasks:
   - To start an immediate vApp backup to Tivoli Storage Manager server storage, click **Back Up Now**.
   - To create a scheduled vApp backup to Tivoli Storage Manager server storage, click **Create Backup Schedule**.
4. In the wizard, complete the following steps:
   a. Select the backup type:

      Incremental Forever - Incremental (Default)
      Backs up the blocks that changed since the previous backup (full or incremental). The most recent incremental is appended to the previous backup. If a full backup does not exist for this vApp, a full backup is automatically started. As a result, you do not have to verify that a full backup exists. After the initial full backup is taken, an ongoing (forever) sequence of incremental backups occurs. This strategy requires no additional backup tasks to be defined.

      Incremental Forever - Full
      Creates an image of an entire vApp. After the full backup is taken, there is no requirement to schedule more full backups.

   b. Select the data mover node that runs the backup operation. Select a data mover node that is not currently used in a backup or restore operation.

   c. If you clicked **Create Backup Schedule**, enter a name to identify this task. The task name must not contain any spaces. You can add a description for the task. If you clicked **Back Up Now**, you can change the default backup name (`BackUpNow`) and also add a description.

   d. Click **Next**.

   - If you clicked **Back Up Now**, click **Next** and proceed to Step 6.
   - If you clicked **Create Backup Schedule**, click **Next**, and proceed to Step 5.
5. On the Schedule page of the Create Schedule wizard, complete the following steps:
   a. Specify the date and time to run the first backup.

   b. Specify the interval that you want the backup to run.
6. Review the Summary page. If the information reflects your backup objective, click **Finish** to start the backup task or to create the schedule. Otherwise, click **Back** to make revisions.

Backing up data by disk usage

Specify the virtual machine disks that you want to include or exclude for backup services by setting include and exclude options.

Before you begin

Review the backup-archive client `domain.vmfull`, `include.vmdisk`, and `exclude.vmdisk` options in Client options reference.

About this task

To include virtual machines in your full virtual machine image backup operations, use the `domain.vmfull` option.

To include a virtual machine disk in a Backup VM operation, use the `include.vmdisk` option.

To exclude a virtual machine's disk from a Backup VM operation, use the `exclude.vmdisk` option.

Use these options for virtual disks that do not require backup. For example, use the options for those virtual disks that contain data that does not need to be restored, or the data is preserved by another backup mechanism.

Restriction: A virtual disk excluded from the backup operation is considered as deleted from the VM for that backup. If the VM is restored from that backup, the excluded virtual disk is not restored. Only the disk definition is restored.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Optional: View the disk name and label of the virtual disk by issuing the `preview` option. For example:
   ```
   dsmc backup vm VM1 -preview
   ```
3. Exclude a virtual disk, set the `exclude.vmdisk` option in the Tivoli Storage Manager backup-archive client `dsm.opt` options file. For example:
   ```
   EXCLUDE.VMDISK VM1 "Hard Disk 3"
   ```
4. Issue the backup command:
   ```
   dsmc backup vm VM1
   ```

Scenario: Including four disks for backup processing

Use the `include.vmdisk` and `domain.vmfull` options to include four virtual machine disks for backup services.

About this task

In the following examples, virtual machine `vm5_fin_com` contains four disks:

```
Hard Disk 1
Hard Disk 2
Hard Disk 3
Hard Disk 4
```

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:

```
cd /opt/tivoli/tsm/client/ba/bin
```

2. Use the include.vmdisk statement to back up disks Hard Disk 1 and Hard Disk 2. For example:

   ```
   INCLUDE.VMDISK vm5_fin_com "Hard Disk 1"
   INCLUDE.VMDISK vm5_fin_com "Hard Disk 2"
   ```

3. Issue the backup command:

   ```
   dsmc backup vm vm5_fin_com
   ```

   Because an include disk statement is specified, this statement implies that only disks specifically included are backed up. As a result, Hard Disk 3 and Hard Disk 4 are not backed up.

4. Use the domain.vmfull statement to back up disks Hard Disk 1 and Hard Disk 2: For example:

   ```
   DOMAIN.VMFULL "vm5_fin_com:vmdk=Hard Disk 1:vmdk=Hard Disk 2"
   ```

5. Issue the backup command:

   ```
   dsmc backup vm vm5_fin_com
   ```

   Hard Disk 3 and Hard Disk 4 are not backed up.

   You can include or exclude one or more disks with a domain.vmfull statement. You can specify include and exclude on the same statement. For example, the following statement is valid:

   ```
   domain.vmfull "vm5_fin_com:vmdk=Hard Disk 1:-vmdk=Hard Disk 2:vmdk=Hard
   Disk 3:vmdk=Hard Disk 4"
   ```

   If an include statement is present, it causes all other disks in the virtual machine to be excluded from a backup operation, unless the other disks are also specified with an include statement. For example, the following statement excludes all disks except for Hard Disk 1:

   ```
   domain.vmfull "vm5_fin_com:vmdk=Hard Disk 1"
   ```

Scenario: Excluding four disks for backup processing

Use the exclude.vmdisk and domain.vmfull options to exclude four virtual machine disks for backup services.

About this task

In the following examples, virtual machine vm5_fin_com contains four disks:

```
Hard Disk 1
Hard Disk 2
Hard Disk 3
Hard Disk 4
```

Procedure

1. Start a backup-archive client command-line session:

   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:

     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```

   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:

     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```

2. Use the exclude.vmdisk statement to back up disks Hard Disk 1 and Hard Disk 2. For example:

```
EXCLUDE.VMDISK vm5_fin_com "Hard Disk 3"
EXCLUDE.VMDISK vm5_fin_com "Hard Disk 4"
```

3. Issue the backup command:

   ```
   dsmc backup vm vm5_fin_com
   ```

   Because an exclude disk statement is specified, this statement implies that only disks specifically excluded are not backed up. As a result, Hard Disk 3 and Hard Disk 4 are not backed up.
4. Use the `domain.vmfull` statement to back up disks Hard Disk 3 and Hard Disk 4: For example:

   ```
   DOMAIN.VMFULL "vm5_fin_com:vmdk=Hard Disk 3:vmdk=Hard Disk 4"
   ```
5. Issue the backup command:

   ```
   dsmc backup vm vm5_fin_com
   ```

   Hard Disk 3 and Hard Disk 4 are not backed up.

Scenario: Separating disks for backup and restore processing

Coordinate the backup and restore capability of Data Protection for VMware and an IBM Data Protection agent installed in a guest virtual machine to protect your data.

Before you begin

Tivoli Storage Manager provides applications that protect specific database and mail server data. The data protection application servers typically run in a virtual machine. To use Data Protection for VMware effectively with the Tivoli Storage Manager data protection applications, you must coordinate the backup and restore processing for each application. One way to coordinate backup and restore processing for each application is to separate processing by disk usage.

About this task

In this scenario, virtual machine VM2-08R2EX10-1 has Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server installed on Disk1 and uses this disk (`.vmdk`) configuration:

- Disk1: Operating system files
- Disk2: Microsoft Exchange Server database files
- Disk3: Microsoft Exchange Server log files
- Disk4: Contains files other than Microsoft Exchange Server files

Procedure

1. Use Data Protection for Microsoft Exchange Server to back up `Disk2` and `Disk3`:
   a. Start a Data Protection for Microsoft Exchange Server command-line session by opening a command prompt and changing to the installation directory: For example:

      ```
      cd "C:\program files\tivoli\tsm\tdpexc"
      ```
   b. Issue the following backup command:

      ```
      tdpexcc backup * full /backupmethod=vss /backupdestination=tsm
      ```
2. Use the backup-archive client to back up `Disk1` and `Disk4`:
   a. Start a backup-archive client command-line session by opening a command prompt and changing to the backup-archive client installation directory: For example:

```
cd "C:\Program Files\tivoli\tsm\baclient"
```

   b. Issue the following backup command:

```
dsmc backup vm "VM2-08R2EX10-1_orig:vmdk=Hard Disk 1:vmdk=Hard Disk 4"
```

3. Use the backup-archive client to restore virtual machine VM2-08R2EX10-1 to a new virtual machine: Issue the following restore command:

```
dsmc restore vm VM2-08R2EX10-1_orig -vmname=user_story_Exch
-datacenter=VC4-VE-2_DATACENTER1 -host=ESX41-VE-2.QA1.COM
-DATASTORE=ESX41-VE-3
```

   The following output is displayed.

```
Restore processing finished.
Session established with server VM-03R2-TSM62-5: Windows
  Server Version 7, Release 1, Level 2.0
  Server date/time: 12/16/2014 12:32:54  Last access: 12/16/2014 11:13:13


Total number of objects restored:            2
Total number of objects failed:              0
Total number of bytes transferred:       42.00 GB
Data transfer time:                   4,708.17 sec
Network data transfer rate:           9,353.97 KB/sec
Aggregate data transfer rate:         9,210.25 KB/sec
Elapsed processing time:              01:19:41
```

4. Start the VMware vSphere Client and go to **Summary** > **Edit Settings** to verify that the restored virtual machine (user_story_Exch) contains the same configuration as the original virtual machine (VM2-08R2EX10-1_orig). In this example, the configuration of the restored virtual machine shows four disks like the original virtual machine. However, only the data for `Disk1` and `Disk4` are restored. `Disk2` and `Disk3` must first be formatted for use. Then use Data Protection for Microsoft Exchange Server to restore `Disk2` and `Disk3`.
5. Start the restored virtual machine:
   a. Go to **Server Manager** > **Disk Management**.
   b. Select `Disk2` and `Disk3` to complete disk initialization requirements.
   c. Select partition style MBR and click **OK**.
   d. Both disks are formatted with the same drive letters as the original virtual machine.
   e. Use Data Protection for Microsoft Exchange Server to restore the Exchange data files to `Disk2` and `Disk3`.

Backing up virtual machines by domain level

Narrow the focus of an operation to a subset of the virtual machines that are running on the system by setting the `domain.vmfull` option.

Before you begin

The `domain.vmfull` option backs up the virtual machines that are running on the system that is identified by the `vmchost` option.

Review the backup-archive client `domain.vmfull` option. For more information, see Domain.vmfull.

About this task

Complete these steps on the data mover system:

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
   - Linux Open a terminal window and change to the backup-archive client installation directory: `cd /opt/tivoli/tsm/client/ba/bin`.
2. Open the backup-archive client options file (dsm.opt) with your preferred text editor.
3. Enter the option name and one or more blank spaces, followed by the option value. For example:

   ```
   domain.vmfull vmhostcluster=Dev0105
   ```

Scenario: Backing up virtual machines by cluster server

Use the `domain.vmfull` **`vmhostcluster`** option to back up virtual machines for a specific cluster server.

About this task

The VMware environment consists of more than 3,000 VMs. Host clusters are used to manage the hardware resources. Although most of the clusters each contain 3 - 4 ESXi hosts, some clusters contain as many as 10 ESXi hosts. However, some ESXi hosts are running 1 - 3 VMs for larger, critical VMs. To manage the load, additional VMware hosts are frequently added or removed as they are needed. Each ESXi host in the cluster manages 10 - 30 VMs. Because the total number of VMs in each cluster ranges from 100 - 200, each host cluster is backed up to a dedicated vStorage backup server. Each server uses a dedicated data mover node to back up data.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:

     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```

   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:

     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```

2. Include all virtual machines in cluster server `TivDev01` in full VM backup operations.
   a. Set the `domain.vmfull` option with the **`vmhostcluster`** parameter in the client options file (dsm.opt). For example:

      ```
      domain.vmfull vmhostcluster=TivDev01
      ```

   b. Issue the backup command. For example:

      ```
      dsmc backup vm -vmbackuptype=fullvm
      ```

3. Repeat Step 2 for each cluster server.

Scenario: Backing up virtual machines by VMware datastore

Use the `domain.vmfull` **`vmdatastore`** option to back up virtual machines for a specific VMware datastore.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Include all virtual machines in VMware datastore `datastore_03` in full VM backup operations.
   a. Set the `domain.vmfull` option with the **`vmdatastore`** parameter in the client options file (dsm.opt). For example:
      ```
      domain.vmfull vmhostcluster=datastore_03
      ```
   b. Issue the backup command. For example:
      ```
      dsmc backup vm -vmbackuptype=fullvm
      ```
3. Repeat Step 2 for each datastore.

Scenario: Backing up virtual machines by name pattern

Use the `domain.vmfull` **`vm`** option to back up virtual machines by a specific name pattern.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Include all virtual machines that contain `MailDept` at the beginning of their name in full VM backup operations.
   a. Set the `domain.vmfull` option with the **`vm`** parameter in the client options file (dsm.opt). For example:
      ```
      domain.vmfull vm=MailDept*
      ```
   b. Issue the backup command. For example:
      ```
      dsmc backup vm -vmbackuptype=fullvm
      ```
3. Repeat Step 2 for each name pattern.

Backing up multiple virtual machines in parallel

You can back up multiple virtual machines at the same time with one data mover.

Before you begin

With Data Protection for VMware parallel backup processing, you can use a single data mover node to back up multiple virtual machines at the same time. To use parallel backup processing, set the backup-archive client `vmmaxparallel`, `vmlimitperhost`, and `vmlimitperdatastore` options in the `dsm.opt` file that is defined for each data mover node. For more information, see Client options reference.

About this task

Complete these steps on the data mover system:

Procedure

1. Start a backup-archive client command-line session: Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
2. Open the `dsm.opt` file with your preferred text editor.
3. Enter the option name and one or more blank spaces, followed by the option value. For example:
   ```
   vmmaxparallel 3
   vmlimitperdatastore 1
   vmlimitperhost 0
   ```
4. Issue the backup command.

Scenario: Backing up multiple virtual machines in parallel

Set backup-archive client options so that one data mover backs up six virtual machine guests during a parallel backup operation.

About this task

The Data Protection for VMware environment contains 2 ESX hosts. Each host contains 6 virtual machines that are connected to three data stores. The backup schedule targets virtual machine guests that use the same data store. Parallel backups are run without causing contention among the three data stores.

Procedure

1. Start a backup-archive client command-line session on the data mover:

   Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
2. Open the `dsm.opt` file with your preferred text editor.
3. Specify a maximum of three virtual machines to be backed up, at any one time, during the parallel backup operation. For example:
   ```
   vmmaxparallel 3
   ```
4. Specify a maximum of one virtual machine per data store to be backed up during the parallel backup operation. For example:
   ```
   vmlimitperdatastore 1
   ```

5. Specify that no virtual machines in an ESX server can be included in the parallel backup operation. For example:

   ```
   vmlimitperhost 0
   ```

Results

One schedule backs up the six virtual machines.

- Three backup operations start in parallel.
- The fourth backup operation starts after the three previous operations finish backing up the three VMware datastores.

Backing up virtual machines that host Active Directory controllers

About this task

The environment consists of a data center with five domain controllers (VDC1 - VDC5). The domain controllers are in two geographic locations. Each domain controller is on a VMware guest. One physical domain controller is included. The domain controllers are in two geographic locations and replicate by using an Active Directory replication process.

Procedure

1. Start a backup-archive client command-line session: Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
2. Back up the virtual machine guests that host VDC1 and VDC3. In these examples, virtual machine guest VM1 hosts domain controller VDC1, and virtual machine guest VM3 hosts domain controller VDC3:

   ```
   dsmc backup vm VM1
   ```

   ```
   dsmc backup vm VM3
   ```
3. Recover the virtual machine guest that hosts VDC1. In this example, virtual machine guest VM1 hosts domain controller VDC1:

   ```
   dsmc restore vm VM1
   ```

   The domain controller is restored to the version taken at the time of the backup. After the server restarts, the restored Active Directory domain controller (on VDC1) replicates data by using other domain controllers in the network.
4. Restart the restored virtual machine guest.
5. Verify that replication processing completed successfully.

Related tasks:

"Verifying that the Active Directory Domain Controller replicated successfully" on page 162

Specifying a management class to associate objects

Specify how to manage virtual machine and vApp backups operations on the Tivoli Storage Manager server.

Before you begin

Review the backup-archive client `vmmc`, `vmctlmc`, and `vappmc` options in Client options reference.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Open the backup-archive client options file (dsm.opt) with your preferred text editor.
3. Enter the option name and one or more blank spaces, followed by the option value. For example:
   ```
   vmmc myManagmentClass
   vmctlmc diskonlymc
   vappmc MCPRODVAPPS
   ```

Scenario: Specifying a management class for VMware backups in a vSphere environment

Use the `vmmc` option to store the VMware backups with a management class other than the default management class.

About this task

Assign a virtual machine backup to a non-default management class.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Create a full VM backup of the virtual machine. Assign the backup to a non-default management class.

   For example, to assign the backup of virtual machine `myVirtualMachine` to management class `myManagmentClass`, specify the `vmmc` option in the command. For example:
   ```
   dsmc backup vm "myVirtualMachine" -vmmc=myManagmentClass
   ```

For information about how management class rebinding applies to VMware backup data on the Tivoli Storage Manager server, see technote 1665032.

Scenario: Specifying a management class for VMware control files in a vSphere environment

Use the vmctlmc option to assign the VMware control files to a management class other than the default management class.

Before you begin

VMware control files are assigned to the default management class. Use the vmmc option to assign VMware data and VMware control files to a non-default management class. The vmctlmc option overrides the default management class and the vmmc option for VMware control files.

Under certain conditions, it might be necessary to assign VMware control files to a different management class than the VMware data files.

Use the vmctlmc option if VMware data files are backed up to tape. Back up the VMware control files to a disk-based storage pool that is not migrated to tape. The storage pool can contain random access volumes and sequential file volumes; the storage pool can be a deduplicated pool. Use the vmctlmc option to specify a management class that stores control files in such a storage pool.

Restriction: The management class that is specified by the **vmctlmc** option determines only the destination storage pool for VMware control files. Retention of VMware control files is determined by the vmmc option, if specified, or by the default management class. The retention for the VMware control files always matches the retention of the VMware data files.

About this task

Assign a virtual machine backup to a non-default management class.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:
     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```
   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:
     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```
2. Create a full VM backup of the virtual machine. Assign the backup to a non-default management class.

   For example, to assign the backup of virtual machine myVirtualMachine to management class myManagmentClass, specify the vmmc option in the command:
   ```
   dsmc backup vm "myVirtualMachine" -vmmc=myManagmentClass
   ```

Scenario: Specifying a management class for objects in a vCloud environment

Use the backup-archive client **vappmc** option to store VMware vCloud vApp backup data by using a management class other than the default management class.

About this task

Assign VMware vCloud vApp backup data to a non-default management class.

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory. For example:

     ```
     cd "C:\Program Files\tivoli\tsm\baclient"
     ```

   - Linux Open a terminal window and change to the backup-archive client installation directory. For example:

     ```
     cd /opt/tivoli/tsm/client/ba/bin
     ```

2. Create a full VM backup of the VMware vCloud vApp backup data. Assign the backup data to a non-default management class.

   For example, to assign the backup data for vApps `org1`, `vdc1`, and `vapp1` to management class `MCPRODVAPPS`, specify the **vappmc** parameter in the command:

   ```
   dsmc backup vapp "org1,vdc1,vapp1" -vappmc=MCPRODVAPPS
   ```

Specifying objects to include in backup and restore operations

Specify the VMs or vApps that you want to include for backup services by setting include options.

Before you begin

Review the backup-archive client `include.vm` and `include.vapp` options. For more information, see Virtual machine include options.

About this task

Complete these steps on the data mover system:

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
   - Linux Open a terminal window and change to the backup-archive client installation directory: `cd /opt/tivoli/tsm/client/ba/bin`.
2. Open the backup-archive client options file (dsm.opt) with your preferred text editor.
3. Enter the option name and one or more blank spaces, followed by the option value. For example:

   ```
   include.vm vmtest*
   ```

Scenario: Specifying objects to include for backup and restore operations in a vSphere environment

Use include options to specify the objects that you want to include in backup and restore operations.

Before you begin

To define when objects are included in a backup, how long they are kept on the server, and how many versions of the object the server keeps, use a management class. Set the management class for an object by using the backup-archive client **`vmmc`** option. Place this option in the client options file `dsm.opt` or in the client system options file `dsm.sys`.

You can also change how files are processed, for example to use a different management class, by using the backup-archive client **`include.vm`** option.

About this task

This scenario assumes the following active management classes on the Tivoli Storage Manager server:

- MCFORTESTVMS
- MCFORPRODVMS
- MCUNIQUEVM

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
   - Linux Open a terminal window and change to the backup-archive client installation directory: `cd /opt/tivoli/tsm/client/ba/bin`.
2. Open the backup-archive client options file (`dsm.opt`) with your preferred text editor.
3. Associate all virtual machine backups, with names that begin with VMTEST, to management class MCFORTESTVMS:
   ```
   include.vm vmtest* MCFORTESTVMS
   ```
4. Associate virtual machine backup WINDOWS VM1 [PRODUCTION] to management class MCFORPRODVMS:
   ```
   include.vm "WINDOWS VM1 ?PRODUCTION?" MCFORPRODVMS
   ```

   The following values are used:
   - The virtual machine is enclosed in quotation marks because it contains space characters.
   - The question mark (?) wildcard is used to match the special characters in the virtual machine name.
5. Associate virtual machine backup VM1 to management class MCUNIQUEVM:
   ```
   include.vm VM1 MCUNIQUEVM
   ```

Scenario: Specifying objects to include for backup and restore operations in a vCloud environment

Use include options to specify the objects that you want to include in backup and restore operations.

Before you begin

To define when objects are included in a backup, how long they are kept on the server, and how many versions of the object the server keeps, use a management class. Set the management class for an object by using the backup-archive client **`vappmc`** option. Place this option in the client options file `dsm.opt` or in the client system options file `dsm.sys`.

You can also change how files are processed, for example to use a different management class, by using the backup-archive client **`include.vapp`** option.

About this task

This scenario assumes the following active management classes on the Tivoli Storage Manager server:

- MCFORTESTVAPPS
- MCFORPRODVAPPS
- MCUNIQUEVAPP

Procedure

1. Start a backup-archive client command-line session:
   - Windows Open a command prompt and change to the backup-archive client installation directory: `cd "C:\Program Files\tivoli\tsm\baclient"`.
   - Linux Open a terminal window and change to the backup-archive client installation directory: `cd /opt/tivoli/tsm/client/ba/bin`.
2. Open the backup-archive client options file (`dsm.opt`) with your preferred text editor.
3. Associate all vApp backups to management class MCFORTESTVAPPS:

   ```
   include.vapp *::*::* vm vmtest* MCFORTESTVAPPS
   ```

   The asterisk (*) wildcards are used to match the special characters in all vApp, organization, and organization virtual data center names.
4. Associate all vApp backups from VMware organization ORG1 and organization virtual data center ORG1VDC to management class MCFORPRODVAPPS:

   ```
   include.vapp "ORG1::ORGVDC1::*" MCFORPRODVAPPS
   ```

   The asterisk (*) wildcard is used to match the special characters in all vApp names.
5. Associate vApp backup VAPP1 to management class MCUNIQUEVAPP:

   ```
   include.vapp MY_ORG::MY_VDC::VAPP1 MCUNIQUEVAPP
   ```

Chapter 8. Restoring VMware data

Data Protection for VMware restore scenarios are provided in this section.

Mounting a virtual machine disk and exporting the volumes

You can restore one (or more) files from a virtual machine that was backed up to Tivoli Storage Manager server storage.

Before you begin

File restore from tape media is supported. However, file restore reads data in a way that causes random read requests. As a result, processing might be slow when a sequential-access device (such as tape media) is used. File restore from disk storage is the preferred method.

Consider moving target virtual machine backup data from tape media to disk storage before you attempt a file restore operation. You can move data with the Tivoli Storage Manager server **MOVE NODEDATA** command. You can also run traditional full VM backups regularly.

Procedure

To mount a backed up virtual machine disk and export the mounted volume for a file restore operation, complete the following steps:

1. Configure the mount proxy nodes:
   a. Go to the Configuration window in the Data Protection for VMware vSphere GUI.
   b. Click **Edit TSM Configuration** in the Tasks list. The configuration notebook might take a few moments to load.
   c. Go to the Mount Proxy Node Pairs page and select a VMware datacenter in the table.
   d. Click **Add Mount Proxy Node Pair**.
   e. Click **New Settings** in the table.
      For Linux operating systems, the Linux mount proxy node must be configured manually. Use the sample `dsm.sys` file content that is shown in the **Mount Proxy Settings** dialog when you configure the Linux mount proxy node.
      For Windows operating systems, only one client acceptor is created. If you want to add a second Windows mount proxy node, you must manually configure the client acceptor on a remote system.
   f. Specify the storage device type from which the snapshot is mounted by setting the client `vmstoragetype` option in the client options file on the Windows mount proxy node.
      1) Open a command prompt and change to the backup-archive client installation directory. For example:
      ```
      cd "C:\Program Files\tivoli\tsm\baclient"
      ```
      2) Open the backup-archive client options file (dsm.opt) with your preferred text editor.
      3) Set the `vmstoragetype` option with one of the following device types:

DISK The snapshots to be mounted are on Disk or File storage pools. This value is the default.

VTL The snapshots to be mounted are on VTL storage pools.

TAPE The snapshots to be mounted are on Tape storage pools.

2. Validate that the mount proxy nodes are online and that the iSCSI service is running:
   a. Go to the Configuration window in the Data Protection for VMware vSphere GUI.
   b. Select a VMware datacenter in the navigation tree.
   c. Select the mount proxy node (created in Step 1) in the table and click **Validate Selected Node**. The validation results might take a few moments to complete. A successful validation shows the `Status: Running` message for each mount proxy node in the Status Details pane. An unsuccessful validation shows the `Status: error` message for each mount proxy node that encountered an error.

      Remember: By default, the iSCSI service is started manually. If the system where this service is running restarts, the iSCSI service must be restarted manually.
      If you receive an error message, investigate possible causes that are based on error messages that are shown in the Task Details pane of the **Recent Tasks** report.
3. Go to the Restore window in the Data Protection for VMware vSphere GUI and click **Restore Points** in the header.
4. Expand the list of VMware datacenters and select a virtual machine from the navigation pane. All active and inactive backup versions for the selected virtual machine are identified as restore points in the Restore Points table. Virtual machine template backups are identified in the Template column in the Restore Points table.
   Depending on the number of managed vCenters, the list might take a few moments to load.
5. Select one or more restore points for one virtual machine in the table and click **Mount** to open the Mount wizard.
6. On the Mount Options page, complete the following steps:
   a. Select the mount proxy node.
   b. Optional: To select the operating system where the backed up virtual machine disks are to be mounted, click the **Guest Operating System** list and make your selection.

      Tip: When the operating system where the disks are to be mounted is different from the operating system of the mount proxy node, the mount point path updates automatically.
   c. Enter the absolute path of the mount point. The following characters are supported: a-z, A-Z, 0-9, colon (:), forward slash (/), backward slash (\), and underscore (_). The maximum length is 200 characters.
      - Windows The absolute path to a disk is *mount root*\tag\vmname\snapshot date and time\file system number. For example:

        ```
        C:\tsmmount\ticket_9471\tangowin2k12test\2014-07-01-10_35_50\Volume1\
        ```

        The default value is `C:\tsmvemount\`*vmname*.

    Restriction: The maximum length of the path and file name that is accessed in a mounted volume on Windows cannot exceed 6255 characters. This maximum length includes the total characters in the path, volume name, mount point, virtual machine name, tag description, and snapshot date.

  - Linux For Linux operating systems, the absolute path to a disk is *`mount root/tag/vmname/snapshot date and time/file system number`*. For example:

    ```
    /tsmmount/ticket_9471/vm1/2014-07-01-10_35_23/Volume1
    ```

    The default value is `/mnt/`*`vmname`*.

    Restriction: The maximum length of the path and file name that is accessed in a mounted volume on Linux cannot exceed 4096 characters. This maximum length includes the total characters in the path, volume name, mount point, virtual machine name, tag description, and snapshot date.

d. Enter a description of this mount operation in the **Description Tag** field. This description becomes part of the mount path so that the administrator can easily identify the operation. The following characters are supported: a-z, A-Z, 0-9, and underscore (_). The maximum length is 20 characters.

e. Optional: If you want the mounted virtual machine disks on a network share, select **Create Network share** and enter the appropriate credentials.

  - For Windows operating systems, enter the user name that is allowed to access Windows Share.

    Tip: For security reasons, ensure that files are shared only by users and groups who are authorized to access those files.

  - For Linux operating systems, enter the IP address or name of the system that mounts the exported file system.

f. Click **Next**.

7. In the Summary page, review the settings and click **Finish** to start the mount operation. To change your mount settings, click **Back**.
   After the operation starts, you can monitor its progress (**Recent Tasks**) in the Reports window.

   If the mount operation does not complete successfully, investigate possible causes that are based on error messages that are shown in the Task Details pane of the **Recent Tasks** report.

8. Export (or share) the mounted volumes from the virtual machine:

   a. Go to the Restore window in the Data Protection for VMware vSphere GUI.

   b. Click **Mount Status** in the header.

   c. Select the mount operation that contains the volumes you want to export.

   d. Copy the content in the Network Share pane by using Ctrl + C and send to the user who accesses the mounted volumes to restore the files.

9. Log in to the system where the files will be restored and complete the following step:

   - For Windows operating systems, connect to the Common Internet File System (CIFS) where the files are mounted. Copy the files with a file manager application such as Windows Explorer.
   - For Linux operating systems, connect to the Network File System (NFS) where the files are mounted. Copy the files with a file manager application.

What to do next

After the files are restored by the user, dismount the volumes:

1. Go to the Restore window in the Data Protection for VMware vSphere GUI.
2. Click **Mount Status** in the header.
3. Select the mount operation that contains the volumes you want to export and click **Dismount**. Your mount operation is identified by `Type=HelpDesk` in the Mount Status table.

vCloud environment restore scenario

This scenario demonstrates how to restore vApps with the **`vmcli -f restore`** command.

These vCloud Director objects can also be restored with the following user interfaces:

Data Protection for VMware vCloud GUI
Information about how to complete backup tasks with the Data Protection for VMware vCloud GUI is provided in the online help that is installed with the GUI. Click **Learn More** in any of the GUI windows to open the online help for task assistance.

Tivoli Storage Manager backup-archive client command-line interface
Information about how to complete backup tasks with the **`dsmc Restore VAPP`** command is provided in the command-line help that is installed with the product (**`dsmc help restore vapp`**). Information is also available at Restore VAPP

This scenario restores vApp1 from organization Mainz_org and organization vDC MZ_Silver to a new vApp named vApp1_restore.

To identify that the backup environment is within vCloud Director, the following **`vmcli -f set_option`** command is issued:

```
vmcli -f set_option -c vcloud
```

Then, the following **`vmcli -f restore`** command is issued:

```
vmcli -f restore -I vapplistfile
```

The `vapplistfile` contains this statement:

```
backupid:47110815 vappname:org=Mainz_org,orgvdc=MZ_Silver,vapp=vApp1
vappname_new:vApp1_restore
```

You can restore a single or multiple vApps. You cannot exclude individual VMs from a vApp restore, nor can you restore a single VM into an existing vApp.

vSphere environment restore scenario

This scenario demonstrates how to restore VMs with the **vmcli -f restore** command.

The VMs can also be restored with the following user interfaces:

Data Protection for VMware vSphere GUI
Information about how to complete restore tasks with the Data Protection for VMware vSphere GUI is provided in the online help that is installed with the GUI. Click **Learn More** in any of the GUI windows to open the online help for task assistance.

Tivoli Storage Manager backup-archive client GUI
Information about how to complete restore tasks with the backup-archive client GUI is provided in the online help that is installed with the GUI. Click **Help** in any of the GUI windows to open the online help for task assistance.

Tivoli Storage Manager backup-archive client command-line interface
Information about how to complete restore tasks with the **dsmc Restore VM** command is provided in the command-line help that is installed with the product (**dsmc help restore vm**). Information is also available at Restore VM.

This scenario completes an instant restore of vmName6 to a new VM, data center, ESX host, and data store. During the restore process, the disk is created with thin provisioning.

The following **vmcli -f restore** command is issued:

```
vmcli -f restore -vmrestoretype instantrestore -I vmlistfile
```

The vmpplistfile contains this statement:

```
backupid:678912345 vmname:vmName6::vmname:vm6newName
newdatacentername:DataCenter2 newesxhostname:esxHost1Name
newdatastoreurl:datastore2 vmtempdatastore:datastore2temp
vmdiskprovision:thin
```

Full VM instant restore scenarios

Windows

A backed up VM is restored and available for immediate use.

Instant access and instant restore capability is supported only for VMware VMs that are hosted on VMware ESXi 5.1 servers, or later versions.

This command completes an instant restore of the VM with the name Cologne.

```
dsmc restore vm Cologne -vmrest=INSTANTRestore -vmtempdatastore=Verify_datastore
```

This command completes a regular restore (without starting the VM) when the VM named San_Jose is being restored.

```
dsmc restore vm San_Jose
```

Alternatively, you can also use the following command:

```
dsmc restore vm San_Jose -vmrest=noni
```

In this command, the `-vmtempdatastore` option specifies a temporary data store on the ESX host. The data for the new VM is stored in this temporary data store:

```
dsmc restore vm Haifa -VMRESToretype=INSTANTRestore -vmname=Haifa_verify
-VMTEMPDAtastore=Verify_Datastore
```

The temporary data store is used by Storage vMotion to store the configuration of the restored virtual machine during the instant restore process. The name that you specify must be unique. It cannot match the name of any of the original data stores that were used by the virtual machine when it was backed up, and it cannot be the same as the name specified on the optional `–datastore` option. If the `–datastore` option is omitted, the virtual machine files are restored to the data stores that they used when the virtual machine was backed up.

This command completes an instant restore of the VM with the name Oslo with the `-pick` option to pick a specific backup version.

```
dsmc restore vm Oslo -vmrest=INSTANTRestore -pick -vmtempdatastore=datastore_temp
```

This command queries to find all active and failed instant restore sessions.

```
dsmc query vm * -VMRESToretype=INSTANTRestore
```

This command retrieves the metadata for all instant restore session from the Tivoli Storage Manager server and prints that information as a list.

This command completes a cleanup of the VM and all its components. These components include iSCSI mounts, devices, and temporary data that are identified by the VM name on the ESX host.

```
dsmc restore vm Oslo -VMRESToretype=VMCLeanup -vmname=Oslo_Verify
```

This command queries information about the real state of the listed VMs based on information from the vSphere SDK on the ESX host.

```
dsmc query vm * -VMRESToretype=INSTANTRestore -Detail
```

Full VM instant restore cleanup and repair scenarios

When an instant restore operation fails after the VM is powered on, manual cleanup and repair tasks are required.

An instant restore operation that fails with storage vMotion running creates either of the following situations:

- The instant restore operation generates an error message.
- The instant restore operation suspends indefinitely and the VM is not responsive.

To determine the cause of the problem, perform a detailed query of the VM by using the following command:

```
dsmc q vm * -vmrestoretype=instantrestore -detail
```

In the output that is produced by this command, for each VM in the output, look for the line that contains `Action Needed`. Use the following *Action Needed* paragraphs to recover from failed instant restore operation, depending on the `Action Needed` status.

Instant access and instant restore capability is supported only for VMware VMs that are hosted on VMware ESXi 5.1 servers, or later versions.

Action Needed: Cleanup

In the output of the `query vm * -vmrestoretype=instantrestore -detail` command, verify that the storage vMotion status is successful (`vMotion Status: Successful`) and that all VM disks are physical disks (`Disk Type: Physical`). This status confirms that the VM was restored and cleanup of orphaned components, such as iSCSI mounts, is needed.

This type of failure occurs as a result of either of the following situations:

- The instant restore failed and Storage vMotion is running. VMware vSphere continues the vMotion process.
- Storage vMotion finished successfully, but the automatic cleanup of the iSCSI mounts fails.

To clean up any orphaned components, run the **restore vm** command with the **-VMRESToretype=VMCLeanup** parameter. For example:

```
dsmc restore vm original_vmname -vmname=new_vm_name -VMRESToretype=VMCLeanup
```

Action Needed: Repair

In the output of the `query vm * -vmrestoretype=instantrestore -detail` command, verify that the iSCSI device that is attached to the VM is dead (status is `Disk Path: Dead`).

This type of failure occurs as a result of one of the following three situations:

- The VM that is used as a data mover or the physical data mover machine failed.
- A network failure occurred between the data mover and the ESX host or the data mover and the Tivoli Storage Manager server.
- The Tivoli Storage Manager recovery agent Service failed.

The iSCSI device must be returned to an active state before any other instant operation is attempted.

To attempt to recover from a data mover failure, complete the following steps:

1. Investigate that cause of the failure and restart the data mover machine if it does not start automatically. This action starts an automatic recovery of the mounted iSCSI disks.
2. In the output of the `query vm * -vmrestoretype=instantrestore -detail` command, verify that the VM disks are active (`Disk Path: Active`). This status means that the VM was restored and is available for use.
3. Restart storage vMotion in the vSphere client and monitor its progress in the vSphere client status bar.
4. If storage vMotion processing completed successfully, run the **restore vm** command with the **-vmrestoretype=VMCLeanup** parameter to clean up the iSCSI disks. For example:

   ```
   dsmc restore vm original_vmname -vmname=new_vm_name -VMRESToretype=VMCLeanup
   ```

To attempt recovery after a network failure, complete the following steps:

1. Repair the network issue so that communication between the data mover and the ESX host, and the data mover and the Tivoli Storage Manager server resumes.

2. In the output of the `query vm * -vmrestoretype=instantrestore -detail` command, verify that the VM disks are active (`Disk Path: Active`). This status means that the VM was restored and is available for use.
3. If the network failure did not cause storage vMotion to time out, no action is required.
4. If the network failure caused storage vMotion to time out, and the error message indicates that the source disk is not responding, restart storage vMotion in the vSphere client. When storage vMotion processing completes, run the **restore vm** command with the **-vmrestoretype=VMCLeanup** parameter to clean up the iSCSI disks. For example:

   ```
   dsmc restore vm original_vmname -vmname=new_vm_name -VMRESToretype=VMCLeanup
   ```

To attempt recovery after a Tivoli Storage Manager recovery agent service failure, complete the following steps:

1. Investigate that cause of the failure and restart the Tivoli Storage Manager recovery agent service if it does not start automatically. This action starts an automatic recovery of the mounted iSCSI disks.
2. In the output of the `query vm * -vmrestoretype=instantrestore -detail` command, verify that the VM disks are active (`Disk Path: Active`). This status means that the VM was restored and is available for use.
3. If the Tivoli Storage Manager recovery agent service failure did not cause storage vMotion to time out, no action is required.
4. If the Tivoli Storage Manager recovery agent service failure caused storage vMotion to time out, and the error message indicates that the source disk as not responding, restart storage vMotion in the vSphere client. When storage vMotion processing completes, run the **restore vm** command with the **-vmrestoretype=VMCLeanup** parameter to clean up the iSCSI disks. For example:

   ```
   dsmc restore vm original_vmname -vmname=new_vm_name -VMRESToretype=VMCLeanup
   ```

Full cleanup

If you are not able to recover from a failure and want to remove the VM and its components, run the **restore vm** with the **-vmrestoretype=VMFULLCLeanup** parameter. For example:

```
dsmc restore vm original_vmname -vmname=new_vm_name -VMRESToretype=VMFULLCLeanup
```

A **VMFULLCLeanup** operation forces removal of the VM and all of its components, regardless of the state of the virtual machine. Do not start a full clean up operation while vMotion is still migrating a virtual machine.

Full VM instant restore integrity validation scenarios

Windows

A new VM is built from the requested VM backup and is available for immediate use.

The process that creates a VM for verification is referred to as instant access. The verification itself is done by a specific application that the user must provide and operate. In this scenario, since the VM guest data remains in the Tivoli Storage Manager server repository, no additional storage is required on the primary data store.

Instant access and instant restore capability is supported only for VMware VMs that are hosted on VMware ESXi 5.1 servers, or later versions.

Start an instant access scenario

Start the instant access operation by entering the following Tivoli Storage Manager backup-archive client command and options:

```
dsmc restore vm Haifa -VMRESToretype=instanta -vmname=Haifa_verify
```

This command verifies the VM backup named Haifa without having to restore the VM. Since the original VM exists, the -vmname option assigns the new VM name Haifa_verify.

In this command, the -vmautostart option specifies that the VM created for verification is powered on automatically:

```
dsmc restore vm Haifa -VMRESToretype=instanta -vmname=Haifa_verify
-VMAUTOSTARTvm=YES
```

By default, the VM created for verification is not powered on automatically. This default value allows the VM to be reconfigured before startup (if needed).

Specify the -inactive and -pick options to select the VM backup to validate from a list of all backed up VMs. Or, specify the -pitdate and -pittime options to select a VM backup by its backup date and time.

All location options (such as -vmname, -datacenter, -host, and -datastore) are supported by the -vmrestoretype=instantaccess and -vmrestoretype=instantrestore options.

This command returns a list of VMs that are running in instant access mode:

```
dsmc query vm * -VMRESToretype=instanta
```

This command starts the cleanup process for a VM backup:

```
dsmc restore vm Haifa -VMRESToretype=VMCLeanup -vmname=Haifa_Verify
```

This command completes the instant access session. A cleanup process includes these actions:

- The temporary VM created for verification is deleted on the ESX host.
- The iSCSI mounts are unmounted on the vStorage Backup Server.
- The iSCSI device list is cleaned on the ESX host.
- The temporary data that is generated during verification is deleted by removing the VMware snapshot.

You cannot use the –VMRESToretype=VMCleanup option or the –VMRESToretype=VMFULLCLeanup option to clean up a virtual machine while Storage vMotion is migrating it to a host.

Verifying that the Active Directory Domain Controller replicated successfully

When a VM guest that contains an Active Directory Domain Controller (AD DC) is restored with Data Protection for VMware, the DC (on that VM) is restored from a backup copy of the AD database.

Before you begin

The original VM must be powered off before the restored VM is started. In addition, the restored VM must be manually rebooted for replication to occur.

About this task

The following tasks occur upon a successful Data Protection for VMware restore and subsequent reboot of the VM guest that contains the AD DC:

Procedure

1. The DC is updated from a backup copy of the AD DC database. A new `invocationID` is assigned to the Directory Server. This update is indicated by event `1109` in the event log on the VM guest. To verify this update:
   a. In the Computer Management window on the restored system, go to **System Tools** > **Event Viewer**.
   b. When the AD DC restored successfully, the `Information` type event for the restored DC displays the following message:

      ```
      ActiveDirectory 1109 Replication
      ```

      The message in the Event Viewer also confirms a successful restore because of the changed `invocationID` attribute:

      ```
      The invocationID attribute for this directory server has been changed.
      The highest update sequence number at the time the backup was created is <time>
      InvocationID attribute (old value):<Previous InvocationID value>
      InvocationID attribute (new value):<New InvocationID value>
      Update sequence number:<USN>
      The InvocationID is changed when a directory server is restored from backup media
      or is configured to host a writeable application directory partition.
      ```

2. The restored DC replicates itself non-authoritatively with its replication partners in the network. It is updated with the most current domain, schema, configuration, and application partitions:

   Note: Data Protection for VMware does not support authoritative restore.

   a. Log in to the VM guest that was restored by using Data Protection for VMware as an Administrator.
   b. Open a Windows command prompt.
   c. Check the status of the last replication that involved the restored DC by issuing the `repadmin /showrepl` command[1]. This command shows the replication partners for each directory partition on the DC and the status of the last replication.

      If the replication schedule did not start, you can manually start the replication operation. Go to the Active Directory Sites and Services, select the replication partners, and right-click **Replicate Now**.

[1] `Repadmin.exe` is a Microsoft command-line tool that is installed with Microsoft Active Directory.

For detailed information about initiating replication, see the following Microsoft Knowledge Base article:
http://support.microsoft.com/kb/232072
When the status is newer than the restore time, this status means that the replication was successful and completed automatically. The
following output shows that replication was successful:

```
Repadmin: running command /showrepl against full DC localhost
Default-First-Site-Name\DC12012
DSA Options: IS_GC
Site Options: <none>
DSA Object GUID: 8393da24-f18b-453a-b197-b8dc6956d51f
DSA invocationID: 8393da24-f18b-453a-b197-b8dc6956d51f

==== INBOUND NEIGHBORS ==============================

CN=Configuration,DC=his,DC=local
 Default-First-Site-Name\DC22012 via RPC
  DSA Object GUID: 790c6f2d-61f1-4704-bdcf-6ef731bcb96e
  Last attempt @ 2013-01-25 14:33:10 was successful.
```

When the `repadmin /showrepl` command displays a successful replication, the AD DC replication is considered successful. No additional tasks are required.

d. When the `repadmin /showrepl` command shows that replication was not successful, output similar to the following is shown:

```
Repadmin: running command /showrepl against full DC localhost
Default-First-Site-Name\DC12012
DSA Options: IS_GC
Site Options: <none>
DSA Object GUID: 8393da24-f18b-453a-b197-b8dc6956d51f
DSA invocationID: 8393da24-f18b-453a-b197-b8dc6956d51f

==== INBOUND NEIGHBORS ==============================

CN=Schema,CN=Configuration,DC=his,DC=local
 Default-First-Site-Name\DC22012 via RPC
  DSA Object GUID: 790c6f2d-61f1-4704-bdcf-6ef731bcb96e
  Last attempt @ 2013-01-25 14:30:32 failed, result 1908 <0x774>:
   Could not find the domain controller for this domain.
  1 consecutive failure(s).
  Last success @ 2012-12-14 15:01:36.
```

If a replication failure exists or persists, follow the instructions provided in the next section.

Recover from Replication Failures

Use the following methods to investigate the cause of a persistent replication failure:

1. Use the Microsoft Domain Controller Diagnostics tool (`dcdiag.exe`) to view information about all components, objects, and permissions that are required for successful replication. For example:
   a. Open a Windows command prompt as an administrator.
   b. Issue the `dcdiag /test:replications` command. Use the output information to resolve any issues. If the command fails, investigate the events that are at **Event Viewer** > **Directory Service** > **ActiveDirectory_DomainServices**.
2. Use the Microsoft `Repadmin.exe` command-line tool to view the retired `invocationID` on a DC. For example:

a. Open a Windows command prompt as an administrator.

b. Issue the `repadmin /showsig [`*`DC_LIST`*`]` command. This output shows that restore from Tivoli Storage Manager was successful because a retired `invocationID` exists:

```
C:\Users\Administrator>repadmin /showsig rodc
Default-First-Site-Name\RODC

Current DSA invocationID: ed8ea6b9-d347-4695-b886-b5128be280c4
2c995946-2389-4d98-bc78-3708ba906e01 retired on 2012-12-19 16:56:21
at USN 17703
```

When the output contains the statement `No retired signatures`, the AD was not restored from Tivoli Storage Manager correctly. As a result, replication cannot be completed because the partner DCs mistake the new `invocationID` as evidence for a completed replication. For example:

```
C:\Users\Administrator>repadmin /showsig rodc
Default-First-Site-Name\RODC

Current DSA invocationID: ed8ea6b9-d347-4695-b886-b5128be280c4
No retired signatures
```

When the `invocationID` is retired, the replication can be started. However, this statement does not guarantee success of the replication.

Appendix A. Troubleshooting

Solutions to Data Protection for VMware vSphere GUI and Data Protection for VMware command-line interface issues are provided.

Locating log files

For information about Data Protection for VMware log files, see the following topics:

- Log file activity
- File restore log activity options
- “Trace options for file restore” on page 175

Data Protection for VMware vSphere GUI or Data Protection for VMware vCloud GUI backup or restore operation fails

Complete these tasks to resolve a backup or restore failure:

1. Log on to the system where the backup-archive client is installed.
2. Start a command-line session:
   - Windows Open the Windows **Start** menu and select **Programs** > **Tivoli Storage Manager** > **Backup Client Command Line**.
   - Linux Open a terminal window.
3. If not already there, go to the installation directory:

   Windows

   ```
   cd C:\Program Files\Tivoli\TSM\baclient
   ```

   Linux

   ```
   cd /opt/tivoli/tsm/client/ba/bin
   ```

   By default, error log files are in the installation directory.
4. View these backup-archive client log files to see if an error was generated:
   - `dsmerror.log`: All client messages.
   - `dsmwebcl.log`: All web client messages.
   - `dsmj.log`: All client Oracle Java™ GUI messages.

   These log files are located in the directory you specify with the DSM_LOG environment variable or in the current working directory.

   Tip: You can view error explanations in IBM Knowledge Center at Messages, return codes, and error codes.
5. If neither of these files contain an error, run a backup-archive client backup and restore operation to see if it fails.
6. If the backup-archive client operations complete successfully, run a Data Protection for VMware command-line interface “Backup” on page 86 and

"Restore" on page 89 operation. Set the appropriate trace parameters (as described in "Profile parameters" on page 113) so you can view any errors that might be generated.

Data Protection for VMware command-line interface backup fails with `scSignOnAsAdmin: Error 53`

In this situation, a Data Protection for VMware command-line interface backup operation failed and this error was generated to the backup-archive client `dsmerror.log`:

```
scSignOnAsAdmin: Error 53 receiving SignOnAsAdminResp verb from server
```

Typically, this error results when the VMCLI node name is different from its administrator name. Tivoli Storage Manager requires these two names to be the same.

Data mover nodes are not visible during a backup operation

Verify that the correct proxy node authority was granted on the Tivoli Storage Manager server. If the correct authority exists, then the data center mapping specified by the VE_DATACENTER_NAME profile parameter is incorrect. See "Profile parameters" on page 113 for a complete description and correct syntax of the VE_DATACENTER_NAME parameter.

The `inquire_detail` command failed with `Return Code 53`

In this situation, the `vmcli -f inquire_detail` command failed and this error was generated to your log file:

```
ANS1033E (RC-53)  An invalid TCP/IP address was specified.
```

This error occurs when a node name does not match its administrator name. This issue can happen when you rename a node but do not rename its administrator. The solution is to either rename the administrator to match the new node name or register a new administrator for the new node.

The commands in these examples are issued from the Tivoli Storage Manager administrative command Line:

- Rename the administrator at the same time you rename the node:

  ```
  rename node <current_node_name> <new_node_name>
  rename admin <current_admin_name> <new_node_name>
  ```

  For example:

  ```
  rename node DC_VC5 DC_WIN2K8_X64
  rename admin DC_VC5 DC_WIN2K8_X64
  ```

  As a result, the new administrator name matches the new node name.
- Register the administrator directly after renaming the node:

  ```
  rename node <current_node_name> <new_node_name>
  register admin <new_admin_name> <password>
  ```

  For example:

  ```
  rename node DC_VC5 DC_WIN2K8_X64
  register admin DC_WIN2K8_X64 DC_WIN2K8_X64PWD
  ```

As a result, the new administrator name matches the new node name.

Invalid sign on and invalid password errors received

In this situation, Data Protection for VMware command-line interface, Data Protection for VMware vSphere GUI, or Data Protection for VMware vCloud GUI operations failed and your log file contained one (or more) of these errors:

```
GVM1170E: A VMCLI command failed.
```

```
ANR2177I FRSV123015.TSMCLI has 1 invalid sign-on attempts. The limit is 5.
```

```
ANR0424W Session 125713 for node FRSV128215.TSMCLI (TSM4VE)
refused - invalid password submitted.
```

This issue can occur when a VMCLI node set password attempt was made by using a password that was previously set.

When the VMCLI node password is set, the password is registered and then automatically changed. As a result, you do not know this changed password. If you must change the VMCLI node password after it is already set, the Tivoli Storage Manager administrator must use the `update node` command to reset this node on the Tivoli Storage Manager server. When the node has been reset, set the VMCLI node password again and specify the new password.

The VMCLI node password is set by either of these methods:

- Data Protection for VMware command-line interface: **`vmcli -f set_password`** command
- Data Protection for VMware vSphere GUI: **Configuration** > **Tasks** > **Edit Configuration** > **VMCLI Node**
- Data Protection for VMware vCloud GUI: **Configuration** > **Tasks** > **Edit Configuration** > **VMCLI Node**

Session timeout

The Tivoli Storage Manager server COMMTIMEOUT option affects the duration of the Data Protection for VMware session. If the processing time of the Data Protection for VMware operation exceeds this value, the server ends the session with Data Protection for VMware. Therefore, if you are sure that no error occurred during a Data Protection for VMware operation and the COMMTIMEOUT value has been reached, increase the value. Likewise, if an error occurred but Data Protection for VMware did not report the error in a timely manner, then decrease the value for better real-time reporting.

vSphere Client displays a Data Protection for VMware vSphere GUI connection error

In this situation, the Data Protection for VMware vSphere GUI was installed successfully on the vCenter node. However, when viewing the Data Protection for VMware vSphere GUI in the vSphere Client Plug-in Manager (**Menu** > **Plug-ins** > **Manage Plug-ins**), the following message is shown:

```
Tivoli Data Protection for VMware
IBM Tivoli Storage Manager 2.1.1
Disabled
Tivoli Data Protection for VMware Plug-in
The following error occured while downloading the script plugin from
https://guihost.mycompany.com:9081/TsmVMwareUI/plugin/config.xml:
The request failed because of a connection failure. (Unable to connect
to the remote server)
```

This issue can occur when the web server cannot access ports that are specified in the `bootstrap.properties` file. During installation, the web server accesses port 9081. However, when these additional ports cannot be accessed, the vSphere Client cannot connect to the Data Protection for VMware vSphere GUI.

Complete these tasks to resolve this issue:

1. On the system where the Data Protection for VMware vSphere GUI is installed, go to the following directory for your operating system: Linux
   `/opt/tivoli/tsm/tdpvmware/common/webserver/usr/servers/veProfile`

   Windows

   `C:\IBM\tivoli\tsm\tdpvmware\webserver\usr\servers\veProfile`
2. Open the `bootstrap.properties` file to view the eWAS port settings. For example:
   ```
   veProfile.http.port=9080
   veProfile.https.port=9081
   veProfile.keystore.pswd={xor}KzosK2sp0g==
   ```
3. Issue the `netstat -a` command to view all active connections and ports. Compare the results with the port settings in the `bootstrap.properties` file. If any of the ports (specified in the `bootstrap.properties` file) are not open, complete either of the following tasks to resolve this connection issue:
   - Open the closed ports.
   - Update the `bootstrap.properties` file with ports that are available.
4. Restart the GUI web server:
   - Windows
     a. Click **Start** > **Control Panel** > **Administrative Tools** > **Services**.
     b. Right-click `Data Protection for VMware Web Server Service` and click `Restart`.
   - Linux Issue the following command as root:
     `[root@bold4win /]# service webserver restart`
     ```
     Restarting  the WebSphere Liberty Profile ...
     Stopping server veProfile.
     Server veProfile stopped.
     Starting server veProfile.
     Server veProfile started with process ID 17894.
     ```
5. Start the Data Protection for VMware vSphere GUI with either of these methods:
   - Click the Data Protection for VMware vSphere GUI icon in the Solutions and Applications window of the vSphere Client.
   - Open a web browser and go to the GUI web server. For example:

```
https://guihost.mycompany.com:9081/TsmVMwareUI/
```

Login by using the vCenter user name and password.

Tip: The plug-in access method is not supported in a VMware vSphere 6 environment.

Resolving a VM guest (with application protection) backup failure

In this situation, a backup (with application protection) of a guest machine is stopped by the user. When the backup-archive client backup process (**dsmagent** or **dsmc**) ends in this manner, the cleanup of the application protection does not take place. As a result, the next backup (with application protection) of the same guest machine can be issued only after a 10-minute interval. This interval is the length of time necessary for the process to recognize that the guest machine is not backed up.

To manually clean up application protection without waiting 10 minutes for communication to clear, complete these steps:

1. Log on to the guest machine with the same user ID and password that was entered when you issued the backup operation.
2. Open a command prompt window and issue this command:
   ```
   echo %TEMP%
   ```
3. Go to the `%TEMP%` directory, then change to the `TSM` directory. For example:
   ```
   C:\Users\Administrator\AppData\Local\Temp\TSM
   ```
4. Delete the `BackupHeartBeat.txt` file.
5. Back up the guest machine.

Event log contains `event ID 8194, VSS` message

After a backup of a VM guest with application protection completes, the event log contains the `event ID 8194, VSS` error message. This cause of this message is an incorrect security setting in the Volume Shadow Copy Service (VSS) writer or requestor process.

To resolve this error, complete these steps:

1. Log on to the VM guest as an administrator and run the Microsoft `dcomcnfg.exe` utility in the **Start** > **Run** dialog:
   ```
   dcomcnfg.exe
   ```
   Click **OK**.
   The `dcomcnfg.exe` utility is used to modify registry settings.
2. In the Component Services interface, go to **Component Services** > **Computers**. Right-click **My Computer** and select **Properties**.
3. In the My Computer properties panel, go to **COM Security** > **Access Permissions: Edit Default**.
4. In the Access Permission panel, add the `Network Service` account with `Local Access` permission set to `Allow`.
5. Apply your changes and close all open Component Services panels.
6. Restart the VM guest.
7. Back up the VM guest and verify that the `event ID 8194, VSS` error message is not issued to the event log.

Data Protection for VMware installation failure: deployment engine initialization

The Data Protection for VMware installation might be stopped due to a deployment engine initialization failure due to `.lock` files. If the deployment engine interferes with the Data Protection for VMware installation, the following error message is produced:

```
Deployment Engine failed to initialize.
The installer will now shutdown. Please check with the log files for a more
complete description of the failure.
PRESS ENTER TO CONTINUE:
```

The cause might be deployment engine `.lock` files that come from a concurrent installation that is running or from an installation that stopped before it completed. If another installation is running, wait until that installation finishes before you install Data Protection for VMware. If there are no other installations that are started and you encounter this problem, delete any `.lock` files.

Important: Do not delete any `.lock` files if there are other Data Protection for VMware installations running.

Windows To delete `.lock` files on Windows, issue the following command:

```
cd C:\Program Files\IBM\Common\acsi\logs
del .lock*
```

Linux To delete `.lock` files on Linux, issue the following command:

```
cd /usr/ibm/common/acsi/logs
rm .lock*
```

After you remove these files, restart the installation.

Unsupported characters in VM or datacenter name

Data Protection for VMware does not support backing up VMs or datacenters that contain any of the following characters in their name:

"	Double quotation mark
'	Single quotation mark
:	Colon
;	Semicolon
*	Asterisk
?	Question mark
,	Comma
<	Less than sign
>	Greater than sign
/	Forward slash
\	Backward slash
|	Vertical bar

Issues encountered after changing the vCenter

After you change the vCenter in the Data Protection for VMware vSphere GUI, the following two issues might occur:

- A data center that is associated with the new vCenter does not appear on the Configuration Status page.

  To resolve this issue, manually set the domain for the new vCenter. See "Set_domain" on page 103 for details about issuing this command.
- In the Restore tab, an ESX host (associated with a previous data center) displays under a new data center within the new vCenter. This issue is a known limitation. There is not a workaround for this issue.

Consolidating VM backups

After a VM backup, the VM might contain preexisting snapshots even though no snapshots are present in the Snapshot Manager. For example, the VM hard disk points to snapshot VMDK files (for example *-000001.vmdk) instead of regular VMDK files. Although preexisting snapshots might be intentionally retained, Data Protection for VMware does not provide a mechanism to verify whether the VMDK points to a valid snapshot. When snapshots are not consolidated, and a VM with preexisting snapshot files is backed up, Data Protection for VMware might report an incorrect size for the backup on the Tivoli Storage Manager server. Snapshot consolidation also prevents other VMware related issues. As a result, consolidate your snapshots whenever this situation occurs.

To resolve this potential problem, VMware vSphere Client 5.x (or later) notifies you when a VM requires snapshot consolidation. For detailed information, see the following VMware Knowledge Base article: http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2003638

For vSphere 4.1 (or earlier), no consolidation option is available. However, the equivalent task is to create a snapshot and then complete a Delete All action.

Re-register the Data Protection for VMware vSphere GUI

To use the Data Protection for VMware vSphere GUI as a vSphere Client plug-in, it must be registered to the vCenter. When the IP address changes on the system where it is installed, you must re-register the GUI. If you cannot find the GUI in the plug-in Manager, re-register it.Use this procedure when the IP address changes or you did not enable GUI access as a plug-in during installation:

1. Log in to the system where the Data Protection for VMware vSphere GUI is installed.
2. Go to the following directory:

   Linux `/opt/tivoli/tsm/tdpvmware/common/scripts`

   Windows (64-bit) `C:\Program Files (x86)\Common Files\Tivoli\TDPVMware\VMwarePlugin\`
3. To register the Data Protection for VMware vSphere GUI, enter the command:

   Linux

   ```
   ../jre/jre/bin/java -jar reg.jar <vCenterServer> <vCenterUser>
   <vCenterPassword> <new_guiHostnameShort> <new_guiHostnameFull> 9081
   ```

The `new_guiHostnameShort` value is the name that is shown for the Data Protection for VMware vSphere GUI icon in the vCenter.
The `new_guiHostnameFull` value is either the full DNS host name or the IP address. For example:

```
../jre/jre/bin/java -jar reg.jar vctr.archive.mycompany.com administrator
pass4admin myguihost myguihost.mydomain.mycompany.com 9081
```

Windows Issue the **reg.jar** command from the IBM Java directory. For example:

```
C:\IBM\tivoli\tsm\tdpvmware\webserver\jre\jre\bin\java -cp . -jar reg.jar
<vCenter Server address> <vCenter User ID> <vCenter Password>
<GUI web server host name> <GUI web server address>
<GUI web server HTTPS port>
```

For example:

```
C:\IBM\tivoli\tsm\tdpvmware\webserver\jre\jre\bin\java -cp . -jar reg.jar
vctr.archive.mycompany.com administrator pass4admin myguihost
myguihost.mydomain.mycompany.com 9081
```

A `config.xml` file is created.

To register the IBM Data Protection extension, issue the same command with the **-wc_ext** parameter. For example:

```
C:\IBM\tivoli\tsm\tdpvmware\webserver\jre\jre\bin\java -cp . -jar reg.jar
-wc_ext <vCenter Server address> <vCenter User ID> <vCenter Password>
<GUI web server host name> <GUI web server address>
<GUI web server HTTPS port>
```

4. Copy the `config.xml` file to the following directory:

   Linux `/opt/tivoli/tsm/tdpvmware/common/webserver/usr/servers/veProfile/apps/tsmVmGUI.war/plugin/`

   Windows `C:\IBM\tivoli\tsm\tdpvmware\webserver\usr\servers\veProfile\apps\tsmVmGUI.war\plugin\`

5. Restart the GUI web server:
   - Linux Issue the following command as root:

     ```
     [root@bold4win /]# service webserver restart
     ```

   - Windows
     a. Click **Start** > **Control Panel** > **Administrative Tools** > **Services**.
     b. Right-click `Data Protection for VMware Web Server Service` and click `Restart`.

6. Restart the vSphere Client and confirm that the Data Protection for VMware vSphere GUI is now registered.

Tip: The plug-in access method is not supported in a VMware vSphere 6 environment.

An error occurred while making the Web server request (GVM0103E)

In this situation, the Data Protection for VMware vSphere GUI or Data Protection for VMware vCloud GUI shows the following error when you tried to access it:

```
GVM0103E: An error occurred while making the Web server request. If this error persists,
check the network connection with the Web server and verify that the Web server is running.
```

To prevent this error, make sure that the following conditions exist before you start the GUI:

- Linux Windows The Data Protection for VMware vSphere GUI is installed on a system that meets the operating system prerequisites. It must have network connectivity to the following systems:
  - vStorage Backup Server
  - Tivoli Storage Manager server
  - vCenter Server (Data Protection for VMware vSphere GUI)
  - vCloud Director (Data Protection for VMware vCloud GUI)
- Windows The Data Protection for VMware vSphere GUI host URL address must be set in your Internet Explorer trusted sites zone. In the Internet Explorer menu bar, go to **Tools** > **Internet Options** > **Security** > **Trusted sites**. Click **Sites** and add the host URL address. Make sure to apply your changes. For example:

  ```
  Add this website to the zone:http://myvctrmachine.xyzco.com
  ```

- Windows For vSphere Web Client 5.1, when you are using Internet Explorer on Windows Server 2008 or Windows 2012 Server, Enhanced Security Configuration (IE ESC) must be disabled. Go to the Server Manager and make sure that IE ESC is set to `Off`.
- Windows On Windows Server 2008, if you start the Data Protection for VMware vSphere GUI and then add the address as a trusted site, a JavaScript error denies continued access to the Data Protection for VMware vSphere GUI. To resolve this issue, close and restart the Data Protection for VMware vSphere GUI.

Data Protection for VMware vSphere GUI does not display correctly in the VMware vCenter

In this situation, the Data Protection for VMware vSphere GUI is registered as a vCenter plug-in. However, the Data Protection for VMware vSphere GUI icon does not display in the Solutions and Applications window of the vSphere Client. When you view the Data Protection for VMware vSphere GUI in the vSphere Client Plug-in Manager (**Menu** > **Plug-ins** > **Manage Plug-ins**), the following message is shown:

```
The following error occured while downloading the script plugin
from http://192.168.66.58:9080/TsmVMwareUI/plugin/config.xml:
The request failed because of a connection failure.
(Unable to connect to the remote server)
```

To resolve this error, complete the steps as described in the following procedure: “ Re-register the Data Protection for VMware vSphere GUI” on page 171.

Tip: The plug-in access method is not supported in a VMware vSphere 6 environment.

Return codes for VM backup operations

The following return codes apply to VM backup operations on Linux or Windows systems:

Table 13. Return codes for VM backup operations

Return Code	Description
0	A command to process one or more VMs completed successfully.
8	A command to process multiple VMs succeeded on only some of the VMs that were targeted by the command. Examine the log file to determine the processing status for each of the targeted VMs.
12	A command was issued to process one or more VMs. The command did not complete for any of the VMs that were targeted by the command. Examine the log file to determine possible reasons for the failure.

Data Protection for VMware vSphere GUI plug-in privileges are not removed

When you remove the Data Protection for VMware vSphere GUI plug-in privileges, only the labels and descriptions that are associated with the privileges are removed. The actual privileges are not removed.

For detailed information, see the following VMware Knowledge Base article: http://kb.vmware.com/kb/2004601

Tip: The plug-in access method is not supported in a VMware vSphere 6 environment.

Troubleshooting file restore operations

You can retrieve diagnostic information to resolve file restore issues, by running Microsoft Windows PowerShell cmdlet commands.

Before you begin

Ensure that Microsoft Windows PowerShell 3 or later is available on the system where Data Protection for VMware is installed. To view which version of PowerShell is installed, enter the following command in a PowerShell session:

```
PS C:\> $PSVersionTable.PSVersion
```

The number that displays in the `Major` column is the PowerShell version.

About this task

Complete these steps on the system where Data Protection for VMware is installed.

Procedure

1. Start a Microsoft Windows PowerShell or Microsoft Windows PowerShell ISE session with administrator authority. For example:
   Start > **All Programs** > **Accessories** > **Windows PowerShell**.
   Right-click **Windows PowerShell** and select **Run as administrator**.
2. Verify that execution policy is set to `RemoteSigned` by issuing the following command:

   ```
   PS C:\> Get-ExecutionPolicy
   ```

   If another policy is shown, set the execution policy to `RemoteSigned` by issuing the following command:

   ```
   PS C:\> Set-ExecutionPolicy RemoteSigned
   ```

This policy allows the vetools.psm1 script to run on the system.

Tip: The **Set-ExecutionPolicy** command must be issued only once.

3. Import the Data Protection for VMware PowerShell module to make the cmdlets available:

```
PS C:\> Import-Module C:\ibm\tivoli\tsm\tdpvmware\webserver\usr\servers\veProfile\tsmVmGUI\vetools.psm1
```

4. Display log file information in a PowerShell Viewer by issuing the following command:

```
PS C:\> Show-VeFileRestoreLogEntries
```

   You can investigate and share log information in the PowerShell Viewer with any of the following actions:

   - Enter a term to filter the results.
   - Click **Add criteria** to filter the information by more detailed specifications.
   - Click one or more rows to save or copy their content for sharing.

5. Optional: Display trace information from a trace file by issuing the following command:

```
PS C:\> Show-VeFileRestoreTraceEntries
```

6. Optional: If you need to gather logs to review detailed diagnostic information (-review) or to send to IBM Support, save the logs in a compressed file by issuing the following command:

```
PS C:\> Get-VeProblemDeterminationInfo -review
```

   By default, this command saves the VeProblemDetermination.zip file on the desktop.

   Tip: If this command returns an error in the default "PowerShell" interface, start the "PowerShell ISE" interface as an administrator. Then, run the command again.

7. Optional: Each cmdlet provides parameters. To view parameters, issue the following **help** command:

```
help cmdlet name -ShowWindow
```

Related information:

File restore log activity options

Log file activity

Trace options for file restore

By setting tracing options in the FRLog.config file, you can troubleshoot problems that you might encounter during file restore operations.

Modify the options in the FRLog.config file with a text editor in administrator mode. The FRLog.config file is in the following directory:

```
C:\IBM\tivoli\tsm\tdpvmware\webserver\usr\servers\veProfile\logs
```

FR.API.TRACE=ON | OFF

Specify whether to trace API activity at the recommended level of detail.

Note: The following values are also supported and indicate the least, recommended, and highest level of detail: DEBUG, TRACE, ALL.

API_MAX_TRACE_FILES=*number*
Specify the maximum number of trace files to be created or used. The default value is 8.

API_MAX_TRACE_FILE_SIZE=*number*
Specify the maximum size of each trace file in KB. The default value is 8192 KB.

API_TRACE_FILE_NAME=*API_trace_file_name*
Specify the name of the API trace file. The default value is `fr_api.trace`.

API_TRACE_FILE_LOCATION=*API_trace_file_location*
Specify the location of the API trace file. Specify the location by using a forward slash (/). The default location is `Install_Directory/IBM/tivoli/tsm/tdpvmware/webserver/usr/servers/veProfile/logs`.

File restore solutions

Resolve unique or infrequent issues that interfere with file restore operations.

Log in issues

In this scenario, the following information message displays when a fully qualified host name (`myhost.mycompany.com`) or numeric IP address (`192.0.2.0`) is entered in the login page:

```
The host cannot be found. Verify the host name and log in again.
If the problem persists, contact your administrator.
```

To resolve this issue, enter either the fully qualified domain name (`myhost.mydomain`) or the short host name (`myhost`).

VMware attributes

Review how Data Protection for VMware interacts with VMware attributes.

VMware custom attributes

Data Protection for VMware includes VMware custom attributes in backup and restore operations. However, custom attributes are only included when the data mover node is connected directly to a vCenter Server and not an ESXi Server. To set this connection, specify a vCenter Server with the `VMCHost` option that is on the data mover node.

For more information, see the following VMware Knowledge Base article: http://kb.vmware.com/kb/1005720

VMware configuration attributes

Data Protection for VMware does not directly access, modify, or back up the .vmx file. The .vmx file is non-portable. As a result, Data Protection for VMware does not save values that are contained in the file or save the actual file. The main objective of Data Protection for VMware is to recover the VM to a usable (or startable) state.

To view a list of VMware configuration attributes that are preserved by Data Protection for VMware, see technote 1631315.

Troubleshooting IBM Data Protection extension problems

Solutions are provided for IBM Data Protection extension issues. You can learn how to resolve Platform Services Controller connection problems, enable tracing, and get more details about IBM Data Protection extension messages.

- "Resolving Platform Services Controller connection problems"
- "Enabling tracing" on page 178
- "Messages for the IBM Data Protection extension" on page 179

Resolving Platform Services Controller connection problems

Tags and categories that are used for the management of virtual machine backups are stored and managed on the VMware Platform Services Controller (PSC). To be able to use the tagging feature for backup management, the tag-based data mover node and the IBM Data Protection extension must be able to connect to the Platform Services Controller by using the Single Sign On process.

The Platform Services Controller server hosts the VMware Lookup Service that registers the location of vSphere components and handles the vCenter Single Sign On process.

Symptoms

When connection problems occur, the data mover node cannot complete the Single Sign On process and cannot access the tags and categories in the Platform Services Controller.

If the Platform Services Controller cannot be reached, the tag information will not be displayed in the IBM Data Protection extension. Virtual machine backup operations will also fail.

Resolving the problem

Complete the following tasks to diagnose and resolve connectivity problems:

- Ensure that the Platform Services Controller and the vCenter server are installed on the same host.
- Ensure that the Platform Services Controller host is powered on and accessible over the network.
- Ensure that the VMware Lookup Service is active and accepting connections at the following address: `https://`*`PSC-FQDN`*`/lookupservice/sdk`, where *PSC-FQDN* is the fully qualified domain name of the Platform Services Controller host.
- Ensure that a data mover is installed on the same server that hosts the Data Protection for VMware vSphere GUI. The data mover node must be configured so that the vCenter server credentials are saved, for example, by using the **`dsmc set password`** command in the backup-archive command-line.
- Linux For Linux data mover nodes, ensure that the default password file (`/etc/adsm/TSM.PWD`) is used.
- Ensure that client option `vmchost` is set by using the same value and format that was used for the vCenter server field during the installation of Data Protection for VMware. The preferred format for the vCenter server address is the vCenter server's fully qualified domain name (FDQN). Use the vCenter server IP address only if it was used during the registration of the vCenter, although the IP address is not preferred by VMware.
- The system time on the data mover host must be in sync with the system time on the Platform Services Controller and vCenter. The system time and time zone

must be set correctly on all three systems. Otherwise, a Platform Services Controller connection error occurs. The following message is typical of this type of error:

```
ANS2378E Single Sign On login to the vSphere Server failed in function
visdkGetSecurityToken - Issue. "The time now Wed Apr 20 21:31:58 UTC 2016
does not fall in the request lifetime interval extended with clock
tolerance of 600000 ms: [ Wed Apr 20 16:20:46 UTC 2016; Wed Apr 20
16:50:46 UTC 2016). This might be due to a clock skew problem."
```

```
ANS2373E The VMware vCloud Suite plug-in library failed to connect to the
Platform Services Controller (PSC) and perform a single sign-on session.
```

If you need to trace this problem, on the backup-archive client command line, enable the client tracing feature by using the `VCLOUD` trace flag, then run the command again and analyze the trace for additional messages. For example:

```
TRACEFLAGS VCLOUD
TRACEFILE c:\temp\tracex64.txt

04/20/2016 12:30:50.253 : ..\common\vcloudSuiteReturnValue.cpp( 108):
vcloudSuiteReturnValue::HandleReturnValue: exception description:
```

```
connect(): Connections to all Platform Service Controllers failed. The
following exceptions were encountered: https://psc.home.lan/sts/
STSService/vsphere.local: javax.xml.ws.soap.SOAPFaultException: The time
now Wed Apr 20 17:32:02 EDT 2016 does not fall in the request lifetime
interval extended with clock tolerance of 600000 ms: [ Wed Apr 20
12:20:50 EDT 2016; Wed Apr 20 12:50:50 EDT 2016). This might be due to a
clock skew problem.
```

- For more information about messages that occurred, see “Messages for the IBM Data Protection extension” on page 179.

Enabling tracing

By enabling the tracing feature, you can troubleshoot problems that you might encounter during operations with the IBM Data Protection extension or the tag-based data mover node.

About this task

To enable tracing in the common VMware vCloud Suite layer for both the backup-archive command-line client and the IBM Data Protection extension, the following trace files and trace properties files are used:

Log location

Trace output is added to the following log files:

- Windows (Client) `C:\Program Files\Tivoli\TSM\baclient\vcsplugin.log`
- Linux (Client) `/opt/tivoli/tsm/client/ba/bin/vcsplugin.log`
- Windows (Data Protection for VMware) `C:\IBM\tivoli\tsm\tdpvmware\webserver\usr\servers\veProfile\logs\vcsplugin.log`
- Linux (Data Protection for VMware) `/opt/tivoli/tsm/tdpvmware/common/webserver/usr/servers/veProfile/logs/vcsplugin.log`

Log property location

The property values are updated in the following trace properties files to enable tracing:

- Windows (Client) `C:\Program Files\Tivoli\TSM\baclient\plugins\vcloudsuite\sdk\log4j.properties`
- Linux (Client) `/opt/tivoli/tsm/client/ba/bin/plugins/vcloudsuite/sdk/log4j.properties`
- Windows (Data Protection for VMware) `C:\IBM\tivoli\tsm\tdpvmware\webserver\usr\servers\veProfile\apps\tsmVmGUI.war\WEB-INF\classes\log4j.properties`
- Linux (Data Protection for VMware) `/opt/tivoli/tsm/tdpvmware/common/webserver/usr/servers/veProfile/apps/tsmVmGUI.war/WEB-INF/classes/log4j.properties`

Procedure

1. To view more detailed trace information for the common VMware vCloud Suite layer, change the following property value from `INFO` to `TRACE` in the corresponding `log4j.properties` file:

   ```
   log4j.logger.com.ibm.tivoli.tsm.ve=TRACE
   ```
2. To view more detailed trace information for the common vCloud Suite layer, VMware vCloud Suite SDK, and associated .jar files, change the following property value from `WARN` to `TRACE`, in the corresponding `log4j.properties` file

   ```
   log4j.rootLogger=TRACE,file
   ```
3. Rerun the actions or commands that caused the error. If the error occurred in the IBM Data Protection extension, you must restart the server that hosts the Data Protection for VMware vSphere GUI.

Messages for the IBM Data Protection extension

To help you understand IBM Data Protection extension messages, review the following information:

- GVM5107E
- GVM5110E
- GVM5111E
- GVM5112E

GVM5107E: Data protection settings are not available because the login credentials provided are invalid for the '*name*' Platform Services Controller

The symptoms, cause, and user response are provided for this IBM Data Protection extension message.

Symptoms

Data protection settings cannot be displayed in the IBM Data Protection extension.

Causes

The credentials that are required to log in to the Platform Services Controller are invalid for the vCenter.

Resolving the problem

Ask the Tivoli Storage Manager server administrator to update the vCenter Server credentials by using the **`dsmc set password`** command in the backup-archive command-line client on the server where the Data Protection for VMware vSphere GUI is installed.

```
dsmc set password -type=vm vmchost username password
```

The value for the `vmchost` option must match the value that is in the client options file. It must also match the vCenter server address that was used during the installation of the Data Protection for VMware vSphere GUI.

You might also receive the following backup-archive client messages that are associated with this error:

- Client message ANS9331W
- Client message ANS9332E

Related information

Set Password

GVM5110E: Data protection settings are not available because an error occurred connecting to the '*name*' Platform Services Controller

The symptoms, cause, and user response are provided for this IBM Data Protection extension message.

Symptoms

Data protection settings cannot be displayed in the IBM Data Protection extension.

Causes

Other errors are causing connection issues to the Platform Services Controller and vCenter.

Resolving the problem

Ensure that the Platform Services Controller listed is running as expected. For more information, see "Resolving Platform Services Controller connection problems" on page 177.

You might also receive the following backup-archive client message that is associated with this error:

- Client message ANS2373E

GVM5111E: Data protection settings are not available because no login credentials are found for the '*name*' Platform Services Controller

The symptoms, cause, and user response are provided for this IBM Data Protection extension message.

Symptoms

Data protection settings cannot be displayed in the IBM Data Protection extension.

Causes

The credentials that are required to log in to the Platform Services Controller cannot be found for the vCenter. For example:

- Windows The value for the `vmchost` option cannot be found in the Windows registry.
- Linux The Tivoli Storage Manager password file (`TSM.PWD`) cannot be accessed or the value for the `vmchost` option cannot be found in the `TSM.PWD` file.

Resolving the problem

Windows

Ask the Tivoli Storage Manager server administrator to update the vCenter Server credentials by using the **dsmc set password** command in the backup-archive command-line client on the server where the Data Protection for VMware vSphere GUI is installed.

```
dsmc set password -type=vm vmchost username password
```

The value for the `vmchost` option must match the value that is in the client options file. It must also match the vCenter server address that was used during the installation of the Data Protection for VMware vSphere GUI.

Linux

If the `TSM.PWD` file cannot be found, try the following actions:

- The default location for the `TSM.PWD` file is `/etc/adsm/TSM.PWD`. Verify that this file exists. If it does not, ask the Tivoli Storage Manager administrator to create the password file. The administrator must complete the following steps in the backup-archive command-line client (data mover) on the server where the Data Protection for VMware vSphere GUI is installed:
  1. Generate and save the password for the data mover node by running the following command:
     ```
     dsmc set password
     ```
  2. Refresh or restart the client acceptor daemon (**dsmcad**).
  3. Run the following command:
     ```
     dsmc set password -type=vm vmchost username password
     ```
     The value for the `vmchost` option must match the value that is in the client options file. It must also match the vCenter server address that was used during the installation of the Data Protection for VMware vSphere GUI.
- If you specified an alternative location for the password file with the `passworddir` option the in `dsm.sys` file, you must also specify the following option in the `vcs.properties` file. The following location is typical for the `vcs.properties` file:

  ```
  /opt/tivoli/tsm/tdpvmware/common/webserver/usr/servers/veProfile/apps/
  tsmVmGUI.war/WEB-INF/config/vcs.properties
  ```

  Add the following statement to the file:

  ```
  passwordfile=<absolute path of the TSM.PWD file>
  ```

  For example:

  ```
  passwordfile=/etc/security/tsm/TSM.PWD
  ```

If the `TSM.PWD` file cannot be accessed due to permission issues, complete the follow steps:

1. Ensure that the `TSM.PWD` file is accessible by the `tdpvmware` user.
2. If you receive a permission error, check that the permissions for the `TSM.PWD` appear as follows:
   ```
   -rw-r----- 1 root tdpvmware
   ```

   If the permissions do not match, go to the directory that contains the `TSM.PWD` file and change the permissions with the following commands:
   ```
   chgrp tdpvmware TSM.PWD
   chmod g+r TSM.PWD
   ```

You might also receive the following backup-archive client messages that are associated with this error:

- Client message ANS9331W
- Client message ANS9332E

Related information

`Set Password`

GVM5112E: Data protection settings are not available because an error occurred processing the login credentials that are provided for the '*name*' Platform Services Controller

The symptoms, cause, and user response are provided for this IBM Data Protection extension message.

Symptoms

Data protection settings cannot be displayed in the IBM Data Protection extension.

Causes

The credentials that are required to log in to the Platform Services Controller are available but one or more of the following errors occurred:

- An error occurred processing the credentials.
- An error occurred loading the native library that is needed to process the credentials.

Resolving the problem

Contact the Tivoli Storage Manager server administrator for assistance.

You might also receive the following backup-archive client messages that are associated with this error:

- Client message ANS2635E
- Client message ANS9365E

Appendix B. Tivoli Storage Manager recovery agent operations

This service enables the mounting of any snapshot volume from the Tivoli Storage Manager server. You can view the snapshot locally, with read-only access, on the client system, or use an iSCSI protocol to access the snapshot from a remote computer.

In addition, the recovery agent provides the instant restore function. A volume that is used in instant restore processing remains available while the restore process proceeds in the background. The recovery agent is accessed with the recovery agent GUI or command-line interface.

Important: Previous versions of Tivoli Storage Manager for Virtual Environments delivered mount and file restore function with the Tivoli Storage Manager recovery agent. Although this function is still supported by the recovery agent, the Tivoli Storage Manager file restore interface is the preferred method, as described in the following topic:

Chapter 3, “Getting started with file restore,” on page 35

The content in this "Tivoli Storage Manager recovery agent operations" collection is provided as a reference for users who prefer the recovery agent method.

Mounting snapshots with the recovery agent

Linux Windows

You can use Tivoli Storage Manager recovery agent to mount a snapshot and use the snapshot to complete data recovery.

Mount snapshots with either the Tivoli Storage Manager recovery agent GUI or with the “Mount command” on page 123. Install and run the Tivoli Storage Manager recovery agent on a system that is connected to the Tivoli Storage Manager server through a LAN. You cannot use the Tivoli Storage Manager recovery agent component operations in a LAN-free path.

Be aware of these three situations when running mount operations:

- When the Tivoli Storage Manager recovery agent is installed on a guest machine, you cannot start an instant restore or a mount operation for any file system or disk while the guest machine is being backed up. You must either wait for the backup to complete, or you must cancel the backup before running an instant restore or a mount operation. These operations are not allowed because the locking mechanism is for a full VM.
- When you browse the snapshot backup inventory, the operating system version of the VM is the version that was specified when the VM was originally created. As a result, Tivoli Storage Manager recovery agent might not reflect the current operating system.
- A volume becomes unstable when a network failure interrupts a mount operation. A message is issued to the event log. When the network connection is

reestablished, another message is issued to the event log. These messages are not issued to the Tivoli Storage Manager recovery agent GUI.

A maximum of 20 iSCSI sessions is supported. The same snapshot can be mounted more than one time. If you mount a snapshot from the same tape storage pool by using multiple instances of the Tivoli Storage Manager recovery agent, one of the following actions occurs:

- The second Tivoli Storage Manager recovery agent instance is blocked until the first instance is complete.
- The second Tivoli Storage Manager recovery agent instance might interrupt the activity of the first instance. For example, it might interrupt a file copy process on the first instance.
- The Tivoli Storage Manager recovery agent cannot connect to multiple servers or nodes simultaneously.

As a result, avoid concurrent Tivoli Storage Manager recovery agent sessions on the same tape volume.

Mounting snapshot guidelines for Windows systems

Snapshots can be mounted in either read-only or read/write mode. In read/write mode, the recovery agent saves changes to data in memory. If the service is restarted, the changes are lost.

The recovery agent operates in either of the following two modes:

No user is logged in

The recovery agent runs as a service. This service enables remote connections through the Data Protection for VMware command-line interface.

User is logged in

The recovery agent continues to run as a service until you start the recovery agent and use the GUI. When you close the recovery agent and GUI, the service restarts. You can use only the recovery agent application and GUI when running with administrator login credentials. Only one copy of the recovery agent application can be active at any time.

When mounted volumes exist and you start Mount from the Start menu on Windows 7, Windows 8, Windows Vista, or Windows 2008, this message is displayed:

```
Some snapshots are currently mounted. If you choose to continue, these snapshots will be
dismounted. Note that if a mounted volume is currently being used by an application, the
application may become unstable. Continue?
```

When **Yes** is clicked, the mounted volumes are unmounted, even when they are in use.

Restriction: When exposing snapshots as iSCSI targets, and a snapshot of a dynamic disk is displayed to its original system, the UUIDs become duplicated. Likewise when a snapshot of a GPT disk is displayed to its original system, the GUIDs become duplicated. To avoid this duplication, expose dynamic disks and GPT disks to a system other than the original system. For example, expose these disk types to a proxy system, unless the original disks no longer exist.

Mounting snapshot guidelines for Linux systems

Use either of these methods to mount (and restore) files on Linux:

- Use the Tivoli Storage Manager recovery agent to create an iSCSI target. You can use an iSCSI initiator on the Linux machine to mount the target volume. The Linux machine does not require the Tivoli Storage Manager recovery agent to be installed. iSCSI mount is the preferred method to mount (and restore) files on Linux.
- Install the Tivoli Storage Manager recovery agent command-line interface on a Windows system. Use the Tivoli Storage Manager recovery agent GUI on the Linux machine.

Be aware of these requirements when running mount operations:

- The Tivoli Storage Manager recovery agent GUI on Windows must be able to access the IBM Tivoli Storage Manager server. The Tivoli Storage Manager recovery agent GUI on Windows displays snapshots as iSCSI targets. Therefore, the snapshots must be accessible to the target Linux system.
- Linux mount and restore operations require the iSCSI port to be open on any firewall between the Windows mount system, the iSCSI target, and the system that completes the restore (the iSCSI initiator). The iSCSI default port is 3260.

Be aware of these two actions when running mount operations:

- To prevent possible mount errors, disable the FS Automount option for the Tivoli Storage Manager disks. This option is set in the configuration file used for the HAL daemon. If you do not disable the FS Automount option, the unmount operation might fail.
- To prevent the recovery process from mounting the device, stop the cron daemon. For example:

  ```
  /etc/init.d/cron stop
  ```

  Start the cron daemon when the processing completes.

When running a Linux instant restore or mount, Tivoli Storage Manager recovery agent saves changes to data on a virtual volume in the write cache. The path is `C:\Documents and Settings\All Users\Application Data\Tivoli\TSM\tdpvmware\mount`, and the size is set to a maximum of 90% of the available space. These settings can be configured by clicking settings in the main Tivoli Storage Manager recovery agent window. The write cache must be on a local drive and cannot be set to a path on a shared folder. You cannot enable or disable the write cache from the UI or from configuration files. Specify the write cache location in a non-system folder on a local disk to prevent possible errors. For example, Windows 2008 has a different path: `C:\ProgramData\Tivoli\TSM\TDPVMWare\mount`.

Restriction: These two restrictions affect mount operations:

- To prevent any interruption during restore processing, exclude the write cache path from all antivirus software protection settings.
- When restoring several volumes to several partitions on the same disk, only one volume can be active. The other volumes remain in the DELAYED state. Their progress as shown on the user interface remains at 0% until they move out of the DELAYED state after the active synchronization completes.

Restoring files with the recovery agent

Linux Windows

Use the Tivoli Storage Manager recovery agent for efficient file restores and to minimize downtime by mounting snapshots to virtual volumes.

Tivoli Storage Manager recovery agent can be used for the following tasks:

- Recovering lost or damaged files from a backup
- Mounting a VM guest volume and creating an archive of the VM guest files
- Mounting database applications for batch reports

The virtual volume can be viewed by using any file manager, for example Windows Explorer. The directories and files in the snapshot can be viewed and managed like any other file. If you edit the files and save your changes, after you unmount the volume, your changes are lost because the changed data is held in memory and never saved to disk. Because the changes are written to memory, Tivoli Storage Manager recovery agent can use a large amount of RAM when working in read/write mode.

You can copy the changed files to another volume before unmounting the volume.

The default *read only* mount option is the preferred method, unless a mounted volume must be writeable. For example, an archive application might require write access to the archived volume.

The Tivoli Storage Manager recovery agent mounts snapshots from the Tivoli Storage Manager server. In the Tivoli Storage Manager recovery agent GUI, click **Remove** to close an existing connection to a Tivoli Storage Manager server. You must remove any existing connection before you can establish a new connection to a different server or different node. Dismount all volumes before you click **Remove**. The remove operation fails if there are active mount and restore sessions in the Linux or Windows Mount machines. You cannot remove the connection to a server when you are running a file restore or an instant restore from that server. You must first dismount all virtual devices and stop all instant restore sessions before you disconnect from a server. If you do not do so, the connection is not removed.

You must unmount all virtual volumes before uninstalling Tivoli Storage Manager recovery agent. Otherwise, these mounted virtual volumes cannot be unmounted after Tivoli Storage Manager recovery agent is reinstalled.

Restoring file information for a block-level snapshot is a random-access process. As a result, processing might be slow when a sequential-access device (such as a tape) is used. To run a file restore of data that is stored on tape, consider moving the data to disk or file storage first. From a Tivoli Storage Manager server administrative command-line client (`dsmadmc`), issue the **QUERY OCCUPANCY** command to see where the data is stored. Then, issue the **MOVE NODEDATA** command to move the data back to disk or file storage.

Mounting a snapshot from the same tape storage pool by two instances of Mount can cause one of these results:

- The second Mount instance is blocked until the first instance is complete.
- Both mounts succeed, but the performance is poor.

When restoring data from a mirrored volume, mount only one of the disks that contains the mirrored volume. Mounting both disks causes Windows to attempt a resynchronization of the disks. However, both disks contain a different timestamp if mounted. As a result, all data is copied from one disk to the other disk. This amount of data cannot be accommodated by the virtual volume. When you must recover data from a volume that spans two disks, and those disks contain a mirrored volume, complete these steps:

1. Mount the two disks.
2. Use the iSCSI initiator to connect to the first disk.
3. Use Windows Disk Manager to import this disk. Ignore any message regarding synchronization.
4. Delete the mirrored partition from the first (or imported) disk.
5. Use the iSCSI initiator to connect to the second disk.
6. Use Windows Disk Manager to import the second disk.

Both volumes are now available.

Restriction: Do not change a Tivoli Storage Manager node password while running a file restore or an instant restore from snapshots stored in that node.

Restoring files from a Windows system with the recovery agent

Windows

You can use Tivoli Storage Manager recovery agent for efficient file restore and to minimize downtime by mounting snapshots to virtual volumes.

Before you begin

Important: Previous versions of Tivoli Storage Manager for Virtual Environments delivered mount and file restore function with the Tivoli Storage Manager recovery agent. Although this function is still supported by the recovery agent, the Tivoli Storage Manager file restore interface is the preferred method, as described in the following topic:

Chapter 3, “Getting started with file restore,” on page 35

The content in this "Tivoli Storage Manager recovery agent operations" collection is provided as a reference for users who prefer the recovery agent method.

You can use Tivoli Storage Manager recovery agent for efficient file restore and to minimize downtime by mounting snapshots to virtual volumes. On supported Windows operating systems, file restore is supported from snapshots of NTFS, FAT, or FAT32 volumes.

In order to recover Microsoft Exchange Server mailbox items, you must use the IBM Tivoli Storage Manager for Microsoft Exchange Server product and documentation. As a result, IBMTivoli Storage Manager for Microsoft Exchange Server must be purchased separately with a valid license. For more information, see the following product website:
http://www.ibm.com/software/products/tivostormanaformail/

The mount function cannot be used to mount a snapshot of partitions from a dynamic or GPT-based disk as a virtual volume. Only partitions from an

MBR-based, basic disk can be mounted as virtual volumes. File restore from GPT, dynamic, or any other non-MBR or non-basic disk is possible by creating a virtual iSCSI target and using an iSCSI initiator to connect it to your system.

Important: The ACL values associated with the folders and files that are restored in a file restore operation are not transferred to the recovered files. In order to maintain ACL values, use the XCOPY command when copying files from the target.

Before proceeding, make sure you have reviewed the following information:

- "Mounting snapshots with the recovery agent" on page 183

  To mount a backed up VM disk from a Windows system for file restore, use the Data Protection for VMware vSphere GUI mount wizard.

In order to recover Microsoft Exchange Server mailbox items, you must use the IBM Tivoli Storage Manager for Microsoft Exchange Server product and documentation. As a result, IBM Tivoli Storage Manager for Microsoft Exchange Server must be purchased separately with a valid license. For more information, see the following product website: http://www.ibm.com/software/products/tivostormanaformail/.

About this task

Windows To run a file restore for a Windows system, complete the following steps:

Procedure

1. Log on to the system where you want to restore files. Tivoli Storage Manager recovery agent must be installed on the system.
2. Start the Tivoli Storage Manager recovery agent GUI from the **Start** > **All Programs** menu or by clicking the Tivoli Storage Manager recovery agent icon in the taskbar.
3. Connect to a Tivoli Storage Manager server by clicking **Select TSM server**. The target node is where the backups are located. You can manage the level of access to the target node data by specifying a different node name in the `Node access method` section.

   A list of VMs with snapshots stored in the specified node displays.
4. Select a VM from the list. A list of snapshots for the selected VM displays.

   Tip: You can find your VM quickly by typing the first few letters of the machine name in the edit portion of the list box. The list shows only those machines that match the letters you entered. Machine names are case-sensitive.

   A VM might display in the list, but if you select it, the snapshots list might be empty. This situation occurs because of one of the following reasons:
   - No snapshots completed successfully for that VM.
   - The **Fromnode** option was used and the specified node is not authorized to restore the selected VM.
5. Select the preferred snapshot date. A list of VM disks that are backed up in the selected snapshot displays. Select a disk and click **Mount**.
6. In the `Select Mount Destination` dialog, check **Create virtual volume from selected partition**. A list of partitions available on the selected disk is shown. For each partition, its size, label, and file system type are displayed.

   - If the disk is not MBR-based, an error message is displayed.
   - By default, only partitions that can be used for file restore are displayed.
   - To display all partitions that existed on the original disk, clear the **Show only mountable partitions** check box.
7. Select the required partition. Partitions formatted using unsupported file systems cannot be selected.
8. Specify a drive letter or an empty folder as a mount point for the virtual volume.
9. Click **OK** to create a Virtual Volume that can be used to recover the files.
10. When the Virtual Volume is created, use Windows Explorer to copy the files to your preferred location.

    Important: The ACL values associated with the folders and files that are restored in a file restore operation are not transferred to the recovered files. In order to maintain ACL values, use the XCOPY command when copying files from the target.

Restoring files from a Linux system with the recovery agent

Linux

File restore on Linux is available from snapshots of disks.

Before you begin

Important: Previous versions of Tivoli Storage Manager for Virtual Environments delivered mount and file restore function with the Tivoli Storage Manager recovery agent. Although this function is still supported by the recovery agent, the Tivoli Storage Manager file restore interface is the preferred method, as described in the following topic:

Chapter 3, “Getting started with file restore,” on page 35

The content in this "Tivoli Storage Manager recovery agent operations" collection is provided as a reference for users who prefer the recovery agent method.

File restore is supported from snapshots of disks that use any of the following:
- MBR-style partition tables.
- Partitions formatted using one of these file systems:
  - EXT2
  - EXT3
  - EXT4
  - ReiserFS

Be aware of these considerations before attempting a file restore on Linux:
- If, during a file restore on a Linux machine, the iSCSI target is dismounted, the file restore fails, and the restored data remains uncompleted.
- The Tivoli Storage Manager recovery agent GUI must be configured before attempting a file restore. To configure, click **Select TSM server** and **Settings** in the Tivoli Storage Manager recovery agent GUI and enter the required information.

- This procedure assumes that you are logged on to the Linux system with root user authority and the Tivoli Storage Manager recovery agent GUI is available.
- Linux requires all iSCSI devices to be unmounted before rebooting or shutting down the system.
- The Tivoli Storage Manager recovery agent component does not support file restore operations over a wide area network (WAN).

Before proceeding, make sure you have reviewed the following information:

- "Mounting snapshots with the recovery agent" on page 183

  To mount a backed up VM disk from a Linux system for file restore, use the Data Protection for VMware vSphere GUI mount wizard. Follow the instructions in "Mounting a virtual machine disk and exporting the volumes" on page 153.
- "Restoring files with the recovery agent" on page 186

About this task

This task describes how to use Tivoli Storage Manager recovery agent to restore a snapshot volume (file) on a Linux system.

Procedure

1. Identify the Tivoli Storage Manager server where the snapshots are stored by clicking **Select TSM server**. Although the **Select TSM server** list appears to contain multiple servers, this list contains a maximum of one server only. Click **Refresh** after selecting a server.
   Tivoli Storage Manager recovery agent queries the server for a list of protected VMs and displays the list.
2. Select a VM from the list. Tivoli Storage Manager recovery agent queries the server for a list of snapshots available for the specified VM. A VM might be displayed in the VMs list, but if you select it, the snapshots list might be empty. This situation might occur for one of the following reasons:
   - No snapshots have yet completed successfully for that VM.
   - The node used for authentication was not granted permission to restore the selected VM.

   Tip: To quickly locate the required VM from the available VM list, type the first few letters of the VM name.
3. Select the required snapshot by selecting the date and disk. Tivoli Storage Manager recovery agent displays a list of partitions available on the selected disk. For each partition, size, label, and file system type are displayed. By default, only mountable partitions are displayed.

   Note: Mount points are not displayed.
4. Click **Mount**.
5. Select the required partition in the `Choose mount destination` dialog. To display all partitions, clear the **Show only mountable partitions** check box.
6. Specify the path where the virtual volume is mounted in the `Use the following mount point` field.
7. Click **OK** to complete the mount operation. After the mount process is completed successfully, a new entry is displayed in the **Mounted Volumes** field. For example:

   ```
   /mnt is mount of [tsm-ba-1@tsm-ve-1]-[vm-1]-[2010-Mar-24
   10:10:10]-[Hard Disk 1]-[Partition 0]
   ```

8. Locate the files you are interested in and restore them from the backup.

   Important: The ACL values associated with the folders and files that are restored in a file restore operation are not transferred to the restored files. In order to maintain ACL values, use the `cp -p` command when copying files.

Restoring volumes instantly with the recovery agent

Linux Windows

Unlike a conventional volume restore, instant restore provides access to volume contents while the restore process is in progress. Less downtime is required before a recovered volume can be used. After you start an instant restore, you can use data on the disk while the restore is in progress.

Instant restore works only with local volumes. The term "local" is used regarding the Tivoli Storage Manager recovery agent since it must be installed on the guest machine that contains the volume to be restored. Local volumes must have an assigned drive letter. Instant restore cannot be used to restore the system volume.

Instant restore destination volumes must be either on basic disks, or simple volumes on dynamic disks. Destination volumes cannot be spanned volumes, mirrored volumes, or Software RAID 0, RAID 1, and RAID 5 volumes. You can use a basic disk as a destination volume and then convert the basic disk to a dynamic disk. The file system on the destination volume cannot be a FAT file system. If you plan to restore into a FAT volume, you must format it as NTFS before attempting an instant restore.

You can complete an instant restore of a volume in a supported clustered environment. While instant restore process is running, you can access the volume. Other volumes in the cluster might not be affected, and you can work with the cluster, and with that volume, in parallel. During the instant restore, the disk that is being restored cannot fail over if the node fails.

If a system is shut down while instant restore is in progress, the instant restore automatically continues from the same point when power is restored.

Restoring volumes instantly from a Windows system with the recovery agent

Windows

With instant restore, you can restore a volume and almost immediately use the restored volume. Less downtime is required before a recovered volume can be used because you can use data on the disk while the restore is in progress.

Before you begin

Important: Previous versions of Tivoli Storage Manager for Virtual Environments delivered mount and file restore function with the Tivoli Storage Manager recovery agent. Although this function is still supported by the recovery agent, the Tivoli Storage Manager file restore interface is the preferred method, as described in the following topic:

Chapter 3, “Getting started with file restore,” on page 35

The content in this "Tivoli Storage Manager recovery agent operations" collection is provided as a reference for users who prefer the recovery agent method.

Instant restore operations on Windows require the Tivoli Storage Manager recovery agent to be installed on the guest machine.

Instant restore is available only from Data Protection for VMware snapshots on a source volume that is on a simple, MBR-based disk. The volume format of volumes on those disks must be NTFS, FAT, or FAT32. However, instant restore to a destination partition on FAT volumes is not supported. As a result, if you plan to restore to a destination partition that is formatted as FAT, you must format the partition as NTFS before attempting a restore. In addition, when selecting a destination volume for instant restore, make sure that the volume is on a physical disk, and not on a virtual iSCSI disk.

- Restoring a volume involves overwriting data on the existing storage volume. After the restore begins, the current volume contents are permanently erased. Before you start the restore, verify that the correct volume is selected, and that there are no open handles or processes that are using that volume.
- The restore operation fails if there are open files or applications that are running on the target restore volume. Selecting **Ignore open handles on the destination volume** causes Data Protection for VMware to ignore the open files and applications that are running on the destination volume. This situation can cause a problem with applications and loss of data in files that are open on the target volume.

Use the **Max CPU** slider to adjust the processor usage for the restore process.

To cancel the restore process, select the instant restore session that is in progress and click **Abort**. All data on the target drive is lost. You can click **Abort All** to cancel all processes. If you stop an instant restore without clicking **Abort** or **Abort all**, the restored volume is displayed as a valid volume, but the data on the volume is invalid. The data is invalid because the data was partially restored, but the restore process did not have time to complete, and the shutdown was abnormal.

If the service is stopped while instant restore is running, the volume appears to be a valid volume. Trying to access the area of the volume that is not yet restored fails, and the data appears corrupted. After the service restarts, the restore process continues, and the data appears valid. If a power failure occurs during instant restore, after the machine restarts, the volume appears to be unformatted. Do not attempt to format or modify the volume. After the service starts, the instant restore process resumes, and the volume appears valid.

A temporary problem might prevent the session from running. For example, a network problem might cause a temporary loss of access to the Tivoli Storage Manager server. In that case, the instant restore session pauses. To continue to the restore process after the pause, select the appropriate line in the instant restore list and click **Resume**. During the period when the session is paused, the parts of the volume that are not yet restored are inaccessible.

You can use instant restore to restore into a simple volume that is on a dynamic disk. However, the source volume must be an MBR-based disk. The source volume cannot be a dynamic disk. This restore might cause the disk status to change to *Online (Errors)*. In addition, the status of all volumes on the disk might change to *At Risk*. This change in disk status can occur when network traffic is too heavy for instant restore to operate. In this situation, the volumes are online and mounted. You can return the disk and volume status to normal by going to the Computer Management Console. Right-click the disk; then, click **Reactivate Disk**.

Before proceeding, make sure you have reviewed the following information:

- "Mounting snapshots with the recovery agent" on page 183
- "Restoring volumes instantly with the recovery agent" on page 191

The Tivoli Storage Manager recovery agent GUI must be configured before attempting a file restore operation. To configure, click **Select TSM server** and **Settings** in the Tivoli Storage Manager recovery agent GUI and enter the required information.

About this task

Use the **Max CPU** slider to adjust the processor usage for the restore process.

To cancel the restore process, select the instant restore session that is in progress and click **Abort**. All data on the target drive is lost. You can click **Abort All** to cancel all processes. If you stop an instant restore without clicking **Abort** or **Abort all**, the restored volume is displayed as a valid volume, but the data on the volume is invalid. The data is invalid because the data was partially restored, but the restore process did not have time to complete, and the shutdown was abnormal.

If the service is stopped while instant restore is running, the volume appears to be a valid volume. Trying to access the area of the volume that is not yet restored fails, and the data appears corrupted. After the service restarts, the restore process continues, and the data appears valid. If a power failure occurs during instant restore, after the machine boots up, the volume appears to be unformatted. After the service starts, the instant restore process resumes, and the volume appears valid.

A temporary problem might prevent the session from running. For example, a network problem might cause a temporary loss of access to the Tivoli Storage Manager server. In that case, the instant restore session pauses. To continue to the restore process after the pause, select the appropriate line in the instant restore list and click **Resume**. During the period when the session is paused, the parts of the volume that are not yet restored are inaccessible.

You can use instant restore to restore a simple volume that is located on a dynamic disk. The destination volume can be a dynamic disk; however, the source volume cannot be a dynamic disk. This restore might cause the disk status to change to *Online (Errors)*. In addition, the status of all volumes on the disk might change to *At Risk*. This change in disk status can occur when network traffic is too heavy for instant restore to operate. In this situation, the volumes are online and mounted. You can return the disk and volume status to normal by going to the Computer Management Console. Right-click the disk; then, click **Reactivate Disk**.

Procedure

To perform an instant restore, complete the following steps:

1. On the guest machine, start the Tivoli Storage Manager recovery agent GUI from the **Start** > **All Programs** menu or by clicking the Tivoli Storage Manager recovery agent icon in the taskbar.

2. In the Tivoli Storage Manager recovery agent window, select the Tivoli Storage Manager server to use as the source by clicking **Select TSM server**. Although the **Select TSM server** list appears to contain multiple servers, this list contains a maximum of one server only. Tivoli Storage Manager recovery agent queries the Tivoli Storage Manager server for a list of protected VMs and displays the list.
3. Select a VM, date, time, and disk, and then click **Restore**.
4. Tivoli Storage Manager recovery agent displays a list of partitions available on the selected disk. For each partition, its size, label, and file system type are displayed. Select the required partition. By default, only partitions that can be restored are displayed. To display all the partitions that are available on one or more disks, clear the **Show only restorable partitions** check box. Select the required partition from the list.

   Note:
   - Drive letters are not displayed.
   - If a disk cannot be parsed, an error message is displayed and the **Instant Restore** dialog is closed. For example, this occurs when the disk is dynamic or a GUID partition table (GPT).
5. Select the destination partition into which the data is to be restored. The destination location size must be equal or larger than the source size.
6. Click **Restore**.
7. A confirmation message is displayed. Verify the information and click **Yes**. The restore process begins. In the instant restore section, you can see the status of the restore process. When the status changes to restoring, the volume is available for use.

Restoring volumes instantly from a Linux system with the recovery agent

Linux

Tivoli Storage Manager recovery agent on Linux is used to restore individual files (file level restore) or volumes (instant restore). Unlike a conventional volume restore, instant restore provides access to volume contents while the restore process is in progress. Less downtime is required before a recovered volume can be used. After you start an instant restore, you can use data on the disk while the restore is in progress.

Before you begin

Important: Previous versions of Tivoli Storage Manager for Virtual Environments delivered mount and file restore function with the Tivoli Storage Manager recovery agent. Although this function is still supported by the recovery agent, the Tivoli Storage Manager file restore interface is the preferred method, as described in the following topic:

Chapter 3, “Getting started with file restore,” on page 35

The content in this "Tivoli Storage Manager recovery agent operations" collection is provided as a reference for users who prefer the recovery agent method.

Before attempting an instant restore on Linux review the following information:

- Multiple instant restore sessions to different target disks run in parallel. However, multiple instant restore sessions to different target partitions on the same disk do not run in parallel. As a result, the first instant restore session must complete before the next Instant Restore session begins.
- The Tivoli Storage Manager recovery agent GUI must be configured before attempting an instant restore. To configure, click **Select TSM server** and **Settings** in the Tivoli Storage Manager recovery agent GUI and enter the required information.
- This procedure assumes that you are logged on to the Linux system with root user authority and that the Tivoli Storage Manager recovery agent user interface is available.
- SUSE Linux Enterprise Server 11 require all iSCSI devices to be unmounted before rebooting or shutting down the system.
- Instant restore is available for snapshots of disks that use MBR-style partition tables only. The partition used as the source for an instant restore operation must be formatted by using one of the following file systems:
  - EXT2
  - EXT3
  - EXT4
  - ReiserFS
- When selecting a destination volume for instant restore, make sure that the volume resides on a physical disk, and not on a virtual iSCSI disk.
- The Tivoli Storage Manager recovery agent component does not support instant restore operations over a wide area network (WAN).

The instant restore progress can be slow in some situations. This can be due to such things as connectivity issues, very large volumes, restore from tape, or high I/O operations. The restore process identifies no progress was made on the MDADM device (/dev/md0) for the last 5 minutes and responds to it as a potential problem. As a result, a cleanup is performed, and the restore restarts itself, continuing from the point at which it stopped. The cleanup can cause I/O operations to fail. To fix this problem, you can increase the restore process period by editing the /etc/crn.d/tsmmount_recover file. Increase the restore process period to 10 minutes or to 20 minutes if the volume is very large, or the I/O is intense.

Before proceeding, make sure you have reviewed the following information:
- “Mounting snapshots with the recovery agent” on page 183
- “Restoring volumes instantly with the recovery agent” on page 191

About this task

This task guides you through how to use Tivoli Storage Manager recovery agent to restore a snapshot volume (instant restore) on a Linux system.

Procedure

1. Identify the Tivoli Storage Manager server where the snapshots are stored by clicking **Select TSM server**. Click **Refresh** after selecting a server.
   Tivoli Storage Manager recovery agent queries the server for a list of protected VMs and displays the list.
2. Select a VM from the list. Tivoli Storage Manager recovery agent queries the server for a list of snapshots available for the specified VM.

Tip: To quickly locate the required VM from the available VM list, type the first few letters of the VM name.

3. Select the required snapshot by selecting the date and disk.
4. Click **Restore**.
5. Select the required partition in the `Choose instant restore destination` dialog. Tivoli Storage Manager recovery agent displays a list of partitions available on the selected disk. For each partition, its size, label, and file system type is displayed. By default, only restorable partitions are displayed. To display all partitions, clear the **Show only restorable partitions** check box.

   Note: Mount points are not displayed.
6. Specify the destination partition into which the data is to be restored, by specifying a mount point or a block device. If you specify both, make sure the block device is mounted on the specified mount point.
7. Click **OK**. The restore process starts. After a short initialization period, the volume is available for use while the restore process runs in the background and until the volume is completely restored.

What to do next

Linux **Restoring to the same volume again:**
If you plan to restore another snapshot into the same target volume, complete one of the following steps:

- Restart the Linux system.
- Manually stop the mirror device and mount the restored volume.

  For example, in the following procedure `sdc1` is the target block device and `md0` is the mirror device:
  1. Issue the command: `umount /dev/md0`.
  2. Issue the command: `mdadm --stop /dev/md0`.
  3. Issue the command: `mount /dev/sdc1 /restoredVolume`.

Linux **Checking the file system**
After the instant restore completes, you can verify the file system restored volume by using the `fsck` file system utility:

1. Unmount the RAID device by issuing this command: `umount /dev/md0`
2. Type in the `fsck` command to run the file system check.

Responding to a timeout during a file level restore or an instant restore (Linux)

During a file level restore or an instant restore, a timeout might occur. If a timeout does occur, the user interface displays a message saying that manual intervention might be needed.

About this task

Linux Follow this procedure if the timeout occurs during a file level restore (Mount operation):

Procedure

1. Stop the restore process by commenting out the one line in `/etc/cron.d/tsmmount_recover` Ensure that the restore process is not running by issuing this command:

```
ps -ef | grep tsmRecover
```

2. Ensure that the required snapshot is mounted in the Tivoli Storage Manager recovery agent Windows backup server. If the snapshot is not mounted, mount it manually.
3. Ensure that the iSCSI target is connected to the Linux machine by using **iscsiadm -m session**. If the iSCSI target is not connected to the Linux machine, perform a manual login to the target by issuing this command:

   ```
   iscsiadm -m discovery -t sendtargets -p <windows_server_ip> --login
   ```
4. Mount the iSCSI device locally by using the Linux **mount** command. For example:

   ```
   mount /dev/sde1 /Mount1
   ```

   Ensure that you use the same mount point as was requested in the user interface. This operation can take long time to complete depending on the consistency of the snapshot.
5. When the mount operation is completed, uncomment the line in `/etc/cron.d/tsmmount_recover`.
6. When you want to unmount, do so first locally by using **umount**. Then use the Linux user interface to unmount the session.

What to do next

For an instant restore operation the manual intervention is to halt and then retry the restore session.

Appendix C. Data Protection for VMware vSphere GUI and Data Protection for VMware vCloud GUI messages

This information contains explanations and suggested actions for messages issued by the Data Protection for VMware vSphere GUI and Data Protection for VMware vCloud GUI.

For messages shown in the Data Protection for VMware vSphere GUI and Data Protection for VMware vCloud GUI that contain the FMM prefix, message information is available at the following web site: FMM, FMF, FMV, FMX, FMY: Tivoli Storage FlashCopy Manager messages

GVM0001E The operation failed with return code *return code*

GVM0002E An internal error occurred: *type of error*

GVM0003E A connection with the IBM Tivoli Storage Manager server could not be established.

Explanation: The server might not be running.

Administrator response: Check the network connection with the server machine. Verify that the server is running and try to log in again.

GVM0004W Are you certain that you want to delete this data?

Explanation: You cannot recover the data after it is deleted. Ensure that the data is not needed before you delete it.

Administrator response: Click OK to delete the data or click Cancel to cancel this action.

GVM0005W The connection with the IBM Tivoli Storage Manager server has timed out.

Explanation: Possible causes include a long-running operation, a problem on the server, or a communications problem.

Administrator response: If the operation is long-running, the operation might be complete or it might soon be complete. Before trying the operation again, determine if the expected result occurred. Check the activity log of the IBM Tivoli Storage Manager server for errors related to the operation. Using a SSL port without selecting SSL can cause this error.

GVM0006I A server connection with the name *server name* **has been successfully created. Click OK to continue.**

GVM0007W There is no IBM Tivoli Storage Manager server definition found.

Explanation: A connection for a IBM Tivoli Storage Manager server must be defined before any server operations or queries are performed.

Administrator response: To define a server: Click the Configuration tab.Click the Edit Configuration Settings action link.Click the IBM Tivoli Storage Manager Server Credentials tab.

GVM0008E An error occurred while writing to the server's database file, tsmserver.props

Explanation: The server definition could not be written to the tsmserver.props file.

Administrator response: The file must reside in the install directory of IBM Tivoli Data Protection for VMware. Before you try the action again, verify that the file exists and that the file is not write protected.

GVM0011I The VM *VM name* **is spanned into multiple datastores. It can only be restored to its original location.**

GVM0011W The VM *VM name* **exists, are you going to over-write it?**

GVM0012W The VM *VM name* **is running, make sure the system is powered down, then hit OK to continue.**

GVM0020E A connection with the vCenter server could not be established.

Explanation: The server might not be running.

Administrator response: This might indicate a network problem. Ensure that the server is running and the machine is accessible. Try the action again.

GVM0021I A connection with the vCenter server has been established.

GVM0022E The VMCLI inquire configuration command failed, the following messages describe the error.

Explanation: The Derby database might not be running.

Administrator response: Correct the problem. Try the action again.

GVM0023I The VMCLI inquire configuration command completed successfully.

GVM0024E Failed to determine which product or products are installed.

Explanation: See message.

Administrator response: Correct the problem. Try the action again.

GVM0025I Successfully determined which product or products are installed.

GVM0026E Multiple restore points have been selected, but they are not located in the same datacenter.

Explanation: Selecting restore points from different datacenters is not permitted. The restore points must all be located in the same datacenter.

Administrator response: Select the restore points from the same datacenter or select just a single restore point.

GVM0027E Multiple restore points have been selected, but they are not from the same backup.

Explanation: Selecting restore points from different backups is not permitted. The restore points must all be located in the same backup.

Administrator response: For restores from IBM Tivoli Storage FlashCopy Manager for VMware, all restore points must come from the same backup. You cannot restore multiple VMs that come from of different backups.

GVM0028E A key configuration file is missing: vmcliConfiguration.xml.

Explanation: The file vmcliConfiguration.xml is required for the GUI to operate, but has not been found during GUI session startup. This is an unusual problem, it may be due to an install issue or manual editing of the file.

Administrator response: Make sure the file is located in the correct directory, has correct access permissions, and has valid syntax for its content. Retry accessing the GUI.

GVM0029E Invalid mode tag in file vmcliConfiguration.xml.

Explanation: The xml tag mode in file vmcliConfiguration.xml is required for the GUI to operate, but is missing or has an incorrect value. This may be due to an install issue or manual editing of the file.

Administrator response: Make sure the tag is specified with a valid value. Retry accessing the GUI.

GVM0030E Invalid enable_direct_start tag in file vmcliConfiguration.xml.

Explanation: The xml tag enable_direct_start in file vmcliConfiguration.xml is required for the GUI to operate, but is missing or has an incorrect value. This may be due to an install issue or manual editing of the file.

Administrator response: Make sure the tag is specified with a valid value. Retry accessing the GUI.

GVM0031E Invalid URL tag for the specified mode tag in file vmcliConfiguration.xml.

Explanation: In file vmcliConfiguration.xml, the URL tag corresponding to the specified mode tag is required for the GUI to operate, but is missing or has an incorrect value. This may be due to an install issue or manual editing of the file.

Administrator response: Make sure the correct URL tag is specified with a valid value for the specified mode. Retry accessing the GUI.

GVM0032E Invalid VMCLIPath tag in file vmcliConfiguration.xml.

Explanation: The xml tag VMCLIPath in file vmcliConfiguration.xml is required for the GUI to operate, but is missing or has an incorrect value. This may be due to an install issue or manual editing of the file.

Administrator response: Make sure the tag is specified with a valid value. Retry accessing the GUI.

GVM0033E Invalid interruptDelay tag in file vmcliConfiguration.xml.

Explanation: The xml tag interruptDelay in file vmcliConfiguration.xml is required for the GUI to operate, but is missing or has an incorrect value. This may be due to an install issue or manual editing of the file.

Administrator response: Make sure the tag is specified with a valid value. Retry accessing the GUI.

GVM0099E The VM name entered *VM name* **conflicts with an existing VM. Please enter a different name.**

GVM0100E An error occurred while processing the request to the Web server. If this error persists, check the network connection with the Web server and verify that the Web server is running.Detail: *exception exception message*

GVM0101E A request to the server took too long to complete. If this error persists, check the network connection with the Web server and verify that the Web server is running.

GVM0102E An error occurred while processing the response from the Web server.Detail: *error*

GVM0103E An error occurred while making the Web server request. If this error persists, check the network connection with the Web server and verify that the Web server is running.Error: *message*

GVM0104E No matching device class found. Please return to source page and reselect.

GVM0105E No matching proxy node found. Please return to source page and reselect.

GVM0106E No proxy ESX hosts available.

GVM0107I Password set successfully.

GVM0108E Set password failed.Error: *message*

Explanation: The password may be incorrect or the server is not running.

Administrator response: Verify the password is correct then try the action again. Or check the network connection with the server machine and verify that the server is running then try the action again.

GVM0109E Get managed domain failed.Error: *message*

GVM0110E Multiple restore points have been selected, but they are not the same backup type.

Explanation: Selecting restore points of different types is not allowed. The restore points must all be located on either a IBM Tivoli Storage Manager server or in the IBM Tivoli Storage FlashCopy Manager for VMware repository.

Administrator response: Select the same type of restore points or select just a single restore point.

GVM0111E Backup ID is null.

Explanation: An internal error occurred.

Administrator response: Refresh the table and perform the action again.

GVM0112E Task ID is null.

Explanation: An internal error occurred.

Administrator response: Refresh the table and perform the action again.

GVM0113E Could not open a pop-up window.

Explanation: An internal error occurred.

Administrator response: Try the action again.

GVM0114E Virtual machine name is null.

Explanation: An internal error occurred.

Administrator response: Refresh the table and perform the action again.

GVM0115E Datastore does not exist.

Explanation: An internal error occurred.

Administrator response: Refresh the table and perform the action again.

GVM0116I No selection was made, the whole virtual machine will be attached.

Explanation: No selection was made.

Administrator response: Continue with the action or cancel the action.

GVM0117I Domain set successfully.

GVM0118E Set domain failed.Error: *message*

Explanation: The server might not be running. The permissions on the file directory may be incorrect.

Administrator response: Check the network connection with the server machine. Verify that the server is running and try the action again. Check the permissions of the directory indicated in SystemErr.log if error indicates incorrect permissions.

GVM0119E The schedule requires use of the following datacenters that are not in the active domain. Datacenters: *list* **Action: This schedule may not be updated, instead either update the domain construct to include the datacenters, or create a new schedule without dependence on these datacenters. Detail: The schedule definition is as follows: Schedule Summary** *summary*

GVM0120E The schedule requires use of the following datacenters that are not known to the system. Datacenters: *list* **Action: This schedule may not be updated, instead create a new schedule without dependence on these datacenters. Detail: The schedule definition is as follows: Schedule Summary:** *summary*

GVM0121E The schedule requires use of the following hosts that are not known to the system. Hosts: *list* **Action: This schedule may not be updated, instead create a new schedule without dependence on these hosts. Detail: The schedule definition is as follows: Schedule Summary:** *summary*

GVM0122E The schedule requires use of the following datastores that are not known to the system. Datastores: *list* **Action: This schedule may not be updated, instead create a new schedule without dependence on these datastores. Detail: The schedule definition is as follows: Schedule Summary:** *summary*

GVM0123E The schedule requires use of the following virtual machines that are not known to the system. Virtual Machines: *list* **Action: This schedule may not be updated, instead create a new schedule without dependence on these virtual machines. Detail: The schedule definition is as follows: Schedule Summary:** *summary*

GVM0124I Password set successfully. Warning: *message*

Explanation: The password was set successfully with a warning.

Administrator response: Follow the action described in the warning message.

GVM0125E An error occurred while making the Web server request. If this error persists, check the network connection with the Web server and verify that the Web server is running. Error: *error*

GVM1100E The following command requires confirmation from the server: *Command*

Explanation: A command was issued, and a reply was expected. Some commands require a confirmation, which you cannot issue through the IBM Tivoli Data Protection for VMware GUI.

Administrator response: Issue the command from the command line.

GVM1101E The following command is unknown to the server: *Command*

Explanation: An unknown command was issued to the server. The command might not be valid on the server version and platform or the command syntax might be incorrect.

Administrator response: Verify that the command is valid for the server version and platform, and verify that the command syntax is correct.

GVM1102E The syntax of the following command is incorrect: *Command***.**

Explanation: See message.

Administrator response: Correct the syntax and issue the command from the command line. The activity log of the IBM Tivoli Storage Manager Server shows all the commands issued before and after this command.

GVM1103E An internal server error occurred.

Explanation: See message.

Administrator response: Try the command again. If this does not work, contact customer support. You might be asked to provide tracing information and information about the actions performed before the failure occurred.

GVM1104E The server ran out of memory while processing the request. Close any unnecessary processes on the IBM Tivoli Storage Manager server and try the operation again.

Explanation: See message.

Administrator response: Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1105E The database recovery log is full.

Explanation: See message.

Administrator response: Before trying the action again, extend the recovery log or back up the IBM Tivoli Storage Manager server database. Contact the administrator of the IBM Tivoli Storage Manager server.

GVM1106E The server database is full.

Explanation: See message.

Administrator response: Before trying the action again, extend the server database. Contact the administrator of the IBM Tivoli Storage Manager server.

GVM1107E The server is out of storage space.

Explanation: See message.

Administrator response: Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1108E You are not authorized to perform this action. An administrator with system authority can change your authority level to allow you to perform this action.

GVM1109E The object that you are attempting to access does not exist on the server.

GVM1110E The object that you are attempting to access is currently in use by another session or process. Retry the action at a later time.

GVM1111E The object that you are attempting to remove is referenced by another object defined to the server. Remove the other object before removing this one.

GVM1112E The object that you are attempting to access or remove is not available.

Explanation: See message.

Administrator response: Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1113E The server encountered an I/O error while processing the request. For more information, see the operating system event or error log.

GVM1114E The action failed because the transaction could not be committed.

Explanation: See message.

Administrator response: Retry the action at a later time. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1115E The action failed because of a resource lock conflict.

Explanation: See message.

Administrator response: Retry the action at a later time. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1116E The action failed because of a mode conflict.

Explanation: See message.

Administrator response: Retry the action at a later time. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1117E The action failed because the server could not start a new thread.

Explanation: See message.

Administrator response: Retry the action at a later time. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1118E The server is not licensed to perform this action. If a license was purchased, use the command line to register the license.

GVM1119E The specified destination is not valid.

Explanation: See message.

Administrator response: Enter a different destination or update the configuration with a valid destination, and try the action again.

GVM1120E The specified input file cannot be opened. Verify the file name and directory permissions, then try the action again.

GVM1121E The specified output file cannot be opened. Verify the file name and directory permissions, then try the action again.

GVM1122E An error occurred while writing to the specified output file.

Explanation: See message.

Administrator response: Check the file system to ensure that there is enough space. Check the operating system event or error log for more information.

GVM1123E The specified administrator is not defined to this server.

Explanation: See message.

Administrator response: Ensure that the administrator name was entered correctly. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1124E The SQL statement could not be processed.

Explanation: An exception occurred while processing the SQL statement. Possible exceptions include divide-by-zero, math overflow, temporary table storage space unavailable, and data-type errors.

Administrator response: Correct the SQL query and try again.

GVM1125E This operation is not allowed with this object.

Explanation: See message.

Administrator response: Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1126E The table was not found in the server database.

Explanation: See message.

Administrator response: Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1127E The specified file space name is not compatible with the filespace type.

Explanation: Unicode file space names are incompatible with non-unicode names.

Administrator response: Enter a file space name of the correct type and try the action again.

GVM1128E The specified TCP/IP address is not valid. Verify the TCP/IP address and try the action again.

GVM1129E No objects were found that match the search conditions.

GVM1130E Your administrative ID on this server is locked. An administrator with system authority can unlock your ID.

GVM1131E The connection to the server was lost while performing the action.

Explanation: See message.

Administrator response: This might indicate a network problem. Ensure that the server is running and the machine is accessible. Retry the action.

GVM1132E Your ID or password is not valid for this server.

Explanation: See message.

Administrator response: Launch the Configuration Editor from the Configuration Tab and enter a valid ID or password for your IBM Tivoli Storage Manager Server.

GVM1133E Your password expired on this server.

Explanation: Your IBM Tivoli Storage Manager password has expired.

Administrator response: Reset your password on the IBM Tivoli Storage Manager Server or contact your IBM Tivoli Storage Manager Server administrator to reset it.

GVM1134E The server cannot accept new sessions. If sessions are disabled for this server, issue the ENABLE SESSIONS command from the command line.

GVM1135E A communications failure occurred while processing the request. Retry the action at a later time.

GVM1136E The administrative API encountered an internal error while processing the request.

GVM1137E The administrative API cannot process the command document sent from the server.

Explanation: The XML command document could not be parsed. Either the file could not be read, or the file is corrupted.

Administrator response: Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1138E The following command contains one or more invalid parameters: ***command*****.**

Explanation: The IBM Tivoli Data Protection for VMware GUI tried to run a command, but the call to the API contained one or more invalid parameters.

Administrator response: Check the parameters in the command. If you entered text in a field, you might find the error in the parameters and correct it. Viewing the activity log might help to determine the cause of the problem. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1139E The administrative API encountered invalid parameters while processing the request.

Explanation: A command was run through the administrative API, but one of the parameters to an API method was invalid.

Administrator response: This is typically an internal error, but it can be caused by unusual parameters. For example, characters such as: < > & can cause the problem. Check the parameters in the command. If you entered text in a field, you might find the error in the parameters and correct it.

GVM1140E The administrator's authority level on this server cannot be determined.

Explanation: See message.

Administrator response: Use a different administrator ID. Before trying the action again, contact the administrator of the IBM Tivoli Storage Manager server.

GVM1141E An object with the name that you specified already exists on the server. Enter a different name.

GVM1142E The version of the server is not supported by the IBM Tivoli Data Protection for VMware GUI.

GVM1143E An internal error has occurred.

Explanation: The operation failed after encountering an internal error.

Administrator response: Retry the operation. If this does not work, contact customer support. You might be asked to provide tracing information and information about the actions performed before the failure occurred.

GVM1144E The operation failed, please go to the log for more details.

GVM1145E Wrong format of the end date and time. Please enter the end date and time format as yyyyMMddHHmmss.

GVM1146E Sorry, the description of the backup task was not created in a file. Please try again.

Explanation: On the general page of the backup wizard, you can describe your backup task in general.

GVM1147E The ESXHOST name you entered is too long. Please change to a shorter one.

GVM1148E Wrong Backup ID. Please try again.

GVM1150E An error occurred when processing the backup object file. Please try again later.

Explanation: When you click submit in the backup wizard, the object list will be stored in a file. When processing this file, an error occurred.

GVM1151E No backup object is selected. You must choose a source node to backup.

Explanation: To initiated a backup task, you have to choose an object on the source page of the backup wizard.

GVM1152E Wrong format of the start date and time. Please enter the start date and time format as yyyyMMddHHmmss.

GVM1153I Backup task ***Task Name*** **started, would you like to monitor this task now?**

GVM1154I Delete backup task completed successfully.

GVM1155E Delete backup task failed, please check log for more detail.

GVM1156I Restore Task *Task ID* **is started successfully, would you like to monitor this task now?**

GVM1157E *Error Or Warning*

GVM1158I Mounted backup Item could not be restored.

GVM1159I Result of attach is *status* **(Task ID:** *Task ID* **), refer to events list to get the details.**

GVM1160I Result of detach is *status* **(Task ID:** *Task ID* **), refer to events list to get the details.**

GVM1161I Command successfully submitted to the IBM Tivoli Storage Manager server. Detail: *Server Messages*

GVM1162E The command submitted to the IBM Tivoli Storage Manager server failed. Error: *Error Code Error Messages*

Explanation: The cause of the problem is identified in the message text.

Administrator response: Correct the problem based on the information that is provided in the message text. Then, try the action again.

GVM1163E No IBM Tivoli Storage Manager server connection, please configure the IBM Tivoli Storage Manager server in the configuration panel.

GVM1164E The selected items can only be under ONE datacenter.

GVM1165E Authentication failed. Could not connect to vCenter. Make sure you log in using the VMware vSphere client and have a valid session.

GVM1166E Authentication failed. Please log in using the VMware vSphere client.

GVM1167E The virtual machine *VM name* **exists. Delete the virtual machine first before restoring it.**

GVM1168E The target virtual machine *VM name* **is running. Close the virtual machine before restoring virtual disks to it.**

GVM1169E Some of selected virtual disks exist in target virtual machine. Remove those virtual disks from target virtual machine before restoring to it.

GVM1170E A VMCLI command failed. Error: *Error Messages*

Explanation: The cause of the problem is identified in the message text.

Administrator response: Correct the problem based on the information that is provided in the message text. Then, try the action again.

GVM1171E A request submitted to the VMware vCenter server failed. Error: *Error Messages*

Explanation: The cause of the problem is identified in the message text.

Administrator response: Correct the problem based on the information that is provided in the message text. Then, try the action again.

GVM1172E A command submitted to the IBM Tivoli Storage Manager server failed. Error: *Error Messages*

Explanation: The cause of the problem is identified in the message text.

Administrator response: Correct the problem based on the information that is provided in the message text. Then, try the action again.

GVM1173E Cannot find the file with format 'summary.date.log' in the path: *path*

GVM1174E Cannot find the IBM Tivoli Storage FlashCopy Manager for VMware installation path using the VMCLI inquire_config command.

GVM1175E A VMCLI command to get version failed.

GVM1176I Backup task *Task ID* **started, would you like to monitor this task now?**

GVM1177E The IBM Tivoli Data Protection for VMware Web Server could not be contacted.

Explanation: The IBM Tivoli Data Protection for VMware GUI has attempted to contact its Web Server. The operation was not successful.

Administrator response: Perform one or more of the following steps to try and determine the problem:Verify that the IBM Tivoli Data Protection for VMware Web Server is running.Verify that the Web Server machine is running.Verify that the Web Server machine is accessible over the network.Close the IBM Tivoli Data Protection for VMware GUI. Start the GUI again when the problem is resolved.

GVM1178I Command successfully submitted to the server.

GVM1179E No host is found in datacenter *datacenter name***. Select another datacenter to restore.**

GVM1180W The schedule does not contain all the required parameters. It cannot be displayed in the properties notebook.

Explanation: This schedule may have been created or modified outside of the IBM Tivoli Data Protection for VMware GUI.

Administrator response: This schedule must be modified outside the the IBM Tivoli Data Protection for VMware GUI.

GVM1181W One or more VMs exist. Do you want to continue the restore operation and overwrite the existing VMs?

GVM1182E The Administrator Id provided does not have sufficient privileges.

Explanation: The operation you are attempting requires a IBM Tivoli Storage Manager Server Administrator Id to have at least Unrestricted Policy privilege.

Administrator response: Contact your IBM Tivoli Storage Manager Server Administrator to grant you Unrestricted Policy privilege for your Administrative Id. Or, use an alternate Id with such privilege and try again.

GVM1183E The nodename *node name* **is already in use. Please choose another nodename.**

Explanation: The node name chosen already exists on the server. Choose another name.

Administrator response: Pick another node name to use. If you want to re-use this node, then unselect the 'Register Node' checkbox.

GVM1184E The node name *node name* **is not defined on server. Make sure the node name you entered exists on the server.**

Explanation: The node name entered does not exist on the server. Since you did not select 'Register Node' checkbox, the node name you enter must have been previously defined and exist on the server.

Administrator response: Check the node name you are supposed to use and enter it again. If you want to register this node, then select the 'Register Node' checkbox.

GVM1185E The passwords in the entry field and the verify field do not match. Please try again.

Explanation: The new passwords entered do not match.

Administrator response: Clear the fields and enter the same password in both password fields.

GVM1186W Please select one or more Datacenters to be managed.

Explanation: At least one Datacenter must be selected.

Administrator response: Add one or more Datacenter(s) into the Managed Datacenters list.

GVM1187W One or more nodes do not have their password set. Make sure all nodes have their password set.

Explanation: If a node has 'Register Node' checkbox set, then that node's password must be set.

Administrator response: Assign a password for nodes that are to be registered.

GVM1188I No datacenter node was found mapped to *datacenter name***. Select a datacenter node from the list to associate with** *datacenter name***. Leave the selection empty to have the Configuration Wizard create a new datacenter node for it.**

GVM1189I Are you sure you want to proceed without entering a IBM Tivoli Storage Manager Administrative ID? Without IBM Tivoli Storage Manager Administrative access, the Wizard will not validate node names or register nodes. Instead, a macro file will be generated at the end of this Wizard for you to give to your IBM Tivoli Storage Manager Administrator to execute.

GVM1190I This task was skipped because it was not necessary or a pre-requisite task failed.

GVM1191E There was an error writing to script file: ***file path*****.**

Explanation: An error was encountered when trying to write to file at the path indicated.

Administrator response: Try the operation again.

GVM1192I Managed datacenters have changed. Please go to the data mover page to verify or change your current mappings.

GVM1193I No datacenter nodes were found for the vCenter node *vCenter node* **and VMCLI node** *VMCLI node* **configuration. The Wizard will generate a default set of datacenter nodes for you.**

GVM1194E The password entered is not acceptable. Choose another password.

Explanation: IBM Tivoli Storage Manager Server could not accept the password chosen. It could be because the password did not meet certain password rule(s).

Administrator response: Try with another password.

GVM1195W Unchecking this checkbox means you are supplying a node name that is already defined on the IBM Tivoli Storage Manager Server AND that it is meant to be used for your configuration. Since this Wizard is proceeding without Administrative access, it cannot verify if the node exists or not. You should only proceed if you understand what you are doing.

Explanation: Since you are using the Configuration Wizard without a IBM Tivoli Storage Manager Administrative ID, you should be very careful. The macro script file generated at the end of running the Configuration Wizard could contain errors because values are not validated.

Administrator response: We strongly recommend you use the Configuration Wizard with a proper IBM Tivoli Storage Manager Administrative ID.

GVM1196W The IBM Tivoli Storage Manager node *node* **has already been identified. If you want a different name other than the default name, edit this field again. If you want to use the same data mover for multiple Datacenters, please use Configuration Settings to do this.**

Explanation: The node is already being used in this configuration.

Administrator response: Try using another node name.

GVM1197W The IBM Tivoli Storage Manager node *node* **has invalid characters or exceeds 64 characters. Choose a different name and edit this field again.**

Explanation: The node name is invalid or longer than 64 characters.

Administrator response: Try using another node name.

GVM1198E The password entered is not acceptable on this Server because it contains invalid characters. The valid characters are: *validCharsString*

Explanation: IBM Tivoli Storage Manager Server could not accept the password chosen because of invalid characters in the password.

Administrator response: Try with another password that only contain valid characters.

GVM1199E The password entered is not acceptable on this Server because of the reason below. Choose another password. Error: *message*

Explanation: IBM Tivoli Storage Manager Server could not accept the password chosen. The reason why this password is not valid is given in the message.

Administrator response: Try with another password that meets the rule(s).

GVM1200E Filter has changed, select Apply filter before continuing.

Explanation: Filter pattern must be applied after it is changed.

Administrator response: Click the Apply filter button.

GVM1201E Select at least one item from a datacenter to continue.

Explanation: A host, host cluster, or VM must be selected to do a backup.

Administrator response: Select an item under a datacenter.

GVM1202E Your selections exceed the 512 character limit allowed for backups, change your selection.

Explanation: The number of characters required to list the selected items exceeds the limit of 512 characters. Also, if hosts have been partially selected, characters are needed to list the VMs that are excluded from the backup.

Administrator response: Create multiple backup tasks, with less selected items per task.

GVM1203I Changing the newly added virtual machines checkbox clears all selections of host clusters, hosts, and virtual machines. Press OK to proceed, or Cancel to leave unchanged.

Explanation: The state of the newly added virtual machines checkbox significantly impacts what is allowed to be selected on the source panel, so selections are cleared when the state changes.

Administrator response: Select OK to proceed, or select Cancel to retain all selections.

GVM1204E Datacenter node ***datacenter node name*** **does not have a TSM node mapped in the vmcli configuration file.**

Explanation: The datacenter node must have a corresponding TSM node listed in the configuration file named vmcliprofile.

Administrator response: Correct the problem by going to the Configuration tab in the GUI and selecting Edit Configuration to update the mapping for the datacenter. Also resolve any other configuration errors that are reported on the Configuration tab.

GVM1205E TSM datacenter node ***datacenter node name*** **maps to vCenter datacenter name** ***datacenter name*** **in the vmcli configuration file, but** ***datacenter name*** **does not exist in the vCenter.**

Explanation: The vCenter datacenter name maps to a datacenter node in the vmcli configuration file named vmcliprofile, but the data enter name does not exist in the vCenter.

Administrator response: Correct the problem by going to the Configuration tab in the GUI and selecting Edit Configuration to update the mapping for the datacenter. Also resolve any other configuration errors that are reported on the Configuration tab.

GVM1206E You have selected items from multiple datacenters: ***datacenter list*****. This is not allowed, all selections must be from one datacenter.**

Explanation: A backup task only supports items from one datacenter. If this is an existing task, changes in the vCenter configuration after task creation may have caused this problem.

Administrator response: Check and correct the selections to make sure all selections are under the same datacenter.

GVM1207E The selected items ***item list*** **are not found under datacenter** ***datacenter name*** **in the vCenter, please review and de-select them.**

Explanation: Items originally selected are no longer found under the datacenter associated with the backup task. This may be caused by changes in the vCenter configuration.

Administrator response: Review if the items are now located under a different datacenter. De-select the not found items, and make new selections under the other datacenter or create a new backup task for these items.

GVM1208I The datacenter in the source page has changed, please reselect the data mover node in the Destination page.

Explanation: When item selection is changed to a different datacenter, the valid data movers may change. You are required to select the data mover again on the Destination page.

Administrator response: Reselect the data mover node in the Destination Page.

GVM1209I Are you sure you want to use node ***data mover node*** **as a data mover for datacenter** ***datacenter*****?**

GVM1210I Are you sure you want to use node ***node name*** **that is already registered on the TSM server as a data mover for datacenter** ***datacenter*****? If so, we will mark the node as such and you will be unable to make any further changes to the node.**

GVM1211E The password entered is not acceptable on this Server because it is too short. Passwords must have a least *minPasswordLength* characters.

Explanation: IBM Tivoli Storage Manager Server could not accept the password chosen because it is too short.

Administrator response: Try with another password that is longer than the required minimum length.

GVM1212E *Component* is downlevel, so its use is disabled in the GUI. You will only be able to use the GUI for *component*.

GVM1213E Mismatching IBM Tivoli Storage Manager Server entries in the current settings is detected. IBM Tivoli Storage Manager Server definition used by the GUI: *server1* IBM Tivoli Storage Manager Server where backups are stored: *server2* Click Reset Server definition to clear the IBM Tivoli Storage Manager definition and enter new credentials. Or click on Reconfigure Environment to launch the Configuration Wizard to reconfigure your IBM Tivoli Data Protection for VMware environment.

Explanation: IBM Tivoli Storage Manager detected mismatching IBM Tivoli Storage Manager Server entries between the vmcliprofile and the current GUI's IBM Tivoli Storage Manager Server connection.

Administrator response: Pick one of the two actions available. You may either reset the IBM Tivoli Storage Manager Server definition/credentials OR use the Conifiguration Wizard to set up a new environment.

GVM1214E The SSL Connection could not be made. The TSM SSL certificate is missing. Check for valid TSM certificate in the TSM-ve-truststore.jks

Explanation: IBM Tivoli Storage Manager Server did not accept the SSL connection. SSL keystore is not in the default location or does not contain a TSM certificate.

Administrator response: Check the TSM-ve-truststore.jks for a valid certificate, ensure TSM-ve-truststore.jks is in the correct default location.

GVM1215E The password entered is not acceptable on this Server because it is too long. Passwords cannot have more than *maxPasswordLength* characters.

Explanation: IBM Tivoli Storage Manager Server could not accept the password chosen because it is too long.

Administrator response: Try with another password that is shorter than the allowed maximum length.

GVM1216E The SSL Connection could not be made. The TSM SSL certificate has expired.

Explanation: IBM Tivoli Storage Manager Server did not accept the SSL connection. The TSM-ve-truststore.jks has an expired TSM SSL certificate.

Administrator response: Obtain a new valid TSM SSL certificate from the TSM server and place it in the TSM-ve-truststore.jks.

GVM1217E The non-SSL connection could not be made. This IBM Tivoli Storage Manager Admin ID requires a TSM SSL connection.

Explanation: IBM Tivoli Storage Manager Server did not accept the non-SSL connection. The TSM Server requires SSL be used with this Admin ID.

Administrator response: Use SSL with this Admin ID. Ensure that the TSM-ve-truststore.jks with a valid TSM server SSL certificate is installed in the default location.

GVM1218E Your selections have caused the backup task definition to require *count* characters, which exceeds the 512 character limit. This can be caused by a long virtual machine exclude list, which is the list of all VMs under host(s) that were not selected. Either select more VMs under selected hosts or de-select the newly added virtual machines checkbox.

Explanation: When the newly added virtual machines checkbox is selected, the resulting backup task must list all unselected VMs for hosts that are partially selected. The backup task definition has a 512 character limit, and the combination of selected items and excluded VMs exceeds this limit.

Administrator response: De-select the newly added virtual machines checkbox or create multiple backup tasks with less selected items per task.

GVM1219E Your selection of virtual machines has caused the backup task definition to require *count* characters, which exceeds the 512 character limit. Either create multiple backup tasks with less virtual machines per task, or select the newly added virtual machines checkbox and choose entire hosts with no more than a few unselected VMs.

Explanation: The backup task definition has a 512 character limit, and the total number of characters for the selected items exceeds this limit.

Administrator response: Create multiple backup tasks with less selected virtual machines per task, or select the newly added virtual machines checkbox and then select hosts instead of individual virtual machines (you can de-select a small number of virtual machines per host if desired.)

GVM1220E There is no data mover node proxy relationship for datacenter node *datacenter node name*. Review the data mover relationships on the Configuration tab or the IBM Tivoli Storage Manager server.

GVM1221E There is no datacenter node defined for datacenter *datacenter name*. Review the node configuration on the Configuration tab.

GVM1222I Node *name name* is currently locked. The Configuration Wizard will attempt to unlock this node if you choose to continue.

GVM1223E A connection with the IBM Tivoli Storage Manager server (*Address:Port*) could not be established. Please verify the server address and *Server or Admin port* are correct.

Explanation: The server might not be running or specified admin port or server port may be incorrect.

Administrator response: Check the network connection with the IBM Tivoli Storage Manager server machine. Verify that the server is running and try to log in again. Also verify server port and admin port information is correct.

GVM1224E The vCenter user name or password is not valid. Please try again.

Explanation: The vCenter user name or password is not valid.

Administrator response: Enter the user name or password again.

GVM1225E Permission to perform this operation was denied. Please try with other user name.

Explanation: The vCenter user name is not valid.

Administrator response: Enter another user name.

GVM1250I A IBM Tivoli Storage Manager Administrative ID and password is currently not set. The absence of this information limits the actions that you can take in the GUI. Click OK to be taken to the configuration settings panel and enter an ID and password. Click Cancel to continue without using an ID and password.

GVM1251W You have chosen an Administrative ID that has less authority than the current ID. Are you sure you want change this ID? Current IBM Tivoli Storage Manager Authority Level: *Current Level* **New IBM Tivoli Storage Manager Authority Level:** *New Level* **Current Role:** *Current Role* **New Role:** *New Role* **Click OK to accept these changes, or Cancel to exit without change.**

GVM1252I Here are the current and new roles for IBM Tivoli Storage Manager Admin IDs. Review and confirm these changes. Current IBM Tivoli Storage Manager Authority Level: *Current Level* **New IBM Tivoli Storage Manager Authority Level:** *New Level* **Current Role:** *Current Role* **New Role:** *New Role* **Click OK to accept these changes, or Cancel to exit without change.**

GVM1253I ID has been changed without save. Previous ID will be loaded.

GVM1254I Your current UI role does not allow you to unlock or reset the VMCLI node. In order to make changes, go to the Server Credentials page and enter a TSM Admin ID and password that has the necessary priviliges for making VMCLI node updates. Select OK to save these credentials, then re-open the Configuration Settings notebook and you can make VMCLI node updates.

GVM1255I Your current UI role does not allow you visit other panels. Select OK to save these credentials, then re-open the Configuration Settings notebook and you can make other updates.

GVM1256I There are non-English characters contained in one or more datacenters. The domain will be adjusted accordingly.

GVM1257E Datacenter ***DataCenter Name*** **cannot be added to the domain because it contains non-English characters.**

Explanation: Datacenters that contain non-English characters are not currently supported. Therefore, they cannot be added to the domain.

Administrator response: Datacenter will not be added to the domain.

GVM1258W Node ***Node Name*** **already exists on the server. Attempt to rename node to** ***New Node Name*****?**

Explanation: Node name is already registered on the IBM Tivoli Storage Manager server.

Administrator response: Click Yes to attempt to rename node. Click No to make other changes. Example: unclick register node, rename node manually.

GVM1259W The following virtual machines for host ***Host Name*** **have unsupported characters in their name:** ***Invalid Virtual Machine Names*****. Therefore, these virtual machines are not backed up, regardless of your selections. You must rename these virtual machines to back them up.**

Explanation: The following characters are not supported in virtual machine names: ' : ; * ? , < > / \ |

Administrator response: Rename the identified virtual machines to remove unsupported characters from their name.

GVM1260E The following host clusters have unsupported characters in their name: ***Invalid Host Clusters*****. These host clusters cannot be selected for backup because they contain unsupported characters. Rename these host clusters or remove them from selection.**

Explanation: The following characters are not supported in host cluster names: ' : ; * ? , < > / \ |

Administrator response: Rename the identified host clusters to remove unsupported characters from their name. Or, remove them from your backup selection.

GVM1261E Your selections created an empty virtual machine list for backup. This issue might occur because all the selected virtual machines contain unsupported characters in their names. Make sure that you selected virtual machines that do not contain unsupported characters in their names.

Explanation: The following characters are not supported in virtual machine names: ' : ; * ? , < > / \ | . Virtual machine names that contain these characters are automatically removed from the backup task definition. This removal can cause an empty task definition.

Administrator response: Rename the identified virtual machines to remove unsupported characters from their name. Or, select different virtual machines to back up.

GVM1262E The filter pattern cannot be applied because it contains unsupported characters. Change the pattern to remove the unsupported characters, then apply the filter again.

Explanation: The following characters are not supported in filter patern: ' : ; < > / \ |

Administrator response: Change the filter pattern to remove unsupported characters, then apply the filter again.

GVM1263E A temporary datastore is not available to perform this operation. This temporary datastore is required in addition to the restore destination datastore.

Explanation: A datastore is required for use as a temporary restore destination for this operation. This temporary datastore must be from the same ESX host as the datastore that is used for the actual restore destination. However, the temporary datastore cannot be the same datastore that is used for the actual restore destination.

Administrator response: Add a datastore to the destination ESX host. Then, select this datastore as the temporary restore destination.

GVM1264E There was an error creating opt file: ***file name*****.**

Explanation: An error was encountered when trying to write to file.

Administrator response: Try the operation again.

GVM1265E Creating ***service*** **has failed. No services were created for data mover node** ***node name*****.**

Explanation: An error was encountered when trying to create TSM service for data mover node specified.

Administrator response: Check environment and ensure user has proper rights before trying operation again.

GVM1266E Creating firewall for *service* has failed. Please manually add firewall rules for services installed.

Explanation: An error has occured when attempting to add firewall rule for specified executable.

Administrator response: Check environment and ensure user has proper rights before trying operation again or manually add rule to firewall for TSM client acceptor , TSM Agent and TSM Scheduler.

GVM1267W Local services were setup successfully but were unable to verify firewall access for these executable files: *agentExe cadExe schedExe* If any problems are experienced related to local services, verify that firewall access is available for these executable files.

Explanation: Microsoft firewall may be disabled or another firewall may be in place.

Administrator response: Check environment and add rules manually if needed for the TSM client acceptor , TSM Agent, and TSM Scheduler.

GVM1268E Data mover node *node name* was successfully registered on the server, however no services were created.

Explanation: An error has occured when trying to create services for specified node.

Administrator response: Check environment and ensure user has proper rights before trying operation again.

GVM1269E Reason Code *reason* This error was reported by the TSM data mover. No further description is available. For more information, review the error log *errorLog* on the data mover host machine *hostname* at address '*address*'.

Explanation: The data mover encountered an error with the reported reason code.

Administrator response: Log into the host machine specified and view the error log for more information.

GVM1270W Warning: If this task is canceled, all created data on the virtual machines that are not completely restored is lost and the virtual machines are removed from the ESX host. Are you sure that you want to cancel this task?

Explanation: A cancel task command is submitted. Refresh to see the cancel progress.

Administrator response: Cancel the selected task or allow the task to continue processing.

GVM1271W Scan schedule *schedule name* was successfully defined on the server and associated with node *node name*, however no services were created to run the schedule. Detail: *error*

Explanation: An error was encountered in one of the steps below when trying to create IBM Tivoli Storage Manager services for the VMCLI node. Create the option file for the VMCLI node. Set the password for the VMCLI node to a temporary password for the next step. Run the IBM Tivoli Storage Manager Client Service Configuration Utility to create the services. Run the IBM Tivoli Storage Manager Client Service Configuration Utility to start the client acceptor service. Reset the VMCLI node password.

Administrator response: Delete the schedule and create the schedule again to automatically configure the services or manually configure the services. Check environment and ensure user has proper rights before trying operation again.

GVM1272W Scan schedule *schedule name* was successfully defined on the server and associated with node *node name*. IBM Tivoli Storage Manager services were created to run the schedule. However, reseting the VMCLI node password failed. Detail: *error*

Explanation: An error was encountered while trying to reset the VMCLI node password.

Administrator response: Use the Configuration Settings to reset the VMCLI node password.

GVM1273W A dismount operation removes the iSCSI disks but does not remove the VM or its data. Before proceeding with dismount, make sure the following conditions exist: -The mounted iSCSI disk is recovered. -Storage vMotion completed migrating the VM to a local datastore. If the recovery operation failed and you want to delete the VM, its data, and dismount any iSCSI targets, click Dismount and Delete. Dismount and Delete is a destructive action and deletes the VM and its data, regardless of the success or failure of the instant restore operation. Based on this information, do you want dismount the VMs that are selected for instant restore?

Explanation: A dismount operation removes the iSCSI disks but does not remove the VM or its data. Before proceeding with dismount, make sure the following conditions exist: The mounted iSCSI disk is recovered,Storage vMotion completed migrating the VM to a local datastore.If the recovery operation failed and you want to delete the VM, its data, and dismount any iSCSI targets, click Dismount and Delete. Dismount and Delete is a destructive action and deletes the VM and its data, regardless of the success or failure of the instant restore operation.

Administrator response: Click 'Dismount' to dismount the virtual machines that are selected for the instant restore operation. Click 'Dismount and Delete' to dismount the virtual machines that are selected for the instant restore operation, remove them from the ESX host, and verify that Storage vMotion is not running.

GVM1274W During a dismount operation, all created data on the virtual machines is lost and the virtual machines are removed from the ESX host. Dismount the selected Instant Access virtual machines?

Explanation: All created data on the virtual machines is lost and the virtual machines are removed from the ESX host.

Administrator response: Click 'Dismount' to dismount (cleanup) the instant access virtual machines.

GVM1275E Selecting multiple virtual machines with different restore types is not allowed.

Explanation: Restoring multiple virtual machines with different restore types is not supported.

Administrator response: Select virtual machines that have the same restore type.

GVM1276I Cleanup Task ***Task ID*** **is started successfully, would you like to monitor this task now?**

GVM1277W Are you sure that you want to cancel this task?

Explanation: A cancel task command is submitted. Refresh to see the cancel progress.

Administrator response: Cancel the selected task or allow the task to continue processing.

GVM1278I Your current UI role does not allow you to view backup property notebook.

GVM1279I Your current UI role does not allow you to edit nodes. In order to make changes, open the Configuration Settings notebook and go to the Server Credentials page and enter a TSM Admin ID and password that has the necessary priviliges for making node updates.

GVM1280E Reason Code ***reason*** **This error was reported by the TSM data mover. No further description is available. For more information, review the error log 'dsmerror.log' on the data mover host machine.**

Explanation: The data mover encountered an error with the reported reason code.

Administrator response: Log into the host machine where data mover resides and view the error log for more information.

GVM1281W Login information for vCenter needed.

Explanation: In order to install new local dm services, vCenter credentials are needed.

Administrator response: Enter vCenter credentials in order to continue.

GVM1282E You do not have the privileges required to access the GUI.

Explanation: In order to access GUI content, the user must have the necessary vSphere privileges.

Administrator response: Add the required privileges for the user.

GVM1283E You do not have the permissions required to access the GUI.

Explanation: In order to access GUI content, the user must have the necessary vSphere permissions.

Administrator response: Add the required permissions for the user.

GVM1284I A new data center (*name*) was detected. Go to the Data Mover Nodes page to add a data center node for it.

GVM1285W The following shares and mounts will be removed and that data in there will be no longer accessible to the end user. Dismount the selected shares and mounts?*mounts*

Explanation: The selected shares and mounts will be removed.

Administrator response: Click 'Dismount' to dismount (cleanup) the mounts and shares.

GVM1286I Dismount Task ***Task ID*** **is started successfully, would you like to monitor this task now?**

GVM1287W An error was encountered during the delete operation for option file: *file name***.**

Explanation: An error was encountered during the delete operation. For example, this error might be caused by insufficient user permissions or the file no longer exists.

Administrator response: Make sure the option file was deleted. If it still exists, delete this file manually.

GVM1288W The remove operation for IBM Tivoli Storage Manager service: *service* **failed.**

Explanation: An error prevented the IBM Tivoli Storage Manager service from being removed.

Administrator response: Check the environment and ensure that the user has sufficient rights to run this operation. Then, try the operation again.

GVM1289E Fail to start iSCSI for mount proxy node *node name***.**

Explanation: An error was encountered when trying to start iSCSI service for mount proxy node specified.

Administrator response: Start the iSCSI service manually.

GVM1500E You have selected organization VDCs from more than one provider VDC. For backup tasks, all selected organization VDCs must belong to the same provider VDC. Change your selections and retry the operation.

GVM1501E The following vcloud resources(vApp, organization, organization vDC) are invalid for selection because they have unsupported characters in their name: *reslist*

Explanation: In order to create backup tasks, vcloud resources names must not contain any of the following characters: ' : ; * ? , < > / \ | .

Administrator response: Rename the identified resources to remove unsupported characters from their name. Or, remove them from your backup selection.

GVM1502E You have selected the vApp from a different organization VDC. For restore tasks, all selected vApps must belong to the same organization VDC. Change your selections and retry the operation.

GVM1503E The vApp *vApp name* **exists. Choose a different vApp name to be the target of the restore.**

GVM2001E Your selection of items to back up has caused the backup task definition to require *count* **characters, which exceeds the 512 character limit. Please create multiple backup tasks with less items per task.**

Explanation: The backup task definition has a 512 character limit, and the total number of characters for the selected items exceeds this limit.

Administrator response: Create multiple backup tasks with less items per task

GVM2002E The Organization VDC node can not be included because its Provider VDC node is not included. Please select the include checkbox for the Provider VDC node first, and try again.

GVM2004E The nodename *node name* **is already in use. Please uncheck the register node checkbox or choose another nodename.**

Explanation: The node name chosen already exists on the server. Either choose to not register it or use another name.

Administrator response: Pick another node name to use. If you want to re-use this existing node, then unselect the 'Register Node' checkbox.

GVM2005W Are you certain that you want to remove the data mover node *node name***?**

GVM2006W The IBM Tivoli Storage Manager node *TSM node* **has already been used. If you want a different name other than the default name, edit this field again.**

Explanation: The node is already being used in this configuration.

Administrator response: Try using another node name.

GVM2007E The Organization VDC node can not be registered because its provider VDC is not valid.

GVM2008E The Organization VDC name *OVDC name* **is invalid.** *For information about supported characters, refer to the TSM Administrator's Reference publication section about naming IBM Tivoli Storage Manager objects.*

GVM2009I This task was skipped because it was not necessary. No further action is required.

GVM2010W Internet explorer version *version* is not supported, please use a supported version or another browser. You may see visual and functional issues if you continue to use this unsupported browser.

Explanation: Due to differences in Internet Explorer implementation by version number, only specific versions are supported. The use of a standards-compliant browser such as Mozilla Firefox is recommended. However, if you are accessing the GUI as a plug-in from the vSphere Client, you are limited to using the Internet Explorer browser installed on the system where the vSphere client is installed.

Administrator response: Use a supported version of Internet Explorer or another browser. Supported browser versions are documented in the online help.

GVM2011W The browser *version* is not supported, please use a supported browser. You may see visual and functional issues if you continue to use this unsupported browser.

Explanation: Due to differences in browser implementations, only specific versions are supported.

Administrator response: Use a supported browser. Supported browser versions are documented in the online help.

GVM2012E At least one virtual machine that you have selected for restore to alternate location already exists in the Datacenter, so restore is not allowed. To restore to an alternate location when the destination virtual machine already exists, select only one virtual machine for the restore operation and choose a new name for the destination virtual machine. Duplicated VM: *VM name*

Explanation: When restoring to an alternate location, the destination virtual machine must not already exist.

Administrator response: Use the single virtual machine restore wizard so that you can rename the destination virtual machine.

GVM2012W Target datastore not found, select a different destination datastore.

GVM2013E The user *User Name* is not authorized to any managed datacenters. Contact your system administrator.

GVM2014E You do not have required permissions to view virtual machines for this Event.

GVM2015E You do not have required permissions to view restore points for this virtual machine.

GVM2016E You do not have required permissions to view some attached points.

GVM2017E You do not have required permissions to view restore points for this datastore.

GVM2018E You do not have required permissions to detach for the restore point.

GVM2019E An error occurred processing user permissions. Contact your system administrator.

GVM2020I Some datacenters are not shown due to permissions requirements.

GVM2021E You do not have permissions to cancel this task.

GVM2022I The task is still in the starting state, please refresh the task and try the cancel again.

GVM2025E An error occurred while writing to the flrConfig.props configuration file.

Explanation: The flrConfig.props file contains configuration options for file level restore processing. Possible reasons for this error include the following situations: The flrConfig.props file is not in the IBM Tivoli Data Protection for VMware installation directory. The flrConfig.props file is write-protected.

Administrator response: Verify that the file exists in the IBM Tivoli Data Protection for VMware installation directory and that the file is not write-protected.

GVM2026E The local mount proxy node pair cannot be removed while the file level restore feature is enabled.

Explanation: File level restore processing requires a local mount proxy node.

Administrator response: Disable the file level restore feature. Then, choose whether you want to remove the mount proxy node pair.

GVM2027E An error occurred while reading the flrConfig.props configuration file.

Explanation: The flrConfig.props file contains configuration options for file level restore processing. The file cannot be read. A common reason for this error is that the file is read-protected.

Administrator response: Verify that the file is not read-protected.

GVM2030W The specified user does not have sufficient permissions to access the following data centers: *list of data centers*. **Click OK to continue or cancel to enter another user name.**

Explanation: The user credentials that you use to authenticate to the vCenter Server must have the correct privileges to access the VMware datacenters.

Administrator response: Verify that you have the correct privileges. See the vCenter Server credentials online help page to see the privileges that are required.

GVM2031I The specified user has sufficient permissions to access the following data centers: *list of data centers*. **Click OK to continue or cancel to enter another user name.**

Explanation: The user credentials that you use to authenticate to the vCenter Server must have the correct privileges to access the VMware datacenters.

Administrator response: Verify that you have the correct privileges. See the vCenter Server credentials online help page to see the privileges that are required.

GVM2032W The specified user does not have sufficient permissions to access any data center. Click OK to continue or cancel to enter another user name.

Explanation: The user credentials that you use to authenticate to the vCenter Server must have the correct privileges to access the VMware datacenters.

Administrator response: Verify that you have the correct privileges. See the vCenter Server credentials online help page to see the privileges that are required.

GVM2132E An error occurred when connecting to the IBM Tivoli Storage Manager server *server name*. **Either your admin ID or password is not valid, or the TCPPORT number was entered in the admin port field instead of the TCPADMINPORT or SSLTCPADMINPORT number.**

Explanation: See message.

Administrator response: Launch the Configuration Editor from the Configuration Tab and enter a valid ID or password for your IBM Tivoli Storage Manager Server.

GVM2133E The password for the administrative user ID *admin id* **expired on the IBM Tivoli Storage Manager server** *server name*.

Explanation: Your IBM Tivoli Storage Manager administrative password has expired.

Administrator response: Contact your IBM Tivoli Storage Manager Server administrator to reset the password for the administrative user ID.

GVM2134E The IBM Tivoli Storage Manager server port number *tcp port* **is incorrect. The expected value for this port is** *tcp port from query*, **which is the value of the TCPPORT option. Please enter the expected value using the configuration wizard.**

Explanation: The value entered in the IBM Tivoli Storage Manager server port field must match the TCPPORT option on the IBM Tivoli Storage Manager server.

Administrator response: Use the configuration wizard to change the IBM Tivoli Storage Manager server port field to the correct value.

GVM2135E This schedule contains an unsupported option so it cannot be edited. This situation can occur when the schedule was created or updated by a tool other than the Data Protection for VMware GUI.

GVM2136E An error occurred while processing a VMCLI command, and the GUI session will be closed. Log in and try the operation again. If the problem persists, contact your administrator.

GVM3000E Windows domain credentials are incorrect. Open the Configuration Editor, go to File Restore page, and try entering the credentials again.

Explanation: The Windows domain credentials that was entered on the File Restore page in the Configuration Editor is incorrect.

Administrator response: Run the Configuration Editor again and re-enter the correct Windows domain credentials.

GVM4001E This action cannot be peformed because there is not a VMCLI node defined. To resolve, use the configuration wizard to define the VMCLI node and complete the other steps in the wizard.

GVM4002E This action cannot be peformed because there is not a vCloud Director node defined. To resolve, use the configuration wizard to define the vCloud Director node and complete the other steps in the wizard.

GVM4003E This action cannot be peformed because the connection to the TSM Server is not operational. Correct the connection problem, and retry this action.

GVM4004E This task requires use of the provider VDC node *provider VDC node name* **from TSM, but this node is not mapped to a known provider VDC in the vCloud Director. This task may not be updated, instead create a new task without dependence on this provider VDC.**

GVM4005E The Organization VDCs listed below were selected but are not configured to the TSM server. You must remove these selections in order to execute this action. *org VDC name*

GVM4006I Your current UI role does not allow you to view node details.

Appendix D. Tivoli Storage Manager recovery agent messages

This information contains explanations and suggested actions for messages issued by the Tivoli Storage Manager recovery agent.

FBP0001E The Recovery Agent is already running.

Explanation: This issue is encountered when multiple users are logged on to the system and attempting to run the Recovery Agent. Only one active Recovery Agent instance is supported.

System action: The Recovery Agent was not started.

User response: To resolve this issue, close the current Recovery Agent instance or start the Recovery Agent on a different system.

FBP0002E The Tivoli Storage Manager server connection cannot be removed.

Explanation: There are currently active instant restore sessions or mounted volumes that require the connection to the Tivoli Storage Manager server. As a result, the existing connection cannot be removed.

System action: The remove connection operation is canceled.

User response: To resolve this issue, wait until the instant restore sessions complete. Or, forcibly end the instant restore sessions or mounted volumes and then disconnect the Tivoli Storage Manager server.

FBP0003E 'Authentication node' and 'Target node' cannot specify the same node.

Explanation: Three node authentication methods are available to access snapshots on the Tivoli Storage Manager server: 'Asnodename' authenticates with a proxy node, 'Fromnode' authenticates with a node that contains limited access, and 'Direct' authenticates directly. When 'Fromnode' or 'Asnodename' are selected, a target node must be specified. The target node is the Tivoli Storage Manager node where the virtual machine backups are located.

System action: The system waits for a user response.

User response: Specify the correct 'Authentication node' and 'Target node'. See information about the node authentication methods in the product documentation.

FBP0004E Recovery Agent failed to mount.

Explanation: The mount operation on the Windows Recovery Agent proxy host failed.

System action: The operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs for information about why the mount operation failed.

FBP0005E RAID mirror status was not obtained.

Explanation: During the instant restore session, the Recovery Agent failed to obtain the status of the mdadm mirror device.

System action: An attempt to recover the instant restore session is being made.

User response: Check the instant restore status in the Recovery Agent GUI and the Recovery Agent engine logs for solutions to this problem.

FBP0006E Incorrect parameters were specified during the Recovery Agent mount operation.

Explanation: The mount operation on the Windows Recovery Agent proxy host failed because incorrect parameters were specified.

System action: The operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs for information about why the mount operation failed.

FBP0007E The selected snapshot is already mounted.

Explanation: The Windows Recovery Agent proxy host identified the selected snapshot as already mounted to the requested target.

System action: None.

User response: The instant restore session or mounted snapshot is available for use.

FBP0010E Failed to dismount.

Explanation: The dismount operation on the Windows Recovery Agent proxy host failed.

System action: The operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs for information about why the dismount operation failed.

FBP0011E The node data was not retrieved.

Explanation: The Windows Recovery Agent proxy host failed to retrieve the node data when querying the Tivoli Storage Manager server.

System action: The operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs for information about why the querying operation failed.

FBP0012E Tivoli Storage Manager server snapshots were not found.

Explanation: The Windows Recovery Agent proxy host failed to expose the snapshots on the specified Tivoli Storage Manger server.

System action: The operation is canceled.

User response: Verify that the correct Tivoli Storage Manager server and node that own the snapshots are specified.

FBP0013E The snapshot was not found. Click 'Refresh'.

Explanation: The selected snapshot was not found on the Tivoli Storage Manager server.

System action: The operation is canceled.

User response: Click Refresh in the Recovery Agent GUI to load the current snapshots on the Tivoli Storage Manager server.

FBP0016E Invalid parameters were specified.

Explanation: The mount operation on the Windows Recovery Agent proxy host failed.

System action: The operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs for information about why the mount operation failed.

FBP0017E The mdadm version is not supported.

Explanation: The installed version of the mdadm utility on the Linux machine is not supported.

System action: The operation is canceled.

User response: Upgrade the mdadm utility on your Recovery Agent Linux machine to a supported version. For current software requirements, see technote 1505139.

FBP0018E The mdadm utility was not found.

Explanation: The mdadm utility is not installed on the Linux machine.

System action: The operation is canceled.

User response: Install the mdadm utility on your Recovery Agent Linux machine. For current software requirements, see technote 1505139.

FBP0019E The iscsiadm version is not supported.

Explanation: The installed version of the iscsiadm utility (for Recovery Agent on RedHat Linux machines) or open-iscsi (for Recovery Agent on SUSE Linux machines) is not supported.

System action: The operation is canceled.

User response: Upgrade the iscsiadm or open-iscsi utility on your Recovery Agent Linux machine to a supported version. For current software requirements, see technote 1505139.

FBP0020E The iscsiadm utility was not found.

Explanation: The iscsiadm utility is not installed on the Linux machine.

System action: The operation is canceled.

User response: Install the iscsiadm utility on your Recovery Agent Linux machine. For current software requirements, see technote 1505139.

FBP0021E The lsscsi version is not supported.

Explanation: The installed version of the lsscsi utility is not supported.

System action: The operation is canceled.

User response: Upgrade the lsscsi utility on your Recovery Agent Linux machine to a supported version. For current software requirements, see technote 1505139.

FBP0022E The lsscsi utility was not found.

Explanation: The lsscsi utility is not installed on the Linux machine.

System action: The operation is canceled.

User response: Install the lsscsi utility on your Recovery Agent Linux machine. For current software requirements, see technote 1505139.

FBP0023E The Secure Shell (SSH) version is not supported.

Explanation: The installed version of the SSH client is not supported.

System action: The operation is canceled.

User response: Upgrade the SSH client on your Recovery Agent Linux machine to a supported version. For current software requirements, see technote 1505139.

FBP0024E The Secure Shell (SSH) was not found.

Explanation: The SSH client is not installed on the Linux machine.

System action: The operation is canceled.

User response: Install the SSH client on your Recovery Agent Linux machine. For current software requirements, see technote 1505139.

FBP0025E Not all instant restore sessions were stopped.

Explanation: The Recovery Agent was unable to stop all instant restore sessions.

System action: Some of the instant restore sessions are still visible in the Recovery Agent 'Instant Restore' panel.

User response: Try stopping the instant restore sessions one after the other. If the problem persists, check the Linux Recovery Agent engine log file. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf. Also check the Windows Recovery Agent proxy host logs for any errors related to this issue.

FBP0026E Failed to read instant restore session.

Explanation: The Recovery Agent was unable to read the instant restore status file.

System action: Information about the instant restore is not available.

User response: Try restarting the instant restore session. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0027E Mount session already exists.

Explanation: The selected snapshot is already mounted to the requested target.

System action: None.

User response: The instant restore session or mounted snapshot is available for use.

FBP0028E Failed to create the mount sessions directory.

Explanation: The Recovery Agent was unable to create the directory for the mount operation.

System action: The operation is canceled.

User response: Try the mount operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0029E Failed to encrypt node credentials.

Explanation: The Recovery Agent was unable to encrypt the node credentials.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0030E Failed to decrypt node credentials.

Explanation: The Recovery Agent was unable to decrypt the node credentials.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0031E Failed to remove mount session.

Explanation: The Recovery agent was unable to delete the mount status file.

System action: The mounted snapshot remain in the Recovery Agent 'Mounted Volumes' panel.

User response: Try unmounting the mounted snapshot again. If the problem persists, check the Linux Recovery Agent engine log file. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf for more information. Also check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0032E Instant restore session already exists.

Explanation: A similar instant restore session already exists or a similar instant restore status file exists.

System action: The new instant restore session is canceled.

User response: Check the Linux Recovery Agent engine log file for more information. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0033E Failed to create the instant restore sessions directory.

Explanation: The Recovery Agent was unable to create the directory for the instant restore operation.

System action: The instant restore operation is canceled.

User response: Try the instant restore operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0034E Failed to remove the instant restore session.

Explanation: The Recovery Agent was unable to delete the instant restore status file.

System action: The instant restore session remains in the Recovery Agent 'Instant Restore' panel.

User response: Try stopping the instant restore session again. If the problem persists, check the Linux Recovery Agent engine log file. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf for more information. Also check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0035E Failed to read from the configuration file that is used for mount and instant restore operations.

Explanation: The Recovery Agent was unable to read the configuration file.

System action: Information about the mount or instant restore is not available.

User response: Try the operation again. If the problem persists check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0036E Failed to write to the configuration file that is used for mount and instant restore operations.

Explanation: The Recovery Agent was unable to write to the configuration file.

System action: Information about the mount or instant restore is not available.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0037E Failed to read from the configuration file section that is used for mount and instant restore operations.

Explanation: The Recovery Agent was unable to read the configuration file.

System action: Information about the mount or instant restore is not available.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0038E Failed to write to the configuration file section that is used for mount and instant restore operations.

Explanation: The Recovery Agent was unable to write to the configuration file.

System action: Information about the mount or instant restore is not available.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0039E Failed to unmount. Device is busy.

Explanation: The Recovery Agent was not able to unmount the file system of the selected mounted snapshot because the file system is in use.

System action: The unmount operation is canceled.

User response: Close any application that might be accessing this volume. Then, try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0040E Not all mount sessions were unmounted.

Explanation: The Recovery Agent did not unmount all mounted snapshots.

System action: Some of the mounted snapshots sessions are still visible in the Recovery Agent 'Mounted Volumes' panel.

User response: Try to unmount the mounted snapshots one after the other. If the problem persists check the Linux Recovery Agent engine log file. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0041E Failed to retrieve data from the Recovery Agent CLI.

Explanation: The Recovery Agent was unable to read the Recovery Agent CLI (TDPVMWareShell) output file.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0042E Failed to parse data from the Recovery Agent CLI.

Explanation: The Recovery Agent was unable to parse the data from the Recovery Agent CLI (TDPVMWareShell) output file.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux Recovery Agent engine log file. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0043E Failed to create query for the Recovery Agent CLI.

Explanation: The Recovery Agent was unable to create the Recovery Agent CLI (TDPVMWareShell) output file.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0044E Failed to retrieve mount data from the Recovery Agent CLI.

Explanation: The Recovery Agent was unable to create the Recovery Agent CLI (TDPVMWareShell) output file.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0045E Failed to create mount query for the Recovery Agent CLI.

Explanation: None.

FBP0046E Failed to connect to the Recovery Agent CLI.

Explanation: The Linux Recovery Agent was unable to retrieve the Recovery Agent CLI (TDPVMWareShell) installation path from the registry on the Windows machine.

System action: The operation is canceled.

User response: Check the connectivity to the Windows machine, verify that the SSH is configured correctly, and that the user defined on Cygwin has administrative privileges. For more information, see the product documentation.

FBP0047E Failed to create the mount directory.

Explanation: The Recovery Agent was unable to locate or create the directory for the mount operation.

System action: The mount operation is canceled.

User response: Try the mount operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0048E Failed to mount the file system of the snapshot.

Explanation: The Recovery Agent succeeded connecting to the mounted snapshot iSCSI device. However, the Recovery Agent was unable to mount the file system of the snapshot.

System action: The mount operation failed. The Recovery Agent automatically attempts to mount the file system every 5 minutes.

User response: Since the mounted snapshot is available as an iSCSI device, attempt to mount the file system of the device. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0049E Failed to set the SSH server address.

Explanation: The Recovery Agent was unable to set the SSH server address. The specified server address might be incorrect.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux Recovery Agent engine log file for more information. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0050E Failed to set SSH user name.

Explanation: The Recovery Agent cannot access the Windows Recovery Agent CLI (TDPVMWareShell) using the defined 'SSH login' user.

System action: The operation is canceled.

User response: Using Secure Shell verify that you can connect to the Windows Recovery Agent CLI machine using the user defined under 'Settings'>'SSH login'.

FBP0051E Failed to run SSH command.

Explanation: None.

FBP0052E Failed to send query to the TDPVMware Shell.

Explanation: None.

FBP0053E Failed to send query to the Recovery Agent CLI.

Explanation: While using SSH, the Recovery Agent failed to send an input command file to the Windows Recovery Agent CLI (TDPVMWare Shell). This issue might be caused by an SSH user without read and write privileges on the Windows Recovery Agent CLI machine.

System action: The operation is canceled.

User response: Verify that the SSH user defined under 'Settings'>'SSH login' has read and write privileges on the Windows Recovery Agent CLI machine. Also check the Linux Recovery Agent engine log file for more information. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0056E Failed to locate the block device specified for the mount point.

Explanation: The Recovery Agent failed to locate the block device for the mount point that was specified for the instant restore operation.

System action: The instant restore operation is canceled.

User response: Verify that the mount point specified for the instant restore operation is correct.

FBP0057E Failed to locate the mount point for the specified block device.

Explanation: The Recovery Agent failed to locate the mount point for the specified instant restore block device.

System action: The instant restore operation is canceled.

User response: Verify that the specified block device for the instant restore operation is correct and mounted.

FBP0058E The specified mount point is not mounted on the block device.

Explanation: The specified mount point is not mounted on the specified block device.

System action: The instant restore operation is canceled.

User response: Verify that the specified mount point and block device are correct, and that the mount point is mounted on that block device.

FBP0059E Restore is not allowed to '/' or '/boot'.

Explanation: The Recovery Agent does not support instant restore operations to target devices that are '/' or '/boot' volumes.

System action: The instant restore operation is canceled.

User response: Specify a different target device for the instant restore operation.

FBP0060E Restore is not allowed to RAID devices.

Explanation: The Recovery Agent does not support instant restore operations to RAID devices.

System action: The instant restore operation is canceled.

User response: Specify a different target device for the instant restore operation.

FBP0061E The restore operation failed to start.

Explanation: The Recovery Agent failed to start the instant restore operation.

System action: The instant restore operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux Recovery Agent engine log file for more information. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0062E Failed to get the iSCSI initiator name.

Explanation: No iSCSI initiator was specified.

System action: The operation is canceled.

User response: Verify that the iSCSI initiator name is specified correctly.

FBP0063E iSCSI target is not logged in.

Explanation: None.

FBP0064E Failed to resolve the IP address to a hostname.

Explanation: The Recovery Agent failed to associate a hostname with the specified IP address.

System action: The operation is canceled.

User response: Verify that the IP or hostname are correct. Then, try the operation again. If the problem persists, check the Linux Recovery Agent engine log file for more information. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0065E The iSCSI service was not found.

Explanation: The iSCSI daemon is not installed on the Recovery Agent Linux machine.

System action: The operation is canceled.

User response: Install the required iSCSI daemon on the Recovery Agent Linux machine. See information about related iSCSI tasks in the product documentation.

FBP0066E Failed to start the iSCSI daemon.

Explanation: The Recovery Agent was unable to start the iSCSI daemon.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0067E Failed to discover iSCSI targets.

Explanation: The Recovery Agent was unable to discover the iSCSI targets.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0068E Failed to log in to the iSCSI target.

Explanation: The Recovery Agent was unable to log in to the iSCSI target.

System action: The operation is canceled.

User response: Check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0069E Failed to log out of the iSCSI target.

Explanation: The Recovery Agent was unable to log out of the iSCSI target.

System action: The operation is canceled.

User response: Check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0070E Failed to delete the iSCSI target.

Explanation: The Recovery Agent was unable to delete the iSCSI target.

System action: The operation is canceled.

User response: Check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0071E Failed to identify the block device for the iSCSI target.

Explanation: The Recovery Agent successfully logged in to the iSCSI target; however, the iSCSI block device was not found.

System action: The operation is canceled.

User response: Check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0072E Failed to create the RAID mirror device.

Explanation: The Recovery Agent was unable to create the RAID mirror device using the mdadm utility.

System action: The instant restore operation is canceled.

User response: Check the Linux system log (usually located at /var/log/messages) for any errors related to this issue.

FBP0073E Failed to stop the RAID mirror device.

Explanation: The Recovery Agent uses the mdadm utility to stop the RAID mirror device. However, the Recovery Agent was unable to stop the RAID mirror device.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent engine log file on the Linux machine for more details about why the device did not stop. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf. Also check the Linux system log (usually located at /var/log/messages).

FBP0074E Failed to add the target block device to the RAID mirror.

Explanation: The Recovery Agent uses the mdadm utility to add the target block device to the RAID mirror. However, the Recovery Agent was unable to add the target block device to the RAID mirror.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent engine log file on the Linux machine for more details about why the device was unable to add the target block device to the RAID mirror. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf. Also check the Linux system log (usually located at /var/log/messages).

FBP0075E Failed to mark the target block device in RAID mirror as faulty.

Explanation: The Recovery Agent uses the mdadm utility to mark the target block device in the RAID mirror. However, the Recovery Agent was unable to mark the target block device as faulty.

System action: The instant restore session is paused.

User response: Check the Recovery Agent engine log file on the Linux machine for more details about why the device was not marked. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf. Also check the Linux system log (usually located at /var/log/messages).

FBP0076E Failed to remove the target block device from the RAID mirror.

Explanation: The Recovery Agent uses the mdadm utility to remove the target block device from the RAID mirror. However, the Recovery Agent was unable to remove the target block device.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent engine log file on the Linux machine for more details about why the device was not removed. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf. Also check the Linux system log (usually located at /var/log/messages).

FBP0079E Unknown key.

Explanation: None.

FBP0080E The operation timed-out.

Explanation: The Recovery Agent engine scripts did not reply to the Recovery Agent GUI in a timely manner.

System action: The operation is canceled.

User response: Try the operation again. If the problem persists, check the Recovery Agent engine log file on the Linux machine. This file is usually located at /opt/tivoli/tsm/TDPVMWare/mount/engine/var/TSM4VE_IR_LOG_0040.sf.

FBP0081E Internal error.

Explanation: None.

FBP0083E The snapshot does not contain a partition with a supported file system.

Explanation: The Recovery Agent successfully parsed the partition structure of the disk. However, the partitions do not use any of these supported file systems: FAT, NTFS, EXT2, EXT3, EXT4, or ReiserFS. As a result, volume-level operations, such as 'Instant Restore' and 'Mount as Virtual Volume', are not supported for this snapshot.

System action: The operation is canceled.

User response: To restore data from the selected snapshot, use the Windows Recovery Agent proxy host to mount and expose the snapshot. See information about mounting as iSCSI targets in the product documentation.

FBP0084E Failed to retrieve partitions.

Explanation: The Windows Recovery Agent proxy host was unable to retrieve the partition list from the disk snapshot.

System action: The operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs about why the partition list was not retrieved.

FBP0085E Recovery Agent can connect only to a Tivoli Storage Manager server node.

Explanation: None.

FBP0086E Failed to remove the Tivoli Storage Manager server connection.

Explanation: The Windows Recovery Agent proxy host reported that there are active instant restore sessions or mounted volumes that require the connection to the Tivoli Storage Manager server. As a result, the existing connection cannot be removed.

System action: The remove connection operation is canceled.

User response: Check the Windows Recovery Agent proxy host logs about the active instant restore sessions or mounted volumes.

FBP0088E Mount operation failed because the Write cache is either full or configured incorrectly.

Explanation: Mount and instant restore sessions (that run on the Linux machine) access the Virtual Volume write cache on the Windows Recovery Agent proxy host . This proxy host reported that the write cache is unavailable.

System action: The operation is canceled.

User response: Check the log files on the Windows Recovery Agent proxy host for information about why the write cache is unavailable. Verify that the Virtual Volume write cache is configured correctly in the Windows Recovery Agent GUI. See information about setting the Virtual Volume write cache options in the product documentation.

FBP0089E The Recovery Agent GUI storage type option is 'Tape', and the requested media is busy.

Explanation: When the Recovery Agent GUI storage type option specifies 'Tape', only a single snapshot can be mounted.

System action: The operation is canceled.

User response: Dismount the currently mounted snapshot before you attempt to mount another snapshot.

FBP0090E Operation timed-out. Manual intervention might be required.

Explanation: The Linux Recovery Agent GUI operation timed-out during a mount or instant restore operation.

System action: The operation is canceled.

User response: Follow the "Responding to a timeout during a file restore or an instant restore (Linux)" procedure documented in the Data Protection for VMware Installation and User's Guide.

FBP0091E The selected disk is not an MBR disk.

Explanation: The Recovery Agent cannot parse the partition structure of the disk, because the disk is not a Basic, MBR-based disk. Volume-level operations, such as 'Instant Restore' and 'Mount as Virtual Volume', are not supported for this snapshot.

System action: Mount and instant restore operations are disabled.

User response: To restore data from the selected snapshot, use the Windows Recovery Agent proxy host to mount and expose the snapshot using 'Mount as iSCSI target' method.

FBP0092E Operation failed. Recovery Agent is initializing.

Explanation: Mount and instant restore operations cannot proceed when the Windows Recovery Agent proxy host is initializing.

System action: The mount or instant restore operation is canceled.

User response: Wait until the Windows Recovery Agent proxy host completes initializing. Then, try the operation again.

FBP0093E The mount point is already in use by another mount session.

Explanation: The mount operation failed because the target mount point is currently in use.

System action: The mount operation is canceled.

User response: Specify a target mount point that is not in use.

FBP0094E The mount point is already in use by another instant restore session.

Explanation: The instant restore operation failed because the target mount point is currently in use.

System action: The instant restore operation is canceled.

User response: Specify a target mount point that is not in use.

FBP1001I The folder:*folder path*does not exist. Do you want to create the folder?

Explanation: The selected folder does not exist. You can create the folder by proceeding with the instructions displayed on the screen.

System action: The system waits for a user response.

User response: Specify Yes to create the folder and continue with the operation. Specify No to not create the folder and end the current operation.

FBP1003I Specify a folder for the cache files

Explanation: A folder that is used to store the virtual disk and virtual volume cache files was not specified. The cache is used to store write operations to the virtual disk and virtual volume during the mount operation.

System action: The system waits for a user response.

User response: Specify a folder to store the virtual disk and virtual volume cache files.

FBP1005I *mount path* already has a mounted virtual volume.Do you want to dismount the volume before you continue?

Explanation: The selected path already has a mounted virtual volume. This existing mounted virtual volume must be dismounted to continue with the current mount operation.

System action: The system waits for a user response.

User response: Specify Yes to dismount the existing mounted virtual volume and continue with the current mount operation. Specify No to end the current mount operation.

FBP1008I Recovery Agent cannot be started because it is being used by another user

Explanation: The Recovery Agent application is already running on this machine. For example, this situation occurs when the application is started by another user on another session.

System action: The operation is canceled.

User response: Log in to the machine as the user that started the Recovery Agent application.

FBP1009I Recovery Agent cannot be closed while mounted volumes exist. Do you want to dismount all volumes?

Explanation: Existing mounted virtual volumes and virtual disks must be dismounted before closing the Recovery Agent application.

System action: The system waits for a user response.

User response: Specify Yes to dismount all the existing mounted virtual volumes and virtual disks and close the Recovery Agent application. Specify No to not dismount all the existing mounted virtual volumes and virtual disks and return to the Recovery Agent application.

FBP1011I The Virtual Volume Driver was registered successfully

Explanation: Successful Recovery Agent Virtual Volume Driver registration is required to use the mount function.

System action: Operation completed successfully.

User response: The Recovery Agent application is ready for operations.

FBP1013I Connection to Tivoli Storage Manager server resumed.

Explanation: Communication between the Recovery Agent application and the Tivoli Storage Manager server is established.

System action: Operation completed successfully.

User response: The Recovery Agent application is ready for operations.

FBP1014I You must restart the Recovery Agent application for changes to the Data Access options to take effect.

Explanation: Recent changes to the Data Access options cannot be implemented until the Recovery Agent application is restarted.

System action: The Recovery Agent application operates with the existing Data Access options setting until it is restarted.

User response: Restart the Recovery Agent application so that changes to the Data Access options are implemented.

FBP1100I Received CONTINUE from service manager

Explanation: The Recovery Agent service received a SERVICE_CONTROL_CONTINUE command.

System action: The Recovery Agent service resumes activities.&msgnl;The latest Recovery Agent driver events are written to the Recovery Agent log file.

User response: The Recovery Agent application is ready for operations.

FBP1101I Received PAUSE from service manager

Explanation: The Recovery Agent service received a SERVICE_CONTROL_PAUSE command.

System action: This command has no effect on the Recovery Agent service.

User response: The Recovery Agent application is ready for operations.

FBP1102I Received a STOP command from the service manager

Explanation: The Recovery Agent service received a SERVICE_CONTROL_STOP command. This message is issued when the service is stopped from the service manager. Opening the Recovery Agent GUI from the Start menu sends a stop command to the service.

System action: The Recovery Agent service stops.

User response: The Recovery Agent application is ready for operations.

FBP1103I Service stopped, reporting to service manager

Explanation: The Recovery Agent service stops. The service can be restarted from the service manager.

System action: The Recovery Agent application stops.

User response: No user action required.

FBP1104I --- Recovery Agent ***version string*** **started ---**

Explanation: The Recovery Agent application started. The version string is printed in the message.

System action: Operation completed successfully.

User response: The Recovery Agent application is ready for operations.

FBP1300I License is OK.

Explanation: The license file is valid.

System action: Operation completed successfully.

User response: The Recovery Agent application is ready for operations.

FBP1301W Not for resale license.

Explanation: The license file is valid.

System action: Operation completed successfully.

User response: The Recovery Agent application is ready for operations.

FBP1302E Error accessing license file.

Explanation: The license file could not be accessed. This situation occurs when the license file cannot be located, it cannot be opened because of permission restrictions, or the file is corrupted.

System action: The Recovery Agent application stops.

User response: Obtain a new license for the Recovery Agent application.

FBP1303E Corrupted license file.

Explanation: The license registration string is not valid.

System action: The Recovery Agent application stops.

User response: Obtain a new license for the Recovery Agent application.

FBP1304E Trial period has expired.

Explanation: The license registration string is not valid.

System action: The Recovery Agent application stops.

User response: Obtain a new license for the Recovery Agent application.

FBP1305I Try and buy license. days left.

Explanation: The license file is valid.

System action: Operation completed successfully.

User response: The Recovery Agent application is ready for operations.

FBP5003W *target volume* **: The repository is not loaded.Load the repository and resume the session.**

Explanation: The instant restore session is unable to resume since the Recovery Agent failed to reestablish connection to the Tivoli Storage Manager server where the backup snapshots are located.The restored volume is inaccessible while the session is paused.

System action: The instant restore session is paused.

User response: Click "Select TSM server" in the Recovery Agent GUI to connect to the Tivoli Storage Manager server and resume the instant restore session.

FBP5005W Windows indicates the destination volume *target volume* **might be a network-mapped drive. If volume** *target volume again* **is confirmed as a network-mapped drive, the operation fails. Continue anyway?**

Explanation: The Recovery Agent does not support instant restore sessions to a network-mapped drive.

System action: The instant restore session is canceled.

User response: Specify a destination volume that is not on a network-mapped drive.

FBP5007W Read block from the source has failedThe problem might have been caused by a network failure.See log file for more details.If the problem was caused by a network failure,correct the problem and resume the session.

Explanation: The instant restore session is unable to retrieve data from the Tivoli Storage Manager server. As a result, the instant restore session is paused.The problem might be caused by a network failure. The restored volume is inaccessble while the session is paused.

System action: The instant restore session is paused.

User response: Check the Recovery Agent logs for information regarding the cause of the problem. After resolving the issue, resume the session.

FBP5008W There are open handles to the volume being restored (*volume name***).Close any application (such as Windows Explorer or a command prompt) that might be accessing this volume and try again.If you select Ignore, applications using these handles might become unstable once the restore process begins.**

Explanation: The target volume for the restore is in use.Restoring a volume to a viewable storage volume involves overwriting data on that existing storage volume. After the restore begins, the current volume contents are permanently erased.

System action: The system waits for a user response.

User response: Close any application (such as Windows Explorer or a command prompt) that might be accessing this volume and try the operation again.If you select Ignore, applications that currently use these open handles might become unstable when the restore operation begins.

FBP5010W System is low on memory.Write operations to virtual volumes might be lost.

Explanation: Changes that are done on mounted volumes are written to memory. As a result, the Recovery Agent can use a large amount of RAM when it operates in read/write mode.

System action: Write operations to virtual volumes might be lost.

User response: Dismount some of the mounted volumes (when possible) or mount the volumes as read-only.The value of the 'Read Ahead cache size' option affects the memory usage. See information about setting this option in the product documentation.

FBP5011W Recovery Agent still has *number of mounted volumes* **volumes mounted. Stopping the Recovery Agent might cause the system to become unstable. Are you sure you want to stop the Recovery Agent?**

Explanation: Stopping the Recovery Agent without first dismounting the virtual volumes might cause both the system and active applications to become unstable.

System action: The system waits for a user response.

User response: Specify No to prevent the Recovery Agent from stopping, then dismount any mounted volumes.Specify Yes to stop the Recovery Agent, even though both the system and active applications might become unstable.

FBP5012W The Recovery Agent still has *number of active sessions* **active instant restore session. These sessions will be paused and the restored volumes will appear unformatted, until the Recovery Agent service restarts.Are you sure you want to stop the Recovery Agent?**

Explanation: Stopping the Recovery Agent without waiting for the restore to complete makes the restored volumes display as if they are unformatted. The restore process resumes when the Recovery Agent service restarts.

System action: The system waits for a user response.

User response: Specify No to prevent the Recovery Agent from stopping and to continue the instant restore session.Specify Yes to stop the Recovery Agent, even though the volumes that are still being processed display as if they are unformatted.Do not attempt to format these volumes as such an attempt causes data loss.

FBP5013W Abort selected sessions?All data is lost and volumes require reformatting.

Explanation: Aborting the instant restore sessions causes the loss of all data that was written to the restored volumes.The restored volumes display as unformatted and require reformatting.

System action: The system waits for a user response.

User response: Specify Yes to abort the instant restore sessions. All data that was written to the restored volumes during these sessions is lost.Specify No to continue the instant restore sessions.

FBP5015W All data on target drive *volume name* **will be lost. Note 1: Successful instant restore processing requires sufficient network connectivity and bandwidth to the repository. Note 2: Use of instant restore is recommended only for applications that primarily issue READ I/O's.Do you want to continue?**

Explanation: Instant restore processing overwrites data on the target storage volume.A sufficient data transfer rate from the Tivoli Storage Manager server is required for a successful instant restore operation.

System action: The system waits for a user response.

User response: Click YES to confirm that you understand the effects and to start the instant restore operation.

FBP5017W There are open files on the volume mounted on:*mounted volume name***.A forced dismount invalidates all of the open files.Are you sure you want to continue?**

Explanation: The virtual volume that is being dismounted is in use by another application. For example, the volume might be open in Windows Explorer. For virtual iSCSI devices, the iSCSI initiator is still logged on to the device.Forcing this volume to dismount might cause the files or applications that are accessing the volume to become unstable.

System action: The system waits for a user response.

User response: Identify and close any files or applications that are accessing the volume. Or, specify 'Continue' to ignore the warning message and continue dismounting the volume.For iSCSI devices, make sure that the iSCSI initiator is logged off the device.

FBP5018W The volume selected for restore is located on a clustered disk.See the product documentation for guidelines when restoring clustered volumes.Failure to follow these guidelines might result in data loss, if a hardware or Windows error occurs.Do you want to continue?

Explanation: Instant restore of a volume in a clustered environment is supported.Other volumes in the cluster are not affected. You can work with the cluster and with the restored volume in parallel.During the instant restore operation, the disk that is being restored cannot fail over if the node fails.

System action: The system waits for a user response.

User response: Specify YES to confirm that you understand the guidelines and to start the instant restore operation.

FBP5020W The Virtual Volume Driver is not yet registered. Recovery Agent can register the driver now. During registration, a Microsoft Windows Logo warning may be displayed. Accept this warning to allow the registration to complete.Do you want to register the Virtual Volume Driver now?

Explanation: User should register the Virtual Volume Driver in order to work with the Recovery Agent.This message is displayed following the first attempt to mount after a silence install, since the driver registration is not performed in silent install.

System action: The system waits for a user response.

User response: Specifying Yes will start the registration process. After registration the Recovery Agent application is ready for operations.

FBP5021W The mounted volume '*mounted volume name*' is in use.Dismounting the volume might cause the application that is using it to become unstable.Do you want to continue?

Explanation: The virtual volume that is being dismounted is in use by another application. For example, the volume might be open in Windows Explorer. For virtual iSCSI devices, the iSCSI initiator is still logged on to the device.

System action: The system waits for a user response.

User response: Identify and close any applications that are accessing the volume. Or, specify 'Continue' to ignore the warning message and continue dismounting the volume.For iSCSI devices, make sure that the iSCSI initiator is logged off the device.

FBP5023W There are active instant restore sessions.These sessions will be paused and the restored volumes will appear unformatted, until the application finishes loading and resumes the sessions.Do you want to continue?

Explanation: Opening the Recovery Agent UI from the 'Start>All Programs' menu stops the service.The active instant restore sessions are paused until the application finishes loading and resumes the sessions.

System action: The system waits for a user response.

User response: Specify Yes to stop the service and load the Recovery Agent UI. This action pauses and then resumes the instant restore sessions.Specify No to not load the Recovery Agent UI. This action leaves the instant restore sessions to run in the background in service mode.

FBP5025W There are '*num active sessions*' sessions using the write cache. Updates to the cache settings are processed when there are no active sessions that use the cache. Do you want to continue?

Explanation: Updates to the write cache settings were detected. These updates are applied when there are no active sessions that use the cache.

System action: The Recovery Agent application operates with the existing write cache settings.

User response: Update the write cache settings when there are no active sessions that use the cache.

FBP5026W The size of the write cache is *num write cache percentage*% full.

Explanation: Mount and instant restore sessions that run on a Linux machine use the Recovery Agent Virtual Volume write cache for write operations. The Cache size is approaching its maximum limit.Linux mount and instant restore sessions might fail when the cache size reaches its limit.

System action: None.

User response: Do not start a new Recovery Agent mount or instant restore session on the Linux machine until the Virtual Volume write 'Cache size' value decreases.See information about setting this option in the product documentation.

FBP5028W The file system of the selected partition (*partition format*) might not be supported by the current operating system.The appropriate File System driver must be installed for Windows to read the volume.Do you want to continue?

Explanation: The partition file system must be supported and recognized by the Windows operating system where the volume is mounted. This condition is required to view the file structure of the mounted partition..It is recommended to mount volumes with native Linux file systems on a Linux machine.

System action: The system waits for a user response.

User response: Make sure the appropriate file system driver is installed on the Windows operating system where the volume is mounted.

FBP5029W The connection to Tivoli Storage Manager server was lost.

Explanation: The connection between the Recovery Agent application and the Tivoli Storage Manager server was lost.

System action: Mounted volumes might become inaccessible. The instant restore sessions are paused.

User response: Check the Recovery Agent logs for information regarding the connection failure. After resolving the issue, resume any paused instant restore sessions.

FBP5030W No snapshots are available for the selected virtual machine. Or, the Authentication node is not authorized to restore this virtual machine.

Explanation: No snapshots were located for the selected virtual machine.Either no snapshot completed successfully, or if the 'From node' access method was used, the Authenticate node does not have permission to restore the selected virtual machine.

System action: The operation is canceled.

User response: If the 'From node' access method is used, make sure sufficient permissions are set for the Authetication node.See the product documentation for details and an example of how to set permissions by using the Tivoli Storage Manager Backup-Archive client 'set access' command.

FBP5031W Some snapshots are currently mounted. If you continue, these snapshots will be dismounted.If a mounted volume is currently being used by an application, the application might become unstable.Do you want to continue?

Explanation: Opening the Recovery Agent UI from the 'Start>All Programs' menu stops the service.The active mounted volumes are dismounted.

System action: The system waits for a user response.

User response: Close any application (such as Windows Explorer or a command prompt) that might be accessing the mounted volumes. Then, open the Recovery Agent UI.If you continue without closing the applications that are accessing the mounted volumes, these applications might become unstable.

FBP5032W The selected snapshot will not be protected from expiration during this operation. See the product documentation for information about expiration.

Explanation: When the 'From node' authentication method is used, the Authentication node is granted Read-only access to the target node with the 'set access' command. The target node owns the snapshot.As a result, the snapshot cannot be marked as being in use on the server. Therefore, the snapshot might expire while the restore operation is in progress.

System action: The system waits for a user response.

User response: If you proceed, disable the expiration process for the snapshot during the operation. Or, make sure that no snapshots are created for the restored machine during the restore operation.Otherwise, cancel the restore operation.

FBP5033W No snapshots exist in the selected node.

Explanation: Either no snapshot was completed, or the selected Tivoli Storage Manager node is not the node that owns the snapshots.

System action: No snapshot is shown.

User response: If Tivoli Storage Manager for Virtual Environments snapshots were completed, select the Tivoli Storage Manager node that owns the snapshots.

FBP5034W The snapshots are not protected from expiration during the mount operation. An expiration can produce unexpected results and negatively impact the mount point.

Explanation: The mounted snapshots will not be marked as being in use on the server. Therefore, the snapshots might expire while the restore operation is in progress.

System action: The system waits for a user response.

User response: If you proceed, make sure that no snapshots are created for the restored machines during the restore operations.Otherwise, enable the expiration protection.

FBP5035W The selected snapshot is not protected from expiration during this mount operation. An expiration can produce unexpected results and negatively impact the mount point.

Explanation: The mounted snapshot will not be marked as being in use on the server. Therefore, the snapshot might expire while the restore operation is in progress.

System action: The system waits for a user response.

User response: If you proceed, make sure that no snapshots are created for the restored machine during the restore operation.Otherwise, enable the expiration protection on the 'settings' panel and perform the operation again.

FBP7003E The folder:*folder name* is invalid.

Explanation: The specified path is not a valid folder path.

System action: The system waits for a user response.

User response: Specify a valid folder path.

FBP7004E The folder:*folder name* could not be created.

Explanation: The system failed to create the requested folder.

System action: The operation is canceled.

User response: Check the Recovery Agent logs for information about why the folder was not created.

FBP7005E *folder name* is not empty.Only empty folders can be used as a mount point.

Explanation: The system can mount a volume snapshot only to an empty folder.

System action: The operation is canceled.

User response: Specify an empty folder path.

FBP7006E snapshot size (*snapshot size*) is larger than target size (*partition name*)

Explanation: The volume size of the destination location must be equal to, or greater than, the size of the original volume on the snapshot to be restored.

System action: The instant restore operation is canceled.

User response: Specify a target volume with a size equal to, or greater than, the source volume on the snapshot to be restored.

FBP7007E A valid iSCSI target name must be specified. Valid iSCSI names consist of the following items: lower-case English characters, digits, '.', ':' and '-'.

Explanation: When a snapshot is exposed as an iSCSI target, a valid iSCSI target name must be entered.

System action: The system waits for a user response.

User response: Specify a valid iSCSI target name.

FBP7008E A valid iSCSI initiator name must be specified. Valid iSCSI names consist of the following items: lower-case English characters, digits, '.', ':' and '-'.

Explanation: The specified iSCSI initiator is not a valid initiator name. When a snapshot is exposed as an iSCSI target, a valid initiator name must be specified by the user.

System action: The system waits for a user response.

User response: Specify a valid iSCSI initiator name.

FBP7009E A valid folder name must be specified.

Explanation: The path to the folder is invalid or was not specified. The path to the mount point for the volume snapshot must include an empty folder.

System action: The system waits for a user response.

User response: Specify a valid path to an empty folder.

FBP7012E Already connected to a Tivoli Storage Manager server.To connect to a different server, or to a different node within the server, select the current server from the list and click 'Remove'.

Explanation: Recovery Agent can connect only to a single Tivoli Storage Manager server and node.

System action: The operation is canceled.

User response: Remove the existing connection by selecting the server from the list and click 'Remove'. You cannot remove a connection to a server that has active mounted volumes or instant restore sessions.

FBP7013E Instant restore is not supported in Tape Mode.

Explanation: Instant restore of snapshot data that is stored on tape is not supported.

System action: The operation is canceled.

User response: Either migrate the snapshot data to a disk storage pool, or use a different restore method.

FBP7014E Cannot mount more than one snapshot in Tape Mode.

Explanation: Only a single snapshot can be mounted when the snapshot data is stored on a tape.

System action: The operation is canceled.

User response: Dismount the currently mounted snapshot before you attempt to mount another snapshot.

FBP7015E No local volume is available as a destination for instant restore.

Explanation: Instant restore is done to a local volume that has a volume letter and is not the system volume.

System action: The operation is canceled.

User response: Make sure you have a local volume that has a volume letter and that is not the system volume as a destination for the instant restore.

FBP7016E The Recovery Agent 'Read Ahead size' option requires a value of 0 through 8192.

Explanation: The Recovery Agent 'Read Ahead size' value specifies the number of extra data blocks retrieved from the storage device after a read request is sent to a single block.

System action: The system waits for a user response.

User response: Specify a valid 'Read Ahead size' value of 0 through 8192. See information about setting this option in the product documentation.

FBP7017E The Recovery Agent 'Read Ahead cache size' option requires a value of 1000 through 75000. The value must also be at least 1 block larger than the value of the 'Read Ahead size' option.

Explanation: Recovery Agent 'Read Ahead cache size' value specifies the size of the cache where the 'Read Ahead' extra data blocks are stored.

System action: The system waits for a user response.

User response: Specify a valid 'Read Ahead cache size' value of 1000 through 75000 and at least 1 block larger than than the value of the 'Read Ahead size' option. See information about setting this option in the product documentation.

FBP7018E The Recovery Agent cannot read the snapshot data from the Tivoli Storage Manager server. Make sure that the storage type setting matches the actual storage device. For example, if the data resides on tape, make sure that the storage type is set to 'Tape'. If this does not solve the problem, check the Tivoli Storage Manager server activity log for additional errors.

Explanation: The required data does not exist on the server or the data is inaccessible.Inaccessible data is typically caused by a 'Storage type' configuration that does not match the actual storage where the data is stored. Recovery Agent cannot read data stored on Tape or VTL if storage type is set to 'Disk'.

System action: The operation is canceled.

User response: Click 'Settings' in the Recovery Agent GUI and select the correct storage device from which to mount the snapshot. You can select 'Disk/File', 'Tape', or 'VTL'. When the storage type is changed, you must restart the Recovery Agent for the changes to take effect. Also, check the Recovery Agent logs and the Tivoli Storage Manager server activity log for any additional errors.

FBP7019E The selected disk is not a basic disk with an MBR partition style.

Explanation: Recovery Agent could not parse the partition structure of the disk, because the disk is not a Basic, MBR-based disk. Volume-level operations, such as 'Instant Restore' and 'Mount as Virtual Volume', are not supported for this snapshot.

System action: Volume-level operations are disabled.

User response: Use other methods, such as 'Mount as iSCSI target', to restore data from the selected snapshot.

FBP7020E The partitions in the selected disk are not formatted with a supported file system.

Explanation: Recovery Agent successfully parsed the partition structure of the disk. However, none of the partitions use these supported file systems: FAT, NTFS, EXT2, EXT3, EXT4, or ReiserFS. As a result, volume-level operations, such as 'Instant Restore' and 'Mount as Virtual Volume', are not supported for this snapshot.

System action: Volume-level operations are disabled.

User response: Use other methods, such as 'Mount as iSCSI target', to restore data from the selected snapshot.

FBP7021E Select the node access method.

Explanation: Three node authentication methods are available to access snapshots on the Tivoli Storage Manager server: 'Asnodename' authenticates with a proxy node, 'Fromnode' authenticates with a node that contains limited access, and 'Direct' authenticates directly.

System action: The system waits for a user response.

User response: Specify the node authentication method to access the snapshots on the Tivoli Storage Manager Server. See information about these three methods in the product documentation.

FBP7022E You must specify a Tivoli Storage Manager server name or IP.

Explanation: Recovery Agent requires this information to access the virtual machines backup snapshots on the Tivoli Storage Manager Server.

System action: The system waits for a user response.

User response: Specify the host name or IP address of the Tivoli Storage Manager Server where the backup snapshots are located.

FBP7023E You must specify a valid Tivoli Storage Manager Server port.

Explanation: Recovery Agent requires this information to access the virtual machines backup snapshots on the Tivoli Storage Manager Server.

System action: The system waits for a user response.

User response: Specify the port number that is used by the Tivoli Storage Manager Server where the backup snapshots are located.

FBP7024E You must specify an authentication node.

Explanation: No authentication node was specified. Specify the Tivoli Storage Manager node that owns the snapshots.

System action: The system waits for a user response.

User response: Specify the Tivoli Storage Manager node that owns the snapshots. See information about the node authentication methods in the product documentation.

FBP7025E You must specify a target node.

Explanation: Recovery Agent provides three node authentication methods. When 'Fromnode' or 'Asnodename' are selected, a target node must be specified.The target node is the Tivoli Storage Manager node where the virtual machine backups are located.

System action: The system waits for a user response.

User response: Specify the target node where the virtual machine backups are located. See information about the node authentication methods in the product documentation.

FBP7026E You must specify a node password.

Explanation: No password was specified for the authentication node.

System action: The system waits for a user response.

User response: Enter the password of the Tivoli Storage Manager node that owns the virtual machine snapshots.

FBP7027E The Recovery Agent 'Driver timeout' option requires a value of 60 through 300.

Explanation: The Recovery Agent 'Driver timeout' option specifies the amount of time (in seconds) to process data requests from the file system driver. When processing does not complete within the specified time, the request is canceled and an error is returned to the file system driver.

System action: The system waits for a user response.

User response: Specify a valid 'Driver timeout' value of 60 through 300. See information about setting this option in the product documentation.

FBP7028E The Recovery Agent 'Write cache size' option requires a value of 1 through ***upper limit***

Explanation: During Linux instant restore and mount operations, the Recovery Agent on the Windows backup proxy host saves data changes in the write cache folder.The maximum cache size is 90% of the available space for the selected folder.

System action: The system waits for a user response.

User response: Specify a valid Virtual Volume write 'Cache size' value. See information about setting this option in the product documentation.

FBP7029E The Recovery Agent CLI mount command is missing one or more required parameters.

Explanation: The Recovery Agent CLI mount command cannot complete without all required parameters.

System action: The operation is canceled.

User response: Issue the 'RecoveryAgentShell.exe -h mount' (Windows) or 'RecoveryAgentShell -h mount dump' (Linux) command to view the required parameters. Then, issue the mount command again with all required parameters.

FBP7030E Repository '*repository name*' was not found

Explanation: The Tivoli Storage Manager Server connection specified in the Recovery Agent '-rep' tag was not found.

System action: The operation is canceled.

User response: Correct the Recovery Agent CLI command '-rep' tag to identify the Tivoli Storage Manager Server where the backup snapshots are located.

FBP7031E A valid iSCSI target name must be specified. Valid iSCSI names consist of the following items: lower-case English characters, digits, '.', ':' and '-'.

Explanation: When a snapshot is exposed as an iSCSI target, a valid iSCSI target name must be entered.

System action: The operation is canceled.

User response: Specify a valid iSCSI target name.

FBP7032E Mount target '*mount target*' is not valid.

Explanation: The specified mount path is not a valid folder path.

System action: The operation is canceled.

User response: Specify a valid folder path.

FBP7033E Reparse point '*reparse point*' was not found and cannot be created

Explanation: The specified mount target path was not found and cannot be created.

System action: The operation is canceled.

User response: Specify a valid folder path.

FBP7035E Failed to load partition '*partition*'

Explanation: The Recovery Agent was unable to retrieve the partition list from the disk snapshot.

System action: The operation is canceled.

User response: Check the Recovery Agent logs for information about why the partition list was not retrieved.

FBP7036E Incorrect partition number '*partition number*'

Explanation: The specified partition was not found on the disk snapshot.

System action: The operation is canceled.

User response: Specify a valid partition number.

FBP7037E 'Cache size' must be at least 1GB.

Explanation: Mount and instant restore sessions that run on a Linux machine use the Recovery Agent Cache for write operations.

System action: The system waits for a user response.

User response: Specify a valid size for the 'Write Cache' size field. 'Cache size' must be at least 1GB.

FBP7038E The value of the Recovery Agent write 'Cache size' option must not exceed *max size in GB*GB

Explanation: During Linux instant restore and mount operations, the Recovery Agent on the Windows backup proxy host saves data changes in the write cache folder.The maximum cache size is 90% of the available space for the selected folder.

System action: Linux mount and instant restore sessions might fail when the cache size reaches its limit.

User response: Do not start a new Recovery Agent mount or instant restore session on the Linux machine until the Virtual Volume write 'Cache size' value decreases.See information about setting this option in the product documentation.

FBP8001E resume failed

Explanation: The instant restore session is unable to resume. As a result, the instant restore session pauses.The restored volume is inaccessible while the session is paused.

System action: The instant restore session pauses.

User response: Check the Recovery Agent logs for information about why the resume failed. After the issue is resolved, resume the session.

FBP8002E failed to mount because of too many mount points

Explanation: The Recovery Agent supports a maximum of 128 simultaneously mounted snapshots. That maximum was exceeded.

System action: The mounting operation is canceled.

User response: Dismount at least one of the currently mounted snapshots before an attempt to mount another snapshot.

FBP8003E failed to dismount *mounted volume name*

Explanation: The Recovery Agent failed to dismount the mounted snapshot.This issue might be caused by a disconnection from the Tivoli Storage Manager server that owns the snapshots.

System action: The dismount operation is canceled.

User response: Check the Recovery Agent logs for information about why the dismount operation failed.

FBP8004E failed to load *repository name*

Explanation: The Recovery Agent failed to expose the snapshots of the specified Tivoli Storage Manager server.

System action: The operation is canceled.

User response: Verify that the correct Tivoli Storage Manager server and node that own the snapshots are specified.

FBP8007E Virtual Volume Driver not enabled

Explanation: Mount operations require a working Recovery Agent Virtual Volume Driver.

System action: The mount operations are canceled.

User response: Check the Recovery Agent logs for information about why the Virtual Volume Driver is not enabled.

FBP8008E snapshot not found.

Explanation: The selected snapshot was not found on the Tivoli Storage Manager server.

System action: The operation is canceled.

User response: Click Refresh in the Recovery Agent GUI to load the current snapshots on the Tivoli Storage Manager server.

FBP8009E already mounted

Explanation: The selected snapshot was already mounted to the requested target.

System action: None.

User response: The mounted snapshot is available for use.

FBP8012E target is a network-mapped drive

Explanation: Mounting snapshots to a network-mapped drive is not supported.

System action: The mount operation is canceled.

User response: Specify a target drive that is not on a network-mapped drive.

FBP8015E volume letter is in use. Select another

Explanation: The selected drive letter for the mount operation is in use.

System action: The mount operation is canceled.

User response: Select a target drive letter that is not in use.

FBP8016E failed to mount

Explanation: The Recovery Agent failed to complete the mount operation.

System action: The mount operation is canceled.

User response: Check the Recovery Agent logs for information about why the mount operation failed to complete.

FBP8019E failed to stop

Explanation: The current request to abort the selected instant restore session failed because the Recovery Agent could not locate the selected session.

System action: None.

User response: The abort request for the instant restore session was already done.

FBP8020E failed to finalize the session

Explanation: The product encountered an internal error when it attempted to finalize the instant restore session.

System action: The operation is canceled.

User response: Check the Recovery Agent logs for information about why the session did not finalize.

FBP8023E target partition is too small

Explanation: The volume size of the destination location must be equal to, or greater than, the size of the original volume on the snapshot to be restored.

System action: The instant restore operation is canceled.

User response: Specify a target volume with a size equal to, or greater than, the source volume on the snapshot to be restored.

FBP8024E load repository *repository name* **failed:** *error message*

Explanation: The Recovery Agent failed to expose the snapshots of the specified Tivoli Storage Manger server.

System action: The operation is canceled.

User response: Verify that the correct Tivoli Storage Manager server and Node that own the snapshots are specified.

FBP8025E repository inaccessible. Dismounting volume

Explanation: The Recovery Agent is unable to retrieve data from the Tivoli Storage Manager server. As a result, the currently mounted snapshots are dismounted.

System action: Mounted snapshots are dismounted.

User response: Check the Recovery Agent logs for information about why the repository is inaccessible.

FBP8026E '*path to repository***' inaccessible or not a repository**

Explanation: The Recovery Agent failed to expose the snapshots of the specified Tivoli Storage Manger server.

System action: The operation is canceled.

User response: Verify that the correct Tivoli Storage Manager server and Node that own the snapshots are specified.

FBP8027E failed to open repository

Explanation: The Recovery Agent failed to expose the snapshots of the specified Tivoli Storage Manger server.

System action: The operation is canceled.

User response: Verify that the correct Tivoli Storage Manager server and Node that own the snapshots are specified.

FBP8029E session stopped by user

Explanation: The user requested to abort the instant restore session.Aborting the instant restore sessions causes all data that was written to the restored volume to be lost.

System action: The instant restore session ends.

User response: The restored volume is shown as unformatted and requires reformatting.

FBP8031E Exclusive access to the mounted snapshot was not obtained on the Tivoli Storage Manager server.

Explanation: An exclusive access to the snapshot data on the Tivoli Storage Manager server could not be obtained. As a result, the version being restored could expire, leading to inability to complete the restore. Failure to obtain exclusive access is often the result of the snapshot data residing on a target replication server.

System action: The mount operation is canceled.

User response: If expiration protection is enabled, check the status of the target Tivoli Storage Manager server. If the target server is the replication server in failover mode, or if you verified no snapshots are running on the primary server, disable expiration protection. Then, try the operation again. If expiration protection was disabled when this error occurred, visit the IBM Support Portal for additional information at http://www.ibm.com/support/entry/portal/.

FBP8032E failed to unmount volume

Explanation: The target volume for the restore operation is in use. As a result, the instant restore operation did not start. Restoring a volume to a viewable storage volume involves overwriting data on that existing storage volume. After the restore session begins, the data on the existing volume is permanently erased.

System action: The instant restore session is canceled.

User response: Close any application (such as Windows Explorer or a command prompt) that might be accessing this volume. Then, try the operation again.

FBP8033E failed to restore blocks

Explanation: The instant restore operation is either unable to retrieve data from the Tivoli Storage Manager server or unable to write data to the target volume.

System action: The instant restore session ends.

User response: Check the Recovery Agent logs for information about why the blocks failed to restore. The restored volumes display as unformatted and require reformatting.

FBP8034E failed to mount volume

Explanation: The Recovery Agent failed to mount the target volume and start the instant restore operation.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent logs for information regarding why the target volume could not be mounted.

FBP8036E Failed to finalize

Explanation: The Recovery Agent failed to finalize the instant restore session.

System action: The instant restore session is canceled.

User response: Check the Recovery Agent logs for information about the cause of the problem. The restored volumes might display as unformatted and require reformatting.

FBP8037E initialization failed. See logs for the reason

Explanation: The Recovery Agent failed to initialize the instant restore operation.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent logs for information about the cause of the problem.

FBP8041E cannot restore to a dynamic disk

Explanation: Instant restore to a dynamic volume is not supported.

System action: The instant restore operation is canceled.

User response: Select a basic volume as the instant restore target. Then, try the operation again.

FBP8042E cannot restore to clustered disk

Explanation: Instant restore of a volume in a clustered environment is supported. However, the user canceled the restore to a volume in a clustered environment.

System action: The instant restore operation is canceled.

User response: Select a different volume as the instant restore target. Then, try the operation again.

FBP8043E failed to create bitmap

Explanation: The Recovery Agent failed to create the required internal data structure for the instant restore operation.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent logs for information about why the data structure was not created.

FBP8044E failed to scramble first block

Explanation: The Recovery Agent failed to overwrite the first sector of the disk.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent logs for information about why the overwrite to disk failed.

FBP8045E failed to notify driver

Explanation: The Recovery Agent failed to notify the kernel driver regarding the start of the instant restore session.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent logs for information about why the driver was not notified.

FBP8046E failed to unscramble first block

Explanation: The Recovery Agent failed to overwrite the first sector of the disk.

System action: The instant restore session ends.

User response: Check the Recovery Agent logs for information about why the overwrite to disk failed. The restored volumes might display as unformatted and require reformatting.

FBP8047E cannot restore to a FAT volume. Format target volume as NTFS

Explanation: Instant restore to a volume formatted as an FAT32 file system is not supported.

System action: The instant restore operation is canceled.

User response: Format the volume as an NTFS file system. Then, try the operation again.

FBP8048E session not responding

Explanation: The instant restore session did not respond to the abort request within 5 minutes. As a result, the instant restore session was forcibly stopped.

System action: The instant restore session ends.

User response: Check the Recovery Agent logs for information about why the Recovery Agent did not respond to the abort request. The restored volumes might display as unformatted and require reformatting.

FBP8050E failed to create first block file

Explanation: The Recovery Agent failed to create a memory-mapped file for the instant restore session.

System action: The instant restore operation is canceled.

User response: Check the Recovery Agent logs for information regarding why the memory-mapped file was not created.

FBP8051E cannot restore to disk with signature '0'

Explanation: Instant restore in not supported for disks without an MBR disk signature.

System action: The instant restore operation is canceled.

User response: Select an instant restore target volume on an MBR disk that contains a disk signature.

FBP8052E Recovery Agent is currently initializing.

Explanation: Mount and instant restore operations cannot proceed when the Recovery Agent is initializing.

System action: The mount or instant restore operation is canceled.

User response: Wait until the Recovery Agent completes initializing. Then, try the operation again.

FBP8053E failed to read data from server

Explanation: The Recovery Agent failed to expose the snapshots of the specified Tivoli Storage Manger server.

System action: The operation is canceled.

User response: Verify that the correct Tivoli Storage Manager server and Node that own the snapshots are specified. Check the Recovery Agent logs for more information.

FBP9000E failed connecting to a kernel driver

Explanation: Instant restore operations require a working Recovery Agent kernel driver.

System action: The instant restore operations are canceled.

User response: Check the Recovery Agent logs for information about why the Recovery Agent failed to connect to the driver.

FBP9001E Incompatible Virtual Volume Driver (FBVV) Version , expecting *expected major version***.***expected minor version* **, installed** *installed major version***.***installed minor version*

Explanation: The kernel driver version does not match the Recovery Agent version. A valid driver is required for the Recovery Agent to work properly.

System action: The Recovery Agent application closes.

User response: The Recovery Agent was not installed correctly. Follow the Recovery Agent installation instructions in the product documentation.

FBP9002E Cannot initialize Windows Sockets.

Explanation: The Recovery Agent failed to initialize the Windows Sockets DLL file.

System action: The Recovery Agent application closes.

User response: Check the Windows events logs for errors related to this issue. Also check the Recovery Agent logs for information about why the Windows Sockets DLL file failed to initialize.

FBP9003E Cannot obtain the application data directory path

Explanation: The Recovery Agent was unable to retrieve the application data directory path from the operating system.

System action: The Recovery Agent application closes.

User response: Check the Windows events log for errors related to this issue. Also check the Recovery Agent logs for information about why the Recovery Agent was unable to obtain the application data directory path.

FBP9004E Cannot create directory *directory name*

Explanation: The Recovery Agent failed to create the application data directory.

System action: The Recovery Agent application closes.

User response: Check the Windows events logs for any errors. Check the Recovery Agent logs for information about why the Recovery Agent failed to create the application data directory.

FBP9005E failed to initialize *module name* **module**

Explanation: The Recovery Agent failed to initialize.

System action: The Recovery Agent application closes.

User response: Check the Recovery Agent logs for information about why the Recovery Agent failed to initialize.

FBP9006E another instance of Recovery Agent is already running

Explanation: Only one active Recovery Agent instance is supported. This issue is encountered when multiple users are logged on to the system and attempting to run the Recovery Agent.

System action: The Recovery Agent is not started.

User response: Either close the current Recovery Agent instance or run the Recovery Agent on a different system.

FBP9007E unable to install the Recovery Agent

Explanation: The Recovery Agent failed to install. A valid installation is required for the Recovery Agent to function properly.

System action: The Recovery Agent is not started.

User response: Follow the Recovery Agent installation instructions in the product documentation.

FBP9008E Cannot get folder name for AFS.dll

FBP9009E Registration of Virtual Volume Driver failed .Check the file *file name***\\installFBVV.log for more information Do you want to retry registering the Virtual Volume Driver?**

Explanation: The Virtual Volume Driver must be registered correctly in order for the Recovery Agent to function correctly.

System action: The system waits for a user response.

User response: >Check the Recovery Agent logs for information about why the Recovery Agent failed to register the driver.Click 'Retry' to make another attempt to register the driver or click 'Cancel' to end the operation.

FBP9010E Write Cache is full.

Explanation: Mount and instant restore sessions that run on a Linux machine use the Recovery Agent Virtual Volume write cache for write operations. Linux mount and instant restore sessions might fail when the cache size reaches its limit.

System action: Write operations to the Linux instant restore and virtual volumes might be lost.

User response: Unmount some of the mounted volumes on the Linux machine to make available space in the write cache. Instant restore volumes on the Linux machine might display as unformatted. When the cache is full, all data that is written to the Linux instant restore volumes is lost.

Appendix E. Accessibility features for the Tivoli Storage Manager product family

Accessibility features help users who have a disability, such as restricted mobility or limited vision to use information technology products successfully.

Accessibility features

The IBM Tivoli Storage Manager family of products includes the following accessibility features:

- Keyboard-only operation using standard operating-system conventions
- Interfaces that support assistive technology such as screen readers

The command-line interfaces of all products in the product family are accessible.

Tivoli Storage Manager Operations Center provides the following additional accessibility features when you use it with a Mozilla Firefox browser on a Microsoft Windows system:

- Screen magnifiers and content zooming
- High contrast mode

The Operations Center and the Tivoli Storage Manager server can be installed in console mode, which is accessible.

The Operations Center help system is enabled for accessibility. For more information, click the question mark icon on the help system menu bar.

Vendor software

The Tivoli Storage Manager product family includes certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

IBM and accessibility

See the IBM Human Ability and Accessibility Center (http://www.ibm.com/able) for information about the commitment that IBM has to accessibility.

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Glossary

A glossary is available with terms and definitions for the IBM Tivoli Storage Manager family of products.

See Tivoli Storage Manager glossary.

To view glossaries for other IBM products, see IBM Terminology.

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